Health Indicators 2013: Definitions, Data Sources and Rationale, May 2013

Statistics Canada
Statistique Canada

Canadian Institute for Health Information
Institut canadien d'information sur la santé

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Our Mandate

To lead the development and maintenance of comprehensive and integrated health information that enables sound policy and effective health system management that improve health and health care.

Our Values

Respect, Integrity, Collaboration, Excellence, Innovation

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Preface

This document describes the methodology used to calculate the health indicators produced by the Canadian Institute for Health Information (CIHI) and is applicable to the most recent release of indicator data. The methodology used for these indicators was designed to maximize inter-regional comparability given the characteristics of available national data sets. For this reason, there may be differences between definitions, data sources and extraction procedures used in some local, regional or provincial/territorial reports when compared to those described here. In addition, discrepancies may exist due to ongoing updates to databases. Data presented in *Health Indicators* publications includes the latest updates available at the time of indicator calculation.

Indicators are calculated for provinces and territories as well as for health regions. Health regions are defined by provincial governments as areas of responsibility for regional health boards (that is, legislated) or as regions of interest to health care authorities.

Health regions with a population of at least 50,000 are featured both in the *Health Indicators* report and e-publication. In addition, selected indicators for health regions with a population ranging from 20,000 to 50,000 are reported in the *Health Indicators* e-publication.

General Methodology Notes

Health Region Assignment

- To determine what health region a patient belongs to, a patient's postal code at the time of hospitalization is first mapped to census geography using Statistics Canada's Postal Code Conversion File (Vintage May 2011) and then to a health region using another Statistics Canada product, *Health Regions: Boundaries and Correspondence With Census Geography*.
- Health region–level analyses do not include records with invalid, missing or partial postal codes.
- Non-Canadian residents are excluded from the rates. They are identified by a mini–postal code relating to one of the U.S. states or by a postal code value indicating out-of-country residents.

Neighbourhood Income Quintiles

- Patients were assigned neighbourhood-level income quintiles using the Statistics Canada Postal Code Conversion File Plus (PCCF+, version 5J). By using this program, the postal code of a patient's place of residence at the time of hospitalization was mapped to the smallest geographical unit available for analysis in the 2006 Canadian Census—the dissemination area (DA)—and the corresponding neighbourhood income quintile of that DA was assigned to the patient. See Appendix I for detailed methodology on neighbourhood income quintile assignment.
- Patients from DAs without income information cannot be assigned to a neighbourhood income quintile and therefore cannot be included in disparity measure analyses.

Population Estimates

- Population estimates are used as denominators for all population-based indicators (expressed as rates per 100,000 population or 10,000 population).
- Population estimates used in this report for health regions are preliminary post-censal estimates for July 1, 2011. These are based on the latest census, adjusted for census net under-coverage and incompletely enumerated Indian reserves, and on administrative sources on births, deaths and migration. Population estimates by health region are derived from the Census Division population estimates, which are produced using the components method and are produced by the Demography Division at Statistics Canada, except for the British Columbia estimates and the Quebec preliminary estimates. Population estimates for health regions in B.C. were provided by BC Stats. Population estimates for health regions in Quebec were derived from census division population estimates provided by the Institut de la statistique du Québec. Population estimates are based on the boundaries in effect as of October 2011 (see Statistics Canada, Demography Division, CANSIM Table 109-5325).
- Population counts by neighbourhood income quintile were estimated based on DA-level population counts from the 2001 and 2006 censuses. Detailed methodology is available upon request. Due to missing income information for about 3% of DAs in both the 2001 Census and 2006 Census, the population estimates used for income quintile analysis are usually smaller than the provincial population estimates provided by Statistics Canada.

Hospitalization Data and Rates

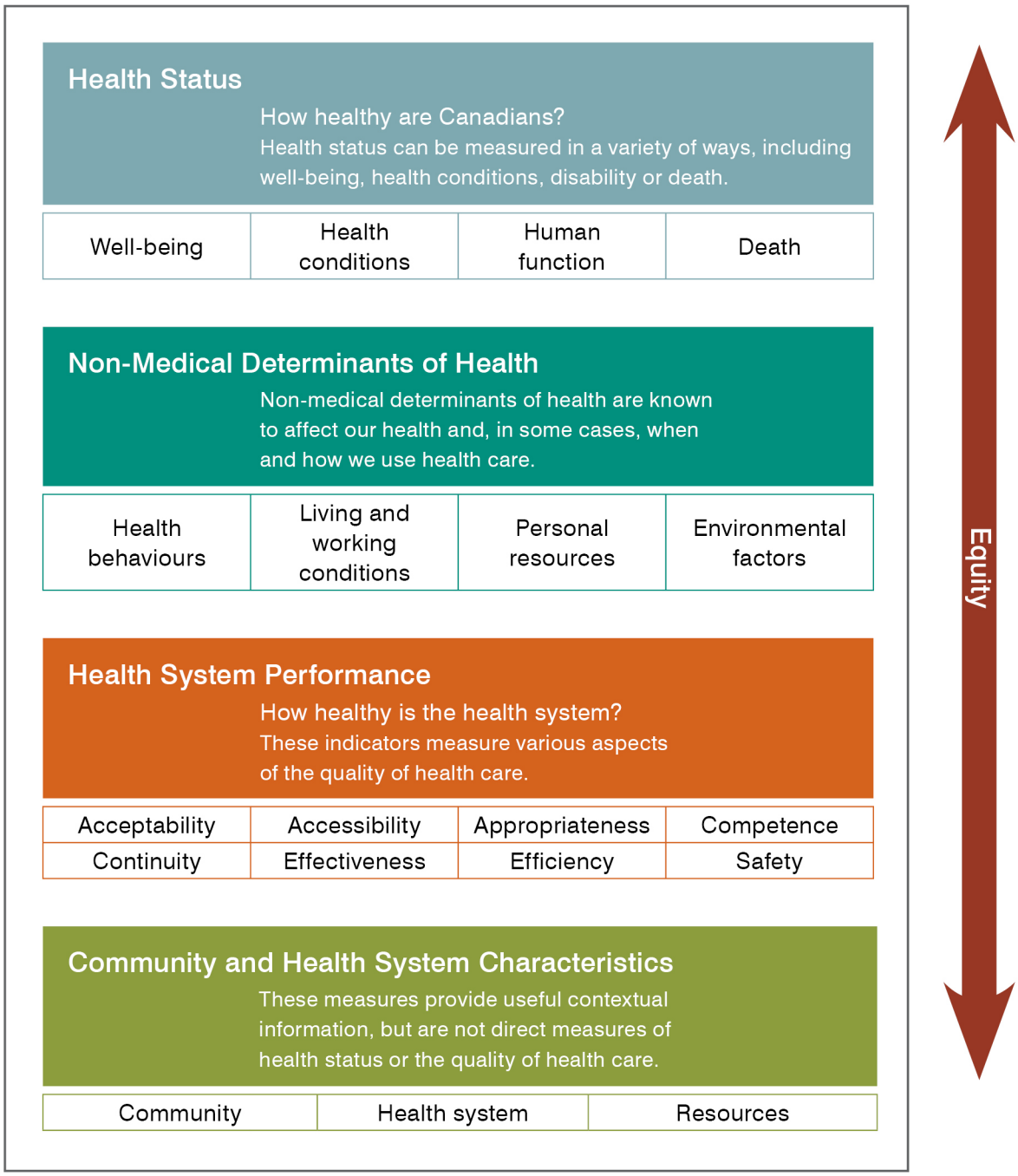
- Unless otherwise specified, data is reported based on the region of the patient's residence, not region of hospitalization. Consequently, these figures reflect the hospitalization experience of residents of the region wherever they are treated, including out of province, as opposed to the comprehensive activity of the region's hospitals (that will also treat people from outside of the region). Hospitalizations occurring in the U.S. or abroad are not included.
- Rates are standardized or risk-adjusted wherever possible to facilitate comparability across provinces/regions and over time.
- Standardized rates are adjusted by age (collapsed to five-year groupings) using a direct method of standardization based on the July 1, 1991, Canadian population as follows:

Age (in Years)	Standard Population, Canada, July 1, 1991	Age (in Years)	Standard Population, Canada, July 1, 1991
<1	403,061	**45–49**	1,674,153
1–4	1,550,285	**50–54**	1,339,902
5–9	1,953,045	**55–59**	1,238,441
10–14	1,913,115	**60–64**	1,190,217
15–19	1,926,090	**65–69**	1,084,588
20–24	2,109,452	**70–74**	834,024
25–29	2,529,239	**75–79**	622,221
30–34	2,598,289	**80–84**	382,303
35–39	2,344,872	**85–89**	192,410
40–44	2,138,891	**90+**	95,467

Source
Statistics Canada, *Causes of Death 1997, Appendix 3* (Ottawa, Ont.: Statistics Canada, 1997), catalogue no. 82-221-x.

- Unless otherwise specified, hospitalizations include discharges and deaths for inpatients in acute care hospitals for the reference period. Same-day surgery (outpatient) cases are included in several indicators (see indicator definitions for exceptions). Patients admitted to non–acute care hospitals (such as chronic care, psychiatric and rehabilitation facilities) are generally not included in the totals.
- For the mental health–related indicators (30-day readmission for mental illness [MI], repeat hospitalizations for MI, MI hospitalization, MI patient days and self-injury hospitalization), the population of interest includes discharges from general hospitals. Same-day surgery visits are included if they are part of an inpatient episode of care. Thus, all free-standing psychiatric hospitals identified by owners of the database used were not included. For the Discharge Abstract Database (DAD), these include all institutions identified as analytical institution type 5; for hospitalization data from Quebec (MED-ÉCHO), these include all "centres hospitaliers de soins psychiatriques." A list of psychiatric hospitals in the Ontario Mental Health Reporting System (OMHRS) was provided by the OMHRS program area at CIHI. Specialized acute services can be provided in general hospitals or psychiatric hospitals, and service delivery may differ slightly across jurisdictions. Therefore, interjurisdictional comparisons should be done with caution.
- For indicators that include data from OMHRS, OHMRS data that is available up until September of the next fiscal year is used. For example, rates for 2011–2012 include OMHRS data submitted to CIHI up until September 2012.
- To ensure interprovincial comparability of indicators, diagnosis codes representing diabetes without complications (E10.9, E11.9, E13.9, E14.9) were recoded to diabetes with complications as per the Canadian coding standards on applicable records for Quebec MED-ÉCHO data. Details are available upon request.
- Wherever information is available, procedures that have been performed out of hospital and procedures abandoned after onset are excluded from the calculations.

Health Indicator Framework



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1.0 Health Status

Health Conditions

1.1 Injury Hospitalization Rate

Definition

Age-standardized rate of acute care hospitalization due to injury resulting from the transfer of energy (excluding poisoning and other non-traumatic injuries), per 100,000 population.

Method of Calculation

(Total number of hospitalizations due to injury/total mid-year population) × 100,000 (age adjusted)

Injury is identified by the first occurrence of the following external cause of injury codes with a diagnosis type of 9:

ICD-9

E800–E807, E810–E838, E840–E848, E880–E888, E890–E902, E906–E910, E913–E928, E953–E958, E960–E961, E963–E968, E970–E976, E978, E983–E988, E990–E998

ICD-10-CA

V01–V06, V09–V99, W00–W45, W46, W49–W60, W64–W70, W73–W77, W81, W83–W94, W99, X00–X06, X08–X19, X30–X39, X50, X52, X58, X59, X70–X84, X86, X91–X99, Y00–Y05, Y07–Y09, Y20–Y36

Interpretation

This indicator contributes to an understanding of the adequacy and effectiveness of injury prevention efforts, including public education, product development and use, community and road design, and prevention and treatment resources.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Sources

National Trauma Registry (NTR), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Poisoning, adverse effects of drugs/medicine, choking, late effects and several other conditions do not meet the definition of trauma developed by the National Trauma Registry Advisory Committee and are therefore excluded. Newborns are also excluded.

Rates are not comparable with those appearing in the NTR annual report due to differences in the method of assigning cases to geography. The NTR data reflects region of hospitalization, while the indicator rates are based on region of residence.

1.2 Hospitalized Acute Myocardial Infarction Event Rate

Definition

Age-standardized rate of new acute myocardial infarction (AMI) events admitted to an acute care hospital, per 100,000 population age 20 and older. A new event is defined as a first-ever hospitalization for an AMI or a recurrent hospitalized AMI occurring more than 28 days after the admission for the previous event in the reference period.

Method of Calculation

(Total number of new AMI events for persons age 20 and older/total mid-year population age 20 and older) × 100,000 (age-adjusted)

Numerator inclusion criteria:

1. AMI present on admission
   ICD-10-CA: I21, I22 coded as diagnosis type (1) or [type (M), (W), (X) or (Y), but not also as a diagnosis type (2)]
2. Age at admission 20 years and older
3. Sex recorded as male or female
4. Admission to an acute care institution
5. Canadian resident

Numerator exclusion criteria:

1. Records with an invalid health card number or date of birth
2. Records with an invalid admission date
3. AMI admissions within 28 days after the admission date of the previous AMI hospitalization
4. Transfers[i]

i. If a subsequent AMI admission occurs on the same day as or prior to the discharge date of a previous AMI admission, it is considered a transfer.

Interpretation

AMI is one of the leading causes of morbidity and death. Measuring its occurrence in the population is important for planning and evaluating preventive strategies, allocating health resources and estimating costs. From a disease surveillance perspective, there are three groups of AMI events: non-diagnosed events, fatal events occurring outside the hospital and those admitted to acute care hospitals. Although AMIs admitted to a hospital do not reflect all AMIs in the community, this information provides a useful and timely estimate of the disease occurrence in the population.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Sources

Discharge Abstract Database (DAD), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

This indicator includes all new hospitalized AMI events in the reference period, encompassing first-ever and recurrent AMIs. A person may have more than one AMI event in the reference period. AMI events not admitted to an acute care hospital and in-hospital AMIs are not included in this indicator.

Myocardial infarction is labelled as acute when it has a stated duration of four weeks (28 days) or less in ICD-10-CA and eight weeks or less in ICD-9/ICD-9-CM. Therefore, a 28-day period to define a new AMI event is applicable only to the records coded in ICD-10-CA.

Bibliography

Heart and Stroke Foundation of Canada. *The Growing Burden of Heart Disease and Stroke in Canada 2003*. Ottawa, Ont.: Heart and Stroke Foundation of Canada, 2003.

Manuel, D. G. et al. “How Many People Have Had a Myocardial Infarction? Prevalence Estimated Using Historical Hospital Data.” *BMC Public Health* 7 (2007): p. 174.

1.3 Hospitalized Stroke Event Rate

Definition

Age-standardized rate of new stroke events admitted to an acute care hospital, per 100,000 population age 20 and older. A new event is defined as a first-ever hospitalization for stroke or a recurrent hospitalized stroke occurring more than 28 days after the admission for the previous event in the reference period.

Method of Calculation

(Total number of new stroke events for persons age 20 and older/total mid-year population age 20 and older) × 100,000 (age-adjusted)

Numerator inclusion criteria:

1. Stroke present on admission
   ICD-10-CA: I60–I64; ICD-9-CM: 430–432, 433–434 with **fifth** digit of 1, 436 coded as diagnosis type (1) or [type (M), (W), (X) or (Y), but not also as a diagnosis type (2)]
2. Age at admission 20 years and older
3. Sex recorded as male or female
4. Admission to an acute care institution
5. Canadian resident

Numerator exclusion criteria:

1. Records with an invalid health card number or date of birth
2. Records with an invalid admission date
3. Stroke admissions within 28 days after the admission date of the previous stroke hospitalization
4. Transfers[ii]

Interpretation

Stroke is one of the leading causes of long-term disability and death. Measuring its occurrence in the population is important for planning and evaluating preventive strategies, allocating health resources and estimating costs. From a disease surveillance perspective, there are three groups of strokes: fatal events occurring out of the hospital, non-fatal stokes managed outside acute care hospitals and those admitted to an acute care facility. Although strokes admitted to a hospital do not reflect all stroke events in the community, this information provides a useful and timely estimate of the disease occurrence in the population.

ii. If a subsequent stroke admission occurs on the same day as or prior to the discharge date of a previous stroke admission, it is considered a transfer.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Source

Discharge Abstract Database (DAD), CIHI

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories, except Quebec. Rates for Quebec are not available due to differences in data collection.

Comments

This indicator includes all new hospitalized stroke events in the reference period, encompassing first-ever and recurrent strokes. A person may have more than one stroke event in the reference period. Stroke events not admitted to an acute care hospital and in-hospital strokes are not included in this indicator.

Note that identification of strokes resulting from occlusion of pre-cerebral arteries, included in this indicator, is not possible in the ICD-9 coding system.

Bibliography

Heart and Stroke Foundation of Canada. *The Growing Burden of Heart Disease and Stroke in Canada 2003*. Ottawa, Ont.: Heart and Stroke Foundation of Canada, 2003.

Johansen, H. L. et al. “Incidence, Comorbidity, Case Fatality and Readmission of Hospitalized Stroke Patients in Canada.” *Canadian Journal of Cardiology* 22 (2006): pp. 65–71.

Truelsen, T., R. Bonita and K. Jamrozik. “Surveillance of Stroke: A Global Perspective.” *International Journal of Epidemiology* Suppl. 1 (2001): pp. S11–S16.

World Health Organization. *WHO STEPS Stroke Manual: The WHO STEPwise Approach to Stroke Surveillance*. Geneva, Switzerland: WHO, 2006.

Deaths

1.4 Premature Mortality

Definitions

Premature mortality rate: Age-standardized rate of premature deaths per 100,000 population. Premature deaths are those that occur among individuals younger than age 75.

Potential years of life lost (PYLL): Age-standardized rate of PYLL per 100,000 population. PYLL is the number of years of potential life not lived when a person dies before age 75.

Method of Calculation

Premature mortality rate:

(Total number of deaths at age younger than 75/total mid-year population younger than age 75) × 100,000 (age adjusted)

Potential Years of Life Lost (PYLL):

(The sum of differences between 75 and age of death[iii]/total mid-year population younger than age 75) × 100,000 (age adjusted)

Interpretation

Premature mortality is an indicator of population health. It reflects deaths at younger ages and can be used to guide efforts on health promotion and disease prevention.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Source

Vital Statistics—Death Database, Statistics Canada.

Reference Period

Rates are based on three years of pooled data: January 1, 2007, to December 31, 2009.

Comprehensiveness

Available for all provinces and territories.

iii. The PYLL values for each of the five-year age groups are available at www.statcan.gc.ca/pub/82-221-x/2011002/quality-qualite/qua2-eng.htm#a229.

2.0 Health System Performance

Accessibility

2.1 Wait Time for Hip Fracture Surgery

Definition

Proportion with surgery within 48 hours: The risk-adjusted proportion of hip fractures that were surgically treated within 48 hours of patient's admission to hospital, among patients age 65 and older.

Method of Calculation

Denominator: The number of hip fractures among patients age 65 and older that were surgically treated in an acute care hospital.

Numerator: A subset of the denominator and represents the number of hip fractures that were surgically treated within 48 hours.

Wait time is measured from the date/time of the first admission with hip fracture (index admission) to the date/time when hip fracture surgery was received.

Refer to the Technical Notes (Appendix II) for the case selection and inclusion/exclusion criteria.

A logistic regression model was fitted with age, sex and selected pre-admission comorbid diagnoses (heart failure, ischemic heart disease, hypertension, chronic obstructive pulmonary disease, diabetes with complications and cardiac dysrhythmia) as independent variables, modelling the probability of having hip fracture surgery within 48 hours. Coefficients derived from the logistic model were used to calculate the probability for each case. The expected number of patients in a region is the sum of these case probabilities for that region. The risk-adjusted proportion was calculated by dividing the observed number by the expected number of cases and multiplying by the Canadian average. A 95% confidence interval was also calculated; the method used to calculate confidence intervals is available upon request. Refer to the Model Specifications (Appendix III) for a list of variables entered in the model and coefficient values.

Interpretation

Operative delay in older patients with hip fracture is associated with a higher risk of post-operative complications and mortality. Wait time for surgery following hip fracture provides a measure of access to care. The wait time may be influenced by comorbid conditions, hospital transfers and practice differences related to certain types of medications, like blood thinners. However, longer waits may indicate lack of resources, physician unavailability and/or other issues related to access to care.

Standards/Benchmarks

A benchmark of hip fracture fixation within 48 hours was set by federal, provincial and territorial governments in December 2005.

Data Source

Discharge Abstract Database (DAD), CIHI

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories, except Quebec. Rates for Quebec are not available due to differences in data collection.

Comments

Beginning with 2009–2010 data, information on procedure start time is available in the DAD; therefore, the proportion of hip fracture patients receiving surgery within 48 hours can be calculated. Prior to that, the indicator was calculated in days rather than hours.

A person can have more than one hip fracture and one repair in the reference period; therefore, a person can be included in the indicator more than once.

Note: Due to differences in methodology, this indicator may differ from similar indicators developed and reported by jurisdictions.

Bibliography

Bergeron, E. et al. “Is the Delay to Surgery for Isolated Hip Fracture Predictive of Outcome in Efficient Systems?” *The Journal of Trauma* 60 (2006): pp. 753–757.

Canadian Institute for Health Information. *Health Indicators 2007*. Ottawa, Ont.: CIHI, 2007.

Canadian Institute for Health Information. *Waiting for Heath Care in Canada: What We Know and What We Don’t Know*. Ottawa, Ont.: CIHI, 2006.

Health Canada. *Final Report of the Federal Advisor on Wait Times*. Ottawa, Ont.: Health Canada, 2006.

Ministry of Health and Long-Term Care. *First Common Benchmarks Will Allow Canadians to Measure Progress in Reducing Wait Times* (press release). Toronto, Ont.: MOHLTC, December 12, 2005. Accessed from <http://news.ontario.ca/archive/en/2005/12/12/First-ever-common-benchmarks-will-allow-Canadians-to-measure-progress-in-reducin.html>.

Vidal, E. I. et al. “Hip Fracture in the Elderly: Does Counting Time From Fracture to Surgery or From Hospital Admission to Surgery Matter When Studying In-Hospital Mortality?” *Osteoporosis International* 20 (2009): pp. 723–729.

Weller, I. et al. “The Effect of Hospital Type and Surgical Delay on Mortality After Surgery for Hip Fracture.” *Journal of Bone and Joint Surgery*. *British Volume* 87 (2005): pp. 361–366.

Appropriateness

2.2 Caesarean Section Rate

Definition

Proportion of women delivering babies in acute care hospitals by Caesarean section.

Method of Calculation

(Number of Caesarean sections／number of deliveries [live births and stillbirths]) × 100

Denominator (Delivery)

Inclusion:
Delivery coded in any diagnosis field:

ICD-9

641–676 with a fifth digit of 1 or 2; 650 or V27

ICD-10-CA

O10–O16, O21–O29, O30–O37, O40–O46, O48, O60–O69, O70–O75, O85–O89, O90–O92, O95, O98, O99 with a sixth digit of 1 or 2; or Z37

Exclusion:
Delivery in which an abortive procedure[iv] was recorded:

CCP

78.52, 86.3, 86.4, 87.0, 87.1 or 87.2

CCI

5.CA.88^^, 5.CA.89^^ or 5.CA.93^^

Numerator (Caesarean Section)

The numerator is a subset of the denominator. Caesarean section is identified as any of the following procedure codes:[iv]

iv. Code may be recorded in any position. Procedures coded as out of hospital and abandoned after onset are excluded.

CCP

86.0–86.2, 86.8 or 86.9

CCI

5.MD.60^^

Interpretation

Caesarean section rates provide information on the frequency of surgical birth delivery relative to all modes of birth delivery. Since Caesarean section delivery increases maternal morbidity/mortality and is associated with higher costs, Caesarean section rates are often used to monitor clinical practices, with an implicit assumption that lower rates indicate more appropriate, as well as more efficient, care.

Standards/Benchmarks

Guidelines defining the appropriate indications for Caesarean section are available.

Data Sources

Discharge Abstract Database (DAD), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Prior to the 2001–2002 rate, deliveries were based on adjusted newborn counts. Beginning with the 2002–2003 rate, stillbirths are included in the delivery count. Prior to that, stillbirths were excluded.

Bibliography

Canadian Institute for Health Information. *Giving Birth in Canada: A Regional Profile*. Ottawa, Ont.: CIHI, 2004.

Canadian Institute for Health Information. *Giving Birth in Canada: Regional Trends From 2001–2002 to 2005–2006*. Ottawa, Ont.: CIHI, 2007.

Joseph, K. S. et al. "Determinants of Pre-Term Birth Rates in Canada From 1981 Through 1983 and From 1992 Through 1994." *New England Journal of Medicine* 339 (1998): pp. 1434–1439.

Liu, S. et al. "Recent Trends in Caesarean Delivery Rates and Indications for Caesarean Delivery in Canada." *Journal of Obstetrics and Gynaecology Canada* 26 (2004): pp. 735–742.

Liu, S. et al. "Risk of Maternal Postpartum Readmission Associated With Mode of Delivery." *Obstetrics and Gynecology* 105 (2005): pp. 836–842.

National Collaborating Centre for Women's and Children's Health. *Caesarean Section* (clinical guidelines). London, U.K.: RCOG Press, 2004. Accessed December 14, 2010, from <www.nice.org.uk/nicemedia/live/13620/57162/57162.pdf>.

Shearer, E. L. "Cesarean Section: Medical Benefits and Costs." *Social Science & Medicine* 37 (1993): pp. 1223–1231.

2.3 Percentage of Patients With Repeat Hospitalizations for a Mental Illness

Definition

Risk-adjusted percentage of individuals that had three or more episodes of care for a selected mental illness[v] over all those who had at least one episode of care for a selected mental illness in general hospitals[vi] within a given year. An episode of care refers to all contiguous hospitalizations and same-day surgery visits in general hospitals.

Method of Calculation

$$\frac{\text{Total number of individuals who had at least three episodes of care for a selected mental illness over a year}}{\text{Total number of individuals with at least one episode of care for a selected mental illness over a year}} \times 100$$

Refer to the Technical Notes (Appendix II) for the episode building and case selection criteria.

A logistic regression model was fitted with age, sex, type of mental illness and discharged against medical advice or did not return from a pass (yes/no) as independent variables. These factors were captured on the index episode of care. Coefficients derived from the logistic model were used to calculate the probability of repeat hospitalizations for each patient. The expected

v. The mental illnesses selected for this indicator are substance-related disorders; schizophrenia, delusional and non-organic psychotic disorders; mood/affective disorders; anxiety disorders; and selected disorders of adult personality and behaviour.

vi. Refer to the General Methodology Notes section for more information.

number of repeat hospitalizations for a region is the sum of these probabilities in that region. The risk-adjusted percentage was calculated by dividing the observed number of repeat hospitalizations in each region by the expected number of repeat hospitalizations in the region and multiplying by the Canadian average repeat hospitalizations percentage. A 95% confidence interval was also calculated; the method used to calculate confidence intervals is available upon request. Refer to the Model Specifications (Appendix III) for a list of variables entered in the model and coefficient values.

Interpretation

This indicator is considered an indirect measure of appropriateness of care, since the need for frequent admission to hospital depends on the person and the type of illness. Challenges in getting appropriate care/support in the community and/or the appropriate medication often lead to frequent hospitalizations. Variations in this indicator across jurisdictions may reflect differences in the services that help individuals with mental illness remain in the community for a longer period of time without the need for hospitalization.[1]

This indicator may help to identify a population of frequent users, and further investigations could provide a description of the characteristics of this group. Understanding this population can aid in developing/enhancing programs that may prevent the need for frequent rehospitalization.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Sources

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Ontario Mental Health Reporting System (OMHRS),[vii] CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2010, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Each individual has a 12-month follow-up after his or her first episode of care in a given year. Repeat hospitalizations over a 12-month period can occur at more than one facility.

vii. In Ontario, facilities are mandated to submit data on discharges from adult designated mental health beds to OMHRS. As a result, inpatient cases from Ontario are extracted from both the DAD and OMHRS. Note that only general hospitals are included (that is, specialty mental health facilities are excluded).

When building episodes of care, the exclusion of psychiatric hospitals might introduce a bias. It is possible that the wrong discharge date might be used to track repeat hospitalizations, or two hospitalizations that belong to the same episode might be erroneously attributed to two different episodes. Further analyses demonstrated that this bias is minimal and does not affect the indicator results.

Reference

1. E. Lin et al., *Hospital Report Card: Mental Health 2007 Briefing Pages*, accessed from <http://www.oha.com/KnowledgeCentre/Library/HospitalReports/Documents/Hospital%20Reports%202007/Mental%20Health.pdf>.

Continuity

2.4 30-Day Mental Illness Readmission Rate

Definition

Risk-adjusted rate of readmission following discharge for a mental illness. A case is counted as a readmission if it is for a selected mental illness diagnosis[viii] and if it occurs within 30 days of the index episode of inpatient care. An episode of care refers to all contiguous hospitalizations and same-day surgery visits in general hospitals.[ix]

Method of Calculation

$$\frac{\text{Total number of episodes with a 30-day readmission for a selected mental illness in a given fiscal year}}{\text{Total number of episodes with a selected mental illness in the first 11 months of the same fiscal year}} \times 100$$

Refer to the Technical Notes (Appendix II) for the episode building and case selection criteria.

A logistic regression model was fitted with age, sex, type of mental illness, discharged against medical advice or did not return from a pass (yes/no) and multiple previous admissions for a selected mental illness (two and more) during the past 12 months as independent variables. These factors were captured on the index episode of care. Coefficients derived from the logistic model were used to calculate the probability of readmission for each episode. The expected number of readmissions for a region is the sum of these probabilities in that region. The risk-adjusted readmission rate was calculated by dividing the observed number of readmissions in each region by the expected number of readmissions in the region and multiplying by the Canadian average readmission rate. A 95% confidence interval for the risk-adjusted readmission rate was also calculated; the method used to calculate confidence intervals is available upon request. Refer to the Model Specifications (Appendix III) for a list of variables entered in the model and coefficient values.

viii. The mental illnesses selected for this indicator are substance-related disorders; schizophrenia, delusional and non-organic psychotic disorders; mood/affective disorders; anxiety disorders; and selected disorders of adult personality and behaviour.

ix. Refer to the General Methodology Notes section for more information.

Interpretation

Readmission to inpatient care may be an indicator of relapse or complications after an inpatient stay. Inpatient care for people living with a mental illness aims to stabilize acute symptoms. Once stabilized, the individual is discharged, and subsequent care and support are ideally provided through outpatient and community programs in order to prevent relapse or complications. High rates of 30-day readmission could be interpreted as a direct outcome of poor coordination of services and/or an indirect outcome of poor continuity of services after discharge.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

The following results were found in the literature. According to the *Hospital Mental Health Services in Canada 2005–2006* report, the 30-day readmission rate, including general hospitals only, was 9.2%.[1] According to the National Association of State Mental Health Program Directors, in 1995, the 30-day readmission rate for psychiatric hospitals in America was between 8.1% and 10.2%.[2] For patients from Department of Veterans Affairs medical centres in the United States, the percentage of patients readmitted within 30 days was between 13.1% and 15.3%.[3]

Data Sources

Discharge Abstract Database (DAD), CIHI

Ontario Mental Health Reporting System (OMHRS),[x] CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

A 30-day readmission can occur in the same facility as the index episode or in a different facility. A readmission can be a planned or unplanned admission. Planned versus unplanned admissions cannot be distinguished in all available data sources. For jurisdictions where comprehensive information was available, rates including both planned and unplanned

x. In Ontario, facilities are mandated to submit data on discharges from adult designated mental health beds to OMHRS. As a result, inpatient cases from Ontario are extracted from both the DAD and OMHRS. Note that only general hospitals are included (that is, specialty mental health facilities are excluded).

readmissions and only unplanned readmissions were compared, and they were not statistically significantly different. Published work has shown that few planned readmissions for mental illness within 30 days are scheduled by practitioners.[4]

When building episodes of care, the exclusion of psychiatric hospitals might introduce a bias. It is possible that the wrong discharge date might be used to track readmissions, or two hospitalizations that belong to the same episode might be erroneously attributed to two different episodes. Further analyses demonstrated that this bias is minimal and does not affect the indicator results.

References

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Effectiveness

2.5 Ambulatory Care Sensitive Conditions Hospitalization Rate

Definition

Age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care prevents or reduces the need for admission to hospital, per 100,000 population younger than age 75.

Method of Calculation

(Total number of acute care hospitalizations for ambulatory care sensitive conditions younger than age 75／total mid-year population younger than age 75) × 100,000 (age adjusted)

Inclusion criteria:

Based on a list of conditions developed by Billings et al., any one most responsible diagnosis code of

- Grand mal status and other epileptic convulsions;
- Chronic obstructive pulmonary diseases;
- Asthma;
- Heart failure and pulmonary edema;
- Hypertension;
- Angina; or
- Diabetes.

See the Technical Notes (Appendix II) for codes used.

Exclusion criteria:

1. Individuals age 75 and older
2. Death before discharge

Interpretation

Hospitalization for an ambulatory care sensitive condition is considered to be a measure of access to appropriate primary health care. While not all admissions for these conditions are avoidable, it is assumed that appropriate ambulatory care could prevent the onset of this type of illness or condition, control an acute episodic illness or condition, or manage a chronic disease or condition. A disproportionately high rate is presumed to reflect problems in obtaining access to appropriate primary care.

Standards/Benchmarks

The right level of utilization is not known, and large regional variations in the rate of hospitalization for these conditions exist.

Data Sources

Discharge Abstract Database (DAD), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Beginning with the 2006–2007 rate, the definition of the ambulatory care sensitive conditions indicator was refined to better align it as a measure of primary health care. In the revised definition, the diabetes component includes diabetes with short-term complications and diabetes without mention of complication; angina, hypertension and heart failure components exclude records where cardiac procedures were also coded. Rates based on the new definition were calculated for the previous years to allow for comparisons over time.

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2.6 30-Day Acute Myocardial Infarction In-Hospital Mortality Rate

Definition

The risk-adjusted rate of all-cause in-hospital death occurring within 30 days of first admission to an acute care hospital with a diagnosis of acute myocardial infarction (AMI).

Method of Calculation

Numerator: Number of deaths from all causes occurring in hospital within 30 days of admission for AMI.

Denominator: Total number of AMI episodes in an 11-month period.

Refer to the Technical Notes (Appendix II) for the episode building and case selection criteria.

A logistic regression model was fitted with age, sex and select pre-admission comorbid diagnoses as independent variables. Coefficients derived from the logistic model were used to calculate the probability of in-hospital death following AMI for each case (episode). The expected number of in-hospital deaths in a region is the sum of the case probabilities of that region. The risk-adjusted mortality rate (RAMR) was calculated by dividing the observed number of in-hospital deaths for each region by the expected number of in-hospital deaths for the region and multiplying by the Canadian average in-hospital death rate. A 95% confidence interval for the RAMR was also

calculated; the method used to calculate confidence intervals is available upon request. Refer to the Model Specifications (Appendix III) for a list of variables entered in the model and coefficient values.

Interpretation

A lower risk-adjusted mortality rate following AMI may be related to quality of care or other factors. It has been shown that the 30-day in-hospital mortality rate is highly correlated (r = 0.9) with total mortality (death in and out of hospital) following AMI.[1] Inter-regional variations in 30-day in-hospital mortality rates may be due to jurisdictional and institutional differences in standards of care, as well as other factors that were not included in the adjustment.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Source

Discharge Abstract Database (DAD), CIHI

Reference Period

Rates are based on three years of pooled data: April 1, 2009, to March 31, 2012

Comprehensiveness

Available for all provinces and territories, except Quebec. Rates for Quebec are not available due to differences in data collection.

Comments

Beginning with the rates based on 2003–2004 to 2005–2006 data, AMI case selection criteria were revised to account for the fact that an increasing number of AMI patients are undergoing a revascularization procedure (percutaneous coronary intervention or coronary artery bypass) at their index admission. In the case of revascularization procedures, AMI may not be coded as the most responsible diagnosis; these cases were previously excluded from the indicator. In addition, exclusion criteria were revised so patients with a length of stay of less than three days who are discharged alive are no longer excluded. Comparison of rates with those of previous years should be made with caution.

These rates should be interpreted with caution due to potential differences in the coding of comorbid conditions across provinces and territories.

Reference

1. J. V. Tu et al., “Acute Myocardial Infarction Outcomes in Ontario,” in *Cardiovascular Health & Services in Ontario: An ICES Atlas*, eds. C. D. Naylor and P. M. Slaughter (Toronto, Ont.: Institute for Clinical Evaluative Sciences, 1999): pp. 84–100.

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2.7 30-Day Stroke In-Hospital Mortality Rate

Definition

The risk-adjusted rate of all-cause in-hospital death occurring within 30 days of first admission to an acute care hospital with a diagnosis of stroke.

Method of Calculation

Numerator: Number of deaths from all causes occurring in hospital within 30 days of admission for stroke.

Denominator: Total number of stroke episodes in an 11-month period.

Refer to the Technical Notes (Appendix II) for the episode building and case selection criteria.

A logistic regression model was fitted with age, sex, type of stroke and select pre-admission comorbid diagnoses as independent variables. Coefficients derived from the logistic model were used to calculate the probability of in-hospital death following stroke for each case (episode). The expected number of in-hospital deaths for a region is the sum of these case probabilities in that region. The risk-adjusted mortality rate (RAMR) was calculated by dividing the observed number of in-hospital deaths for each region by the expected number of in-hospital deaths for the region and multiplying by the Canadian average in-hospital death rate. A 95% confidence interval for the RAMR was also calculated; the method used to calculate confidence intervals is available upon request. Refer to the Model Specifications (Appendix III) for a list of variables entered in the model and coefficient values.

Interpretation

Stroke is a leading cause of death and long-term disability. Adjusted mortality rates following stroke may reflect the underlying effectiveness of treatment and quality of care. Inter-regional variations in stroke mortality rates may be due to jurisdictional and institutional differences in standards of care, as well as other factors that are not included in the adjustment.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Source

Discharge Abstract Database (DAD), CIHI

Reference Period

Rates are based on three years of pooled data: April 1, 2009, to March 31, 2012.

Comprehensiveness

Available for all provinces and territories, except Quebec. Rates for Quebec are not available due to differences in data collection.

Comments

Beginning with rates based on 2003–2004 to 2005–2006 data, case selection criteria for stroke were revised to include patients transferred to rehabilitation during their index admission. In this case, stroke may not be coded as the most responsible diagnosis; these cases were previously excluded from the indicator. In addition, stroke resulting from occlusion of pre-cerebral arteries is now included in the indicator. These cases were previously excluded because their identification was not possible in the ICD-9 coding system. Comparison of rates with those of previous years should be made with caution.

This indicator is based on the methodology used to calculate the 30-day acute myocardial infarction in-hospital mortality rate. Rates should be interpreted with caution due to potential differences in the coding of comorbid conditions across provinces and territories.

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2.8 30-Day Acute Myocardial Infarction Readmission Rate

Definition

Risk-adjusted rate of urgent readmission following discharge for acute myocardial infarction (AMI). Non-elective return to an acute care hospital for any cause is counted as a readmission if it occurs within 30 days of discharge from the index episode of inpatient care. An episode of care refers to all contiguous inpatient hospitalizations and same-day surgery visits.

Method of Calculation

Numerator: Number of cases within the denominator with an urgent readmission within 30 days of discharge in the reference period.

Denominator: Total number of AMI episodes in an 11-month period.

Refer to the Technical Notes (Appendix II) for the episode building and case selection criteria.

A logistic regression model was fitted with selected patient characteristics as independent variables. Coefficients derived from the logistic model were used to calculate the probability of readmission for each case (episode). The expected number of readmissions in a region is the sum of the case probabilities of that region. The risk-adjusted readmission rate (RARR) was calculated by dividing the observed number of readmissions for each region by the expected number of readmissions for the region and multiplying by the Canadian average readmission rate. A 95% confidence interval for the RARR was also calculated; the method used to calculate confidence intervals is available upon request. Refer to the Model Specifications (Appendix III) for a list of variables entered in the model and coefficient values.

Interpretation

Readmissions to acute care facilities are increasingly being used to measure institutional or regional quality of care and care coordination. Readmission rates after AMI can be influenced by a variety of factors, including the quality of inpatient and outpatient care, effectiveness of the care transition and coordination, or the availability of appropriate diagnostic or therapeutic technologies during the initial hospital stay. While not all urgent readmissions are avoidable, interventions during and after a hospitalization can be effective in reducing readmission rates.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Sources

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Patients can appear in the denominator more than once if they have multiple episodes of care between April 1 and March 1 of the fiscal year.

Planned readmissions reported as urgent admissions are included in the readmission rate.

Bibliography

Ashton, C. M. and N. P. Wray. "A Conceptual Framework for the Study of Early Readmission as an Indicator of Quality of Care." *Social Science and Medicine* 43 (1996): pp. 1533–1541.

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2.9 30-Day Obstetric Readmission Rate

2.10 30-Day Readmission—Patients Age 19 and Younger

2.11 30-Day Surgical Readmission Rate

2.12 30-Day Medical Readmission Rate

Definition

Risk-adjusted rate of urgent readmission for each of the following patient groups:

- Obstetric
- Patients Age 19 and Younger
- Surgical
- Medical

Non-elective return to an acute care hospital for any cause is counted as a readmission if it occurs within 30 days of discharge from the index episode of inpatient care. An episode of care refers to all contiguous inpatient hospitalizations and same-day surgery visits.

Method of Calculation

Numerator: Number of cases within the denominator with an urgent readmission within 30 days of discharge.

Denominator: Number of obstetric/patients age 19 and younger/surgical/medical episodes of care discharged between April 1 and March 1 of the fiscal year.

Records with pregnancy/childbirth (except for obstetric readmission), mental diseases and disorders, or palliative care (as most responsible diagnosis) are excluded. Refer to the Technical Notes of the obstetric, patients age 19 and younger, surgical and medical readmission rates (Appendix II) for the episode building and case selection criteria.

A logistic regression model was fitted with selected patient characteristics as independent variables. Coefficients derived from the logistic model were used to calculate the probability of readmission for each case (episode). The expected number of readmissions in a region is the sum of the case probabilities of that region. The risk-adjusted readmission rate (RARR) was calculated by dividing the observed number of readmissions for each region by the expected number of readmissions for the region and multiplying by the Canadian average readmission rate. A 95% confidence interval for the RARR was also calculated; the method used to calculate confidence intervals is available upon request. Refer to the Model Specifications of the obstetric, patients age 19 and younger, surgical and medical readmission (Appendix III) for a list of variables entered in the model and coefficient values.

Interpretation

Readmissions to acute care facilities are increasingly being used to measure institutional or regional quality of care and care coordination. Readmission rates can be influenced by a variety of factors, including the quality of inpatient and outpatient care, effectiveness of the care transition and coordination, and the availability and use of effective community-based disease management programs. While not all urgent readmissions are avoidable, interventions during and after a hospitalization can be effective in reducing readmission rates.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Sources

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Patients can appear in the denominator more than once if they have multiple episodes of care between April 1 and March 1 of the fiscal year.

Planned readmissions reported as urgent admissions are included in the readmission rate.

Bibliography

Ashton, C. M. and N. P. Wray. "A Conceptual Framework for the Study of Early Readmission as an Indicator of Quality of Care." *Social Science and Medicine* 43 (1996): pp. 1533–1541.

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2.13 Self-Injury Hospitalization Rate

Definition

Age-standardized rate of hospitalization in a general hospital[xi] due to self-injury per 100,000 population.

Method of Calculation

$$\frac{\text{Total number of discharges for a self-injury for patients age 15 and older}}{\text{Total mid-year population age 15 and older}} \times 100{,}000 \text{ (age adjusted)}$$

xi. Refer to the General Methodology Notes section for more information.

Self-injury is identified by the following external cause of injury codes with a diagnosis type of 9:

ICD-10-CA

X60 to X84

Interpretation

Self-injury is defined as a deliberate bodily injury that may or may not result in death. This type of injury is the result of either suicidal or self-harming behaviours, or both. Self-injury can be prevented, in many cases, by early recognition, intervention and treatment of mental illnesses. While some risk factors for self-injury are beyond the control of the health system, high rates of self-injury hospitalization can be interpreted as the result of a failure of the system to prevent self-injuries that are severe enough to require hospitalizations.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

The following results were found in the literature. In Canada, in 2001–2002, the age-adjusted hospitalization rate due to self-injuries was 7.6 per 10,000.[1]

Data Sources

Discharge Abstract Database (DAD), CIHI

Ontario Mental Health Reporting System (OMHRS),[xii] CIHI

National Ambulatory Care Reporting System (NACRS),[xiii] CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

xii. In Ontario, facilities are mandated to submit data on discharges from adult designated mental health beds to OMHRS. As a result, inpatient cases from Ontario are extracted from both the DAD and OMHRS. Note that only general hospitals are included (that is, specialty mental health facilities are excluded).

xiii. To capture all hospitalized self-injury cases in Ontario, individuals identified in emergency departments with a self-injury code as the main reason for the visit and then transferred to a designated mental health bed were counted. More information is available upon request.

Comments

This indicator does not include cases of self-injury involving outpatient treatment in hospital emergency rooms or other medical facilities or completed suicide prior to hospital admission. Thus, this indicator cannot be used to estimate the prevalence of self-injury in the general population. Also not included are patients who were institutionalized in psychiatric hospitals and were self-injured during their stay but did not require admission to a general hospital. For a broader estimate of self-injury, please refer to the In Focus section of *Health Indicators 2012*.

Using the available data sources, capturing intention is difficult. This indicator cannot distinguish whether or not the self-injury was intended to result in death (self-harming or suicidal behaviour). In addition, this indicator might provide biased estimates of the true number of hospitalizations for self-injury, due to the manner in which intent is captured in the data sources available. For example, poisoning can be coded as “unintentional”—an overdose—or “undetermined”—reflecting an uncertainty between unintentional and intentional motives. Both unintentional and undetermined injuries were not included in this indicator, even though it is assumed that a small number of these cases were, in fact, intentional.

Reference

1. Canadian Institute for Health Information, *National Trauma Registry Analytic Bulletin: Hospitalizations Due to Suicide Attempts and Self-Inflicted Injury in Canada, 2001–2002* (Ottawa, Ont.: CIHI, 2004).

2.14 Potentially Avoidable Mortality and Mortality From Preventable and Treatable Causes

Definitions

Potentially avoidable mortality: Premature deaths that could potentially have been avoided through all levels of prevention (primary, secondary, tertiary). Premature deaths are those that occur among individuals younger than age 75. Expressed as the age-standardized mortality rate and age-standardized potential years of life lost (PYLL) per 100,000 population.

Mortality from preventable causes: Premature deaths that could potentially have been prevented through primary prevention efforts. Mortality from preventable causes is a subset of potentially avoidable mortality. Expressed as the age-standardized mortality rate and age-standardized PYLL per 100,000 population.

Mortality from treatable causes: Premature deaths that could potentially have been avoided through secondary or tertiary prevention. Mortality from treatable causes is a subset of potentially avoidable mortality. Expressed as the age-standardized mortality rate and age-standardized PYLL per 100,000 population.

Method of Calculation

Mortality Rate:

$$\frac{\text{Number of deaths at age younger than 75 from avoidable/preventable/treatable causes}}{\text{Total mid-year population younger than age 75}} \times 100{,}000 \text{ (age adjusted)}$$

Potential Years of Life Lost (PYLL):

$$\frac{\text{The sum of differences between 75 and age of death}^{xiv} \text{ from avoidable/preventable/treatable causes}}{\text{Total mid-year population younger than age 75}} \times 100{,}000 \text{ (age adjusted)}$$

Refer to the Technical Notes (Appendix II) for the list of causes of death included in the indicators.

Interpretation

These indicators contribute to the measurement of health system performance. The potentially avoidable mortality indicator includes premature deaths that could be avoidable through all levels of prevention.

Mortality from preventable causes focuses on premature deaths from conditions that could potentially be avoided through primary prevention efforts, such as lifestyle modifications or population-level interventions (for example, vaccinations, injury prevention). The indicator informs efforts aimed at reducing the number of initial cases, or incidence reduction, as deaths are prevented by avoiding new cases altogether.

Mortality from treatable causes focuses on premature deaths that could potentially be avoided through secondary and tertiary prevention efforts, such as screening for and effective treatment of an existing disease. The indicator informs efforts aimed at reducing the number of people who die once they have the condition, or case-fatality reduction.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Source

Vital Statistics—Death Database, Statistics Canada.

Reference Period

Rates are based on three years of pooled data: January 1, 2007, to December 31, 2009.

xiv. The PYLL values for each of the five-year age groups are available at www.statcan.gc.ca/pub/82-221-x/2011002/quality-qualite/qua2-eng.htm#a229.

Comprehensiveness

Available for all provinces and territories.

Comments

Avoidable mortality indicators were developed based on the Australian Potentially Avoidable Deaths indicator and the U.K. Office for National Statistics' list of causes of avoidable mortality, followed by expert review of the diagnosis codes and rationales for including each condition. Causes of death were assigned to preventable and treatable subcategories based on two main mechanisms of mortality reduction: incidence and case-fatality reduction. These subcategories are mutually exclusive. In cases where a prevention/treatment overlap exists, the case was assigned to the preventable category; the exceptions were ischemic heart disease and stroke, where a random half of cases were assigned as preventable and the other half assigned as treatable. However, the mutually exclusive nature of the subcategories does not imply that all cases assigned to the preventable group do not have a treatable component, and vice versa.

It is generally acknowledged that not all deaths from potentially avoidable causes can actually be avoided. For example, some deaths from treatable causes may be unavoidable due to late diagnosis or concurrent health problems, while some deaths from preventable causes could be due to unpredictable events against which no protective measures could have been taken.

An upper age limit of 75 should not imply that some deaths in the population older than 75 could not be avoided. However, multiple comorbidities are common among older adults, making the assignment of a single cause of death challenging.

The indicators will be reviewed periodically to assess the upper age limit and potential new avoidable conditions due to better understanding of disease etiology or advances in treatment.

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Safety

2.15 Hospitalized Hip Fracture Event Rate

Definition

Age-standardized rate of new hip fractures admitted to an acute care hospital, per 100,000 population age 65 and older. A new event is defined as a first-ever hospitalization for hip fracture or a subsequent hip fracture occurring more than 28 days after the admission for the previous event in the reference period.

Method of Calculation

(Total number of new hip fracture events for persons age 65 and older/total mid-year population age 65 and older) × 100,000 (age adjusted)

Numerator inclusion criteria:

1. Hip fracture present on admission
   ICD-10-CA: S72.0, S72.1 or S72.2; ICD-9/ICD-9-CM: 820.0–820.3, 820.8 or 820.9 coded as diagnosis type (1) or [type (M), (W), (X) or (Y), but not also as a diagnosis type (2)]
2. Age at admission 65 and older
3. Sex recorded as male or female
4. Admission to an acute care institution
5. Canadian resident

Numerator exclusion criteria:

1. Records with an invalid health card number or date of birth
2. Records with an invalid admission date
3. Hip fracture admissions within 28 days after the admission date of the previous hip fracture hospitalization
4. Transfers[xv]

Interpretation

Hip fractures represent a significant health burden for seniors and for the health system. As well as causing disability or death, hip fracture may have a major effect on independence and quality of life. Measuring occurrence of hip fractures in the population is important for planning and evaluating preventive strategies, allocating health resources and estimating costs.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

xv. If a subsequent hip fracture admission occurs on the same day as or prior to the discharge date of a previous hip fracture admission, it is considered a transfer.

Data Sources

Discharge Abstract Database (DAD), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

This indicator includes all new hospitalized hip fractures in the reference period, encompassing first-ever and recurrent events. A person may have more than one hip fracture event in the reference period. Hip fractures not admitted to an acute care hospital and in-hospital hip fractures are not included in this indicator. Hip fractures occurring in a hospital are reported separately in the in-hospital hip fracture indicator.

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3.0 Health System Characteristics

Health System

3.1 Coronary Artery Bypass Graft Surgery Rate

Definition

Age-standardized rate of coronary artery bypass graft (CABG) surgery performed on inpatients in acute care hospitals, per 100,000 population age 20 and older.

Method of Calculation

(Total number of discharges for CABG for inpatients age 20 and older ⁄ total mid-year population age 20 and older) × 100,000 (age adjusted)

CCP[xvi]

48.1^

CCI[xvi]

1.IJ.76^^

Interpretation

As with other types of surgical procedures, variation in CABG surgery rates can be attributed to numerous factors, including differences in population demographics, physician practice patterns and availability of services. In cases amenable to treatment with less-invasive procedures, percutaneous coronary intervention (PCI), an alternative intervention to improve blood flow to the heart muscle, may be used. Variations in the extent to which PCI is utilized may result in variations in the rate of bypass surgery.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Sources

Discharge Abstract Database (DAD), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Rates are based on the total number of discharges for CABG in a given year. Therefore, a patient who received more than one CABG procedure during the same hospitalization was counted once.

CABG operations can only be performed in designated cardiac centres; therefore, procedures reported by facilities without on-site CABG services were excluded from the indicator calculation.

xvi. Code may be recorded in any position. Procedures coded as out of hospital and abandoned after onset are excluded.

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Faris, P. D. et al. "Diagnostic Cardiac Catheterization and Revascularization Rates for Coronary Heart Disease." *Canadian Journal of Cardiology* 20 (2004): pp. 391–397.

Institute for Clinical Evaluative Sciences. *Cardiovascular Health and Services in Ontario*. Toronto, Ont.: ICES, 1999.

Yap, A. G. et al. "Coronary Artery Bypass Surgery on Small Patients." *Journal of Invasive Cardiology* 12 (2000): pp. 242–246.

3.2 Percutaneous Coronary Intervention Rate

Definition

Age-standardized rate of percutaneous coronary interventions (PCIs) performed on patients in acute care hospitals, same-day surgery facilities or catheterization laboratories, per 100,000 population age 20 and older.

Method of Calculation

(Total number of discharges for PCI for patients age 20 and older/total mid-year population age 20 and older) × 100,000 (age adjusted)

CCP[xvii]

48.02 or 48.03

CCI[xvii]

1.IJ.50^^ or 1.IJ.57.GQ^^

Interpretation

In many cases, PCI serves as a non-surgical alternative to coronary artery bypass graft (CABG) surgery and is undertaken for the purpose of opening obstructed coronary arteries. While PCI encompasses several techniques, angioplasty is the procedure most frequently provided. The choice of revascularization mode (PCI or CABG) depends on numerous factors, including physician preferences, availability of services and referral patterns, as well as differences in population health.

xvii. Code may be recorded in any position. Procedures coded as out of hospital and abandoned after onset are excluded.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Sources

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories, except Quebec. Rates for Quebec are not available due to differences in data collection.

Comments

Rates are based on the total number of discharges for PCI in a given year. Therefore, a patient who received more than one PCI procedure during the same hospitalization was counted once.

PCI can only be performed in designated cardiac centres; therefore, procedures reported by facilities without on-site PCI services were excluded from the indicator calculation.

Bibliography

Cardiac Care Network of Ontario Consensus Panel on Target Setting. *Final Report and Recommendations*. Toronto, Ont.: CCN, 2004. Accessed from <http://www.ccn.on.ca/ccn_public/UploadFiles/files/Cons_Panel_Target_Setting_FRR.pdf>.

Faris, P. D. et al. “Diagnostic Cardiac Catheterization and Revascularization Rates for Coronary Heart Disease.” *Canadian Journal of Cardiology* 20 (2004): pp. 391–397.

Institute for Clinical Evaluative Sciences. *Cardiovascular Health and Services in Ontario*. Toronto, Ont.: ICES, 1999.

King, S. B. 3rd et al. “2007 Focused Update of the ACC/AHA/SCAI 2005 Guideline Update for Percutaneous Coronary Intervention: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines.” *Journal of the American College of Cardiology* 51 (2008): pp. 172–209.

Smith, S. C. Jr. et al. “A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1993 Guidelines for Percutaneous Transluminal Coronary Angioplasty).” *Journal of the American College of Cardiology* 37 (2001): pp. 2215–2239.

3.3 Cardiac Revascularization Rate

Definition

Age-standardized rate of coronary artery bypass graft (CABG) surgery performed on inpatients in acute care hospitals or percutaneous coronary interventions (PCIs) performed on patients in acute care hospitals, same-day surgery facilities or catheterization laboratories, per 100,000 population age 20 and older.

Method of Calculation

(Total number of discharges for CABG or PCI for patients age 20 and older/total mid-year population age 20 and older) × 100,000 (age adjusted)

CCP[xviii]

48.1^, 48.02 or 48.03

CCI[xviii]

1.IJ.76^^, 1.IJ.50^^ or 1.IJ.57.GQ^^

Interpretation

The choice of revascularization mode (PCI or CABG) depends on numerous factors, including physician preferences, availability of services and referral patterns, as well as differences in population health and socio-economic status. The combined cardiac revascularization rate represents total activity of cardiac revascularization in a jurisdiction.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Sources

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories, except Quebec. Rates for Quebec are not available due to differences in data collection.

xviii. Code may be recorded in any position. Procedures coded as out of hospital and abandoned after onset are excluded.

Comments

Rates are based on the total number of discharges for a cardiac revascularization procedure in a given year. Therefore, a patient who received more than one procedure (either CABG or PCI) during the same hospitalization was counted once.

Cardiac revascularization procedures can only be performed in designated cardiac centres; therefore, procedures reported by facilities without on-site cardiac services were excluded from the indicator calculation.

Bibliography

Cardiac Care Network of Ontario Consensus Panel on Target Setting. *Final Report and Recommendations*. Toronto, Ont.: CCN, 2004. Accessed from <http://www.ccn.on.ca/ccn_public/UploadFiles/files/Cons_Panel_Target_Setting_FRR.pdf>.

Faris, P. D. et al. "Diagnostic Cardiac Catheterization and Revascularization Rates for Coronary Heart Disease." *Canadian Journal of Cardiology* 20 (2004): pp. 391–397.

Institute for Clinical Evaluative Sciences. *Cardiovascular Health and Services in Ontario*. Toronto, Ont.: ICES, 1999.

3.4 Hip Replacement Rate

Definition

Age-standardized rate of unilateral or bilateral hip replacement surgery performed on inpatients in acute care hospitals, per 100,000 population age 20 and older.

Method of Calculation

(Total number of discharges for hip replacement surgery for inpatients age 20 and older/total mid-year population age 20 and older) × 100,000 (age adjusted)

CCP[xix]

93.51, 93.52, 93.53 or 93.59

CCI[xix]

1.VA.53.LA-PN^^ or 1.VA.53.PN-PN^^

xix. Code may be recorded in any position. Procedures coded as out of hospital and abandoned after onset are excluded.

Interpretation

Hip replacement surgery has the potential to improve functional status, reduce pain and contribute to other gains in health-related quality of life. Over the past two decades, rates of hip replacement surgery have increased substantially. Wide inter-regional variations in joint replacement rates may be attributable to numerous factors, including the availability of services, provider practice patterns and patient preferences.

Standards/Benchmarks

Benchmarks have not been established for this procedure.

Data Sources

Discharge Abstract Database (DAD), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Rates are based on the total number of discharges for hip replacement surgery in a given year. Therefore, a patient who received both a left and a right hip replacement in the same year but at separate admissions was counted twice.

Beginning with the 2005–2006 rate, this indicator is calculated for the population age 20 and older; therefore, it is not comparable with rates reported previously. Rates based on the new definition were calculated for the years prior to 2005–2006 to allow for comparisons over time.

Bibliography

Naylor, C. D. and D. P. DeBoer. “Variations in Selected Surgical Procedures and Medical Diagnoses by Year and Region. Total Hip and Knee Replacement.” In *Patterns of Health Care in Ontario, 2nd Ed*. Eds. V. Goel et al. Ottawa, Ont.: Canadian Medical Association, 1996: p. 54.

University of Toronto and Ontario Hospital Association. *The Hospital Report 98. A System-Wide Review of Ontario’s Hospitals*. Toronto, Ont.: Ontario Hospital Association, 1998.

Wright, C. J. and Y. Robens-Paradise. *Evaluation of Indications and Outcomes in Elective Surgery*. Vancouver, B.C.: Centre for Clinical Epidemiology and Evaluation, Vancouver Hospital and Health Services Centre, May 2001.

3.5 Knee Replacement Rate

Definition

Age-standardized rate of unilateral or bilateral knee replacement surgery performed on patients in acute care hospitals or same-day surgery facilities, per 100,000 population age 20 and older.

Method of Calculation

(Total number of discharges for knee replacement surgery for patients age 20 and older/total mid-year population age 20 and older) × 100,000 (age adjusted)

CCP[xx]

93.40 or 93.41

CCI[xx]

1.VG.53^^

Interpretation

Knee replacement surgery has the potential to improve functional status, reduce pain and contribute to other gains in health-related quality of life. Over the past two decades, rates of knee replacement surgery have increased substantially. Wide inter-regional variation in joint replacement rates may be attributable to numerous factors, including the availability of services, provider practice patterns and patient preferences.

Standards/Benchmarks

Benchmarks have not been established for this procedure.

Data Sources

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

xx. Code may be recorded in any position. Procedures coded as out of hospital and abandoned after onset are excluded.

Comments

Rates are based on the total number of discharges for knee replacement surgery in a given year. Therefore, a patient who received both a left and a right knee replacement in the same year but at separate admissions was counted twice.

Beginning with the 2005–2006 rate, this indicator is calculated for the population age 20 and older and includes same-day surgery procedures; therefore, it is not comparable with rates reported previously. Rates based on the new definition were calculated for the years prior to 2005–2006 to allow for comparisons over time.

Bibliography

Naylor, C. D. and D. P. DeBoer. "Variations in Selected Surgical Procedures and Medical Diagnoses by Year and Region. Total Hip and Knee Replacement." In *Patterns of Health Care in Ontario, 2nd Ed*. Eds. V. Goel et al. Ottawa, Ont.: Canadian Medical Association, 1996: p. 54.

University of Toronto and Ontario Hospital Association. *The Hospital Report 98. A System-Wide Review of Ontario's Hospitals*. Toronto, Ont.: Ontario Hospital Association, 1998.

Wright, C. J. and Y. Robens-Paradise. *Evaluation of Indications and Outcomes in Elective Surgery*. Vancouver, B.C.: Centre for Clinical Epidemiology and Evaluation, Vancouver Hospital and Health Services Centre, May 2001.

3.6 Hysterectomy Rate

Definition

Age-standardized rate of hysterectomy provided to patients in acute care hospitals or same-day surgery facilities, per 100,000 women age 20 and older.

Method of Calculation

(Total number of discharges for hysterectomy for women age 20 and older / total mid-year female population age 20 and older) × 100,000 (age adjusted)

CCP[xxi]

80.2–80.6

CCI[xxi]

1.RM.89^^, 1.RM.91^^, or any of the following codes: 1.RM.87.CA-GX, 1.RM.87.DA-GX, 1.RM.87.LA-GX with extent attribute coded as SU

xxi. Code may be recorded in any position. Procedures coded as out of hospital and abandoned after onset are excluded.

Interpretation

As with other types of surgical procedures, variation in hysterectomy rates can be attributed to numerous factors, including differences in population demographics, physician practice patterns and availability of services. Utilization rates may reflect the level of uncertainty about the appropriate use of this surgical procedure. The right level of utilization is not known.

Standards/Benchmarks

Benchmarks have not been established for this procedure.

Data Sources

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Beginning with the 2006–2007 rate, hysterectomy cases include both total and subtotal hysterectomies, similar to reporting prior to 2001–2002 data. Subtotal hysterectomy was not uniquely identified in the Canadian Classification of Health Interventions (CCI) versions 2001 and 2003; therefore, hysterectomy rates reported for 2001–2002 to 2005–2006 included only total hysterectomies. Identification of subtotal hysterectomies became possible again with version 2006 of CCI. For jurisdictions with higher volumes of subtotal hysterectomies, comparability with previous years might be affected.

Beginning with the 2005–2006 rate, this indicator includes same-day surgery procedures. However, due to small volumes of hysterectomy in same-day surgery settings, comparability with previous years should not be affected.

Bibliography

Cohen, M. M. and W. Young. “Hysterectomy.” In *Patterns of Health Care in Ontario, 2nd Ed*. Eds. V. Goel et al. Ottawa, Ont.: Canadian Medical Association, 1996: p. 141.

Cumming, D. C. “Hysterectomy Revisited.” *Journal of Obstetrics and Gynecology Canada* 18 (1996): pp. 869–879.

Gimbel, H. “Total and Subtotal Hysterectomy for Benign Uterine Diseases? A Meta-Analysis.” *Acta Obstetricia et Gynecologica* 86 (2007): pp. 133–144.

Lefebvre, G. et al. “SOGC Clinical Practice Guidelines—Hysterectomy.” *Journal of Obstetrics and Gynecology Canada* 109 (2002).

Zekam, N. et al. “Total Versus Subtotal Hysterectomy: A Survey of Gynecologists.” *Obstetrics and Gynecology* 102 (2003): pp. 301–305.

3.7 Inflow/Outflow Ratio

Definition

A ratio of the number of separations (discharges and deaths) from acute care/same-day surgery facilities within a given region divided by the number of acute care/same-day surgery separations generated by residents of that region.

Method of Calculation

Numerator: Number of separations (discharges and deaths) from acute care/same-day surgery facilities within a given region (including non-residents).

Denominator: Number of separations generated by residents of a given region, where region is as specified in the numerator.

An overall ratio was calculated for discharges associated with any diagnosis or procedure for acute care discharges only and separately for coronary artery bypass graft (CABG), percutaneous coronary intervention (PCI), hip replacement, knee replacement and hysterectomy procedures.[xxii]

CABG (acute care discharges only):

CCP

48.1^

CCI

1.IJ.76^^

PCI (acute care and same-day surgery discharges):

CCP

48.02 or 48.03

CCI

1.IJ.50^^ or 1.IJ.57.GQ^^

xxii. Code may be recorded in any position. Procedures coded as out of hospital and abandoned after onset are excluded.

Hip replacement (acute care discharges only):

CCP

93.51, 93.52, 93.53 or 93.59

CCI

1.VA.53.LA-PN^^ or 1.VA.53.PN-PN^^

Knee replacement (acute care and same-day surgery discharges):

CCP

93.40 or 93.41

CCI

1.VG.53^^

Hysterectomy (acute care and same-day surgery discharges):

CCP

80.2–80.6

CCI

1.RM.89^^, 1.RM.91^^ or any of the following codes: 1.RM.87.CA-GX, 1.RM.87.DA-GX or 1.RM.87.LA-GX with extent attribute coded as SU

Interpretation

This indicator reflects the balance between the quantity of hospital stays provided to both residents and non-residents by all relevant facilities (acute care/same-day surgery) in a given region and the extent of utilization by residents of that region, whether they receive care within or outside of the region. A ratio of less than one indicates that health care utilization by residents of a region exceeded care provided within that region, suggesting an outflow effect. A ratio of greater than one indicates that care provided by a region exceeded the utilization by its residents, suggesting an inflow effect. A ratio of one indicates that care provided by a region is equivalent to the utilization by its residents, suggesting that inflow and outflow activity, if it exists at all, is balanced. A ratio of zero is an indication that none of the institutions in the region provided the service and residents received care outside of their region.

Standards/Benchmarks

Benchmarks are not available for this measure.

Data Sources

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Beginning with the 2006–2007 rate, hysterectomy cases include both total and subtotal hysterectomies, similar to reporting prior to 2001–2002. Subtotal hysterectomy was not uniquely identified in the Canadian Classification of Health Interventions (CCI) versions 2001 and 2003; therefore, hysterectomy rates reported for 2001–2002 to 2005–2006 included only total hysterectomies. Identification of subtotal hysterectomies became possible again with version 2006 of CCI. For jurisdictions with higher volumes of subtotal hysterectomies, comparability with previous years might be affected.

Beginning with the 2005–2006 rate, hysterectomy and knee replacement totals include same-day surgery procedures. Due to small volumes of these procedures in same-day surgery settings, comparability with previous years should not be affected.

3.8 Mental Illness Hospitalization Rate

Definition

Age-standardized rate of separations from general hospitals[xxiii] through discharge or death following a hospitalization for a selected mental illness,[xxiv] per 100,000 population.

Method of Calculation

$$\frac{\text{Total number of separations for a selected mental illness for patients age 15 and older}}{\text{Total mid-year population age 15 and older}} \times 100{,}000 \text{ (age adjusted)}$$

xxiii. Refer to the General Methodology Notes section for more information.

xxiv. The mental illnesses selected for this indicator are substance-related disorders; schizophrenia, delusional and non-organic psychotic disorders; mood/affective disorders; anxiety disorders; and selected disorders of adult personality and behaviour.

A selected mental illness is coded as most responsible diagnosis (MRDx). Diagnosis codes are

a) Substance-related disorders
   ICD-10-CA: F55, F10 to F19
   DSM-IV: 291.x (0, 1, 2, 3, 5, 81, 89, 9), 292.0, 292.11, 292.12, 292.81, 292.82, 292.83, 292.84, 292.89, 292.9, 303.xx (00, 90), 304.xx (00, 10, 20, 30, 40, 50, 60, 80, 90), 305.xx (00, 10 to 90 excluding 80)
   Provisional diagnosis[xxv]: (d) substance-related disorder

b) Schizophrenia, delusional and non-organic psychotic disorders
   ICD-10-CA: F20 (excluding F20.4), F22, F23, F24, F25, F28, F29, F53.1
   DSM-IV: 295.xx (10, 20, 30, 40, 60, 70, 90), 297.1, 297.3, 298.8, 298.9
   Provisional diagnosis[xxv]: (e) schizophrenia disorder

c) Mood/affective disorders
   ICD-10-CA: F30, F31, F32, F33, F34, F38, F39, F53.0
   DSM-IV: 296.0x, 296.2x, 296.3x, 296.4x, 296.5x, 296.6x, 296.7, 296.80, 296.89, 296.90, 300.4, 301.13
   Provisional diagnosis[xxv]: (f) mood disorders

d) Anxiety disorders
   ICD-10-CA: F40, F41, F42, F43, F48.8, F48.9, F93.8
   DSM-IV: 300.xx (00, 01, 02, 21, 22, 23, 29), 300.3, 308.3, 309.x (0, 3, 4, 9), 309.24, 309.28, 309.81
   Provisional diagnosis[xxv]: (g) anxiety disorders or (o) adjustment disorders

e) Selected disorders of adult personality and behaviour
   ICD-10-CA: F60, F61, F62, F68, F69, F21
   DSM-IV: 300.16, 300.19, 301.0, 301.20, 301.22, 301.4, 301.50, 301.6, 301.7, 301.81, 301.82, 301.83, 301.9
   Provisional diagnosis[xxv]: (p) personality disorders

For this indicator, all records with an invalid health insurance number are excluded due to the methodology used to calculate the 95% confidence intervals; details are available upon request.

Interpretation

Hospitalization rate is a partial measure of general hospital utilization. It does not include inpatients who were using hospital services but had not yet been discharged within the fiscal year of interest. This indicator may reflect differences between jurisdictions, such as the health of the population, differing health service delivery models and variations in the availability and accessibility of specialized, residential and/or ambulatory and community-based services.

xxv. Only for data extracted from the Ontario Mental Health Reporting System (OMHRS) with no DSM-IV code recorded.

Monitoring hospital service use captures only the relatively small proportion of individuals who are acutely ill and require in-hospital treatment, compared to the much larger contingent that receives (or fails to receive) outpatient or community services. For these reasons, this indicator cannot be used to estimate the prevalence of mental disorders in the general population.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

The following results were found in the literature. In 2005–2006, the age-standardized rate for general hospitals in Canada was 507.1 separations per 100,000 population.[1] Over the last four years of reporting, results have been stable.

Data Sources

Discharge Abstract Database (DAD), CIHI

Ontario Mental Health Reporting System (OMHRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

Individuals can be admitted to hospital more than once for the treatment of a mental illness, and they can have more than one condition at a given time. Separation data, therefore, does not represent either the number of mental illnesses that led to the separations or the number of people with mental illness who were separated from the hospital.

While this indicator does not include data from free-standing psychiatric facilities, it is acknowledged that in some jurisdictions (for example, Alberta) direct substitution between general and psychiatric facilities exists; the extent of this practice is unknown. As such, this indicator provides a partial view of hospital utilization for mental health issues in an acute setting.

Reference

1. Canadian Institute for Health Information, *Hospital Mental Health Services in Canada 2005–2006* (Ottawa, Ont.: CIHI, 2008).

3.9 Mental Illness Patient Days Rate

Definition

Age-adjusted rate of total number of days in general hospitals[xxvi] for selected mental illness,[xxvii] per 10,000 population.

Method of Calculation

$$\frac{\text{Total number of days in hospital for selected mental illness (patients age 15 and older)}}{\text{Total mid-year population age 15 and older}} \times 10{,}000 \text{ (age adjusted)}$$

A selected mental illness is coded as most responsible diagnosis (MRDx). Diagnosis codes are

a) Substance-related disorders
ICD-10-CA: F55, F10 to F19
DSM-IV: 291.x (0, 1, 2, 3, 5, 81, 89, 9), 292.0, 292.11, 292.12, 292.81, 292.82, 292.83, 292.84, 292.89, 292.9, 303.xx (00, 90), 304.xx (00, 10, 20, 30, 40, 50, 60, 80, 90), 305.xx (00, 10 to 90 excluding 80)
Provisional diagnosis[xxviii]: (d) substance-related disorder

b) Schizophrenia, delusional and non-organic psychotic disorders
ICD-10-CA: F20 (excluding F20.4), F22, F23, F24, F25, F28, F29, F53.1
DSM-IV: 295.xx (10, 20, 30, 40, 60, 70, 90), 297.1, 297.3, 298.8, 298.9
Provisional diagnosis[xxviii]: (e) schizophrenia disorder

c) Mood/affective disorders
ICD-10-CA: F30, F31, F32, F33, F34, F38, F39, F53.0
DSM-IV: 296.0x, 296.2x, 296.3x, 296.4x, 296.5x, 296.6x, 296.7, 296.80, 296.89, 296.90, 300.4, 301.13
Provisional diagnosis[xxviii]: (f) mood disorders

d) Anxiety disorders
ICD-10-CA: F40, F41, F42, F43, F48.8, F48.9, F93.8
DSM-IV: 300.xx (00, 01, 02, 21, 22, 23, 29), 300.3, 308.3, 309.x (0, 3, 4, 9), 309.24, 309.28, 309.81
Provisional diagnosis[xxviii]: (g) anxiety disorders or (o) adjustment disorders

xxvi. Refer to the General Methodology Notes section for more information.
xxvii. The mental illnesses selected for this indicator are substance-related disorders; schizophrenia, delusional and non-organic psychotic disorders; mood/affective disorders; anxiety disorders; and selected disorders of adult personality and behavior.
xxviii. Only for data extracted from the Ontario Mental Health Reporting System (OMHRS) with no DSM-IV code recorded.

e) Selected disorders of adult personality and behaviour
ICD-10-CA: F60, F61, F62, F68, F69, F21
DSM-IV: 300.16, 300.19, 301.0, 301.20, 301.22, 301.4, 301.50, 301.6, 301.7, 301.81, 301.82, 301.83, 301.9
Provisional diagnosis[xxviii]: (p) personality disorders

For this indicator, all records with an invalid health insurance number are excluded due to the methodology used to calculate the 95% confidence intervals; details are available upon request.

Interpretation

The patient days rate is a partial measure of general hospital utilization. It does not include patients who were admitted to hospital but had not yet been discharged within the fiscal year of interest. Patient days are influenced by the number of hospitalizations and the length of stay. For the same number of hospitalizations, the rate of patient days will increase as length of stay increases. This indicator may reflect differences between jurisdictions, such as the health of the population, differing health service delivery models and variations in the availability of and accessibility to specialized, residential and/or ambulatory and community-based health services.

Standards/Benchmarks

Benchmarks have not been identified for this indicator.

Data Sources

Discharge Abstract Database (DAD), CIHI

Ontario Mental Health Reporting System (OMHRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces and territories.

Comments

While this indicator does not include data from free-standing psychiatric facilities, it is acknowledged that in some jurisdictions (for example, Alberta) direct substitution between general and psychiatric facilities exists; the extent of this practice is unknown. As such, this indicator provides a partial view of hospital utilization for mental health issues in an acute setting.

xxviii. Only for data extracted from the Ontario Mental Health Reporting System (OMHRS) with no DSM-IV code recorded.

Resources

3.10 General/Family Physicians Rate and Specialist Physicians Rate

Definition

General practitioners or family physicians (family medicine and emergency family medicine specialists) on December 31 of the reference year, per 100,000 population. Specialist physicians (medical, surgical and laboratory specialists) on December 31 of the reference year, per 100,000 population.

The data includes active physicians in clinical practice and those not working in clinical practice. Active physicians are defined as physicians that have an MD degree, are registered with a provincial/territorial medical college and have a valid address (mail sent to the physician by Scott's Directories is not returned). The data excludes residents and non-licensed physicians who requested that their information not be published in the *Canadian Medical Directory* as of December 31 of the reference year.

Method of Calculation

(Total number of general and family practitioners/total mid-year population) × 100,000

(Total number of specialists/total mid-year population) × 100,000

Physicians are geo-coded to a region based on the postal code of correspondence submitted to Scott's Medical Database. Records with invalid, missing or partial postal codes are excluded from the regional totals.

Interpretation

Physician-to-population ratios are used to support health human resources planning. While physician density ratios are useful indicators of changes in physician numbers relative to the population, inference from total numbers or ratios as to the adequacy of provider resources should not be made. Various factors influence whether the supply of physicians is appropriate, such as distribution and location of physicians within a region or province; physician type (family medicine physicians versus specialists); level of service provided (full time versus part time); physician age and gender; population access to hospitals, health care facilities, technology and other types of health care providers; population needs (demographic characteristics and health problems); and society's perceptions and expectations.

In some regions, health facilities and personnel provide services to a larger community than the residents of the immediate region. In others, residents may seek care from physicians and specialists outside the region where they live. The physician-to-population ratio reflects the number of doctors in a region and has not been adjusted to take these movements into account. The extent to which this affects individual regions is likely to vary.

Standards/Benchmarks

Benchmarks are not available for this measure.

Data Source

Scott's Medical Database (SMDB), CIHI

Reference Period

January 1, 2011, to December 31, 2011

Comprehensiveness

Available for all provinces and territories.

Comments

While the postal code of correspondence may not necessarily reconcile with a physician's place of practice, the majority of postal codes submitted refer to the physician's office, in-home office or hospital address.

Specialist physicians include certificants of the Royal College of Physicians and Surgeons of Canada (RCPSC) and/or the Collège des médecins du Québec (CMQ), unless noted otherwise. Specialists in Saskatchewan and Newfoundland and Labrador (as of 2004), Nova Scotia, New Brunswick and Yukon (as of 2007), Prince Edward Island and Quebec (as of 2009) and Alberta (as of 2010) also include physicians who are licensed as specialists but who are not certified by the RCPSC or the CMQ (non-certified specialists). For all other jurisdictions, and for above-noted provinces prior to the change, non-certified specialists are counted as family practitioners. With the exception of the criteria just noted all other physicians are counted as family practitioners, including certificants of the College of Family Physicians of Canada (CCFP and CCFP—Emergency Medicine). For further information on physician count methodologies please see CIHI's report *Supply, Distribution and Migration of Canadian Physicians* (www.cihi.ca). Depending on the jurisdiction and/or years examined, rates for previous years may not be comparable.

It is recognized that physician specialty classification as noted above does not necessarily reflect the services provided by individual physicians. The range of services provided by a physician is subject to provincial licensure rules, medical service plan payment arrangements and individual practice choices. Due to differences in data collection, processing and reporting methodology, these indicators may differ from provincial and territorial data.

Note: Scott's Medical Database (SMDB) information may undercount physicians due to provincial/territorial licensing authority data supply interruptions. SMDB data does not reflect licensing authority updates for the following jurisdictions and years: British Columbia, 2004; Quebec, 2003; Ontario, 2002; and Alberta and Yukon, 2000.

4.0 Disparity

4.1 Disparity Rate Ratio

Definition

Ratio of the rate of a health indicator for the least affluent neighbourhood income quintile to the rate for the most affluent neighbourhood income quintile.

Method of Calculation

Indicator rate for the least affluent neighbourhood income quintile／indicator rate for the most affluent neighbourhood income quintile

Interpretation

This indicator reflects the rate for the least affluent socio-economic group compared with the most affluent. It provides a summary measure of the magnitude of the socio-economic disparity for a health indicator in a jurisdiction. It should be evaluated with other measures, such as the indicator rate for each socio-economic group as well as potential rate reduction.

Standards/Benchmarks

A rate ratio of 1 indicates no disparity between the least affluent and the most affluent groups.

Data Sources

2006 Census, Statistics Canada

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces. Not available for the territories due to the small population in each quintile.

Comments

Socio-economic status was measured using neighbourhood income quintile. In the absence of personal socio-economic characteristics (that is, individual-level data) in the administrative health databases, small geographic area characteristics based on census data were used to derive neighbourhood income quintile. The methodology for defining neighbourhood income quintile is provided in the General Methodology Notes section.

Bibliography

Keppel, K. et al. “Methodological Issues in Measuring Health Disparities.” *Vital and Health Statistics, Series 2* 141. Washington, D.C.: National Center for Health Statistics, 2005.

Kunst, A. E. and J. P. Mackenbach. *Measuring Socio-Economic Inequalities in Health*. Copenhagen, Denmark: World Health Organization, 1994.

4.2 Potential Rate Reduction

Definition

Potential reduction in a health indicator rate that would occur in the hypothetical scenario that each socio-economic group in the jurisdiction experienced the rate of the most affluent socio-economic group.

Method of Calculation

$$PRR = \frac{\sum_{i=1}^{5} P_i \left(\frac{R_i}{R_5} - 1\right)}{1 + \sum_{i=1}^{5} P_i \left(\frac{R_i}{R_5} - 1\right)}$$

Where R_i and P_i are the age-standardized rate and the proportion of population in each of the five income quintiles, respectively.

Interpretation

This indicator is based on the concept of population-attributable risk and provides a summary measure of the overall effect of socio-economic disparity on a health indicator in a jurisdiction.

This indicator is relevant when disparity has been identified by other measures, such as the indicator rates for each socio-economic group and the disparity rate ratio.

Standards/Benchmarks

Benchmarks are not available for this measure.

Data Sources

2006 Census, Statistics Canada

Discharge Abstract Database (DAD), CIHI

National Ambulatory Care Reporting System (NACRS), CIHI

Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec

Reference Period

April 1, 2011, to March 31, 2012

Comprehensiveness

Available for all provinces. Not available for the territories due to the small population in each quintile.

Comments

Socio-economic status was measured using neighbourhood income quintile. In the absence of personal socio-economic characteristics (that is, individual-level data) in the administrative health databases, small geographic area characteristics based on census data were used to derive neighbourhood income quintile. The methodology for defining neighbourhood income quintile is provided in the General Methodology Notes section.

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Keppel, K. et al. “Methodological Issues in Measuring Health Disparities.” *Vital and Health Statistics, Series 2* 141. Washington, D.C.: National Center for Health Statistics, 2005.

Kunst, A. E. and J. P. Mackenbach. *Measuring Socio-Economic Inequalities in Health*. Copenhagen, Denmark: World Health Organization, 1994.

Appendix I—Defining Neighbourhood Income Quintile

Assigning Patients to Neighbourhood Income Quintiles

Each patient was assigned to a neighbourhood income quintile using Statistics Canada's Postal Code Conversion File Plus (PCCF+).[1] This software links the six-character postal codes to the standard Canadian census geographic areas (such as dissemination areas, census tracts and census subdivisions). By linking postal codes to the census geography, the file facilitates extraction of the relevant census information (for example, income) for each geographic area.

The dissemination area (DA) is the smallest geographical unit available for analysis in the Canadian Census, with a targeted population size of 400 to 700 persons.[2] Using PCCF+ (Version 5J),[3] the postal code of the patient's place of residence at the time of hospitalization was mapped to the corresponding 2006 Census DA, and the neighbourhood income quintile of that DA was assigned to the patient.

In the PCCF+, for postal codes that map to more than one DA, probabilistic assignment based on population size is used, meaning that the same postal code can be mapped to a different DA if the program is run more than once. To ensure that the same patient with the same postal code was always assigned to the same DA, a unique combination of encrypted health card number, birthdate and postal code was assigned to the same DA.

Construction of Income Quintiles for Dissemination Areas

The neighbourhood income quintiles available in the PCCF+ were constructed according to the methods developed at Statistics Canada.[4] A short description of the method is provided below.

Neighbourhood income quintiles were based on the average income per single-person equivalent in a DA obtained from the 2006 Census. This measure uses the person weights implicit in the Statistics Canada low-income cut-offs to derive "single-person equivalent" multipliers for each household size.[3] For example, a single-person household received a multiplier of 1.0, a two-person household received a multiplier of 1.24 and a three-person household received a multiplier of 1.53. To calculate average income per single-person equivalent for each DA, total income of the dissemination area was divided by the total number of single-person equivalents. Income quintile for DAs with a household population of less than 250 was imputed based on the neighbouring DAs (where possible), because census data on income for these DAs was suppressed.

Next, quintiles of population by neighbourhood income were constructed separately for each census metropolitan area, census agglomeration or residual area within each province. DAs within each such area were ranked from the lowest average income per single-person equivalent to the highest, and DAs were assigned to five groups, such that each group contained approximately one-fifth of the total non-institutional population of each area.

The quintile data was then pooled across the areas. Quintiles were constructed within each area before aggregating to the national or provincial level to minimize the potential effect of the differences in income, housing and other living costs across different areas in the country.

Limitations

Neighbourhood income quintiles derived from linking postal codes to the census are less accurate in rural areas because rural postal codes cover larger geographical areas. Another limitation is that the measure excludes people living in long-term care facilities because income data from the 2006 Canadian Census is only available for non-institutional residents. As a result, not all people can be included in the rates by neighbourhood income quintile.

References

1. Statistics Canada, *Postal Code Conversion File Plus (PCCF+)*, accessed on November 26, 2009, from <http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?lang=eng&catno=82F0086X>.
2. Statistics Canada, *2006 Census Dictionary* (Ottawa, Ont.: Statistics Canada, 2007), catalogue no. 92-566-XWE.
3. R. Wilkins and S. Khan, *PCCF+ Version 5J User's Guide. Automated Geographic Coding Based on the Statistics Canada Postal Code Conversion Files, Including Postal Codes Through May 2011* (Ottawa, Ont.: Statistics Canada, Health Analysis Division, 2011), catalogue no. 82F0086-XDB.
4. R. Wilkins et al. "Trends in Mortality by Neighbourhood Income in Urban Canada From 1971 to 1996," *Health Reports* 13, Suppl. (2002): pp. 1–27, catalogue no. 82-003-SIE.

Appendix II—Technical Notes

2.1 Wait Time for Hip Fracture Surgery

The unit of analysis is a hip fracture event, where there is both a hip fracture diagnosis and a hip fracture fixation surgery. **Wait time** is calculated from the admission date/time of the **first** hospitalization with a hip fracture diagnosis (index hospitalization) to the procedure date/time of the hip fracture surgery (surgery hospitalization). If hip fracture surgery is not performed during the index hospitalization, records are linked according to the following criteria:

1) Index and surgery hospitalizations having the same hip fracture diagnosis code(s) (coded as diagnosis type (M), (1), (W), (X) or (Y)) matching to the fourth digit of the ICD-10-CA code.
2) The time interval between the admission date for the index hospitalization and the admission date for the surgery hospitalization is within 28 days.

The hospitalization record with a hip fracture diagnosis and a hip fracture surgery (surgery hospitalization) is selected first per the denominator inclusion/exclusion criteria below. Then the search for the index hospitalization is performed.

Denominator

Inclusion criteria:

1. a) Hip fracture ICD-10-CA codes of S72.0, S72.1 or S72.2 as MRDx, but not also as a diagnosis type (2); or
   b) Where another diagnosis is coded as MRDx and also a type (2), and a diagnosis of hip fracture is coded as a diagnosis type (1) or [(W), (X), (Y), but not also as a diagnosis type (2)]; or
   c) Where convalescence or rehabilitation ICD-10-CA codes Z50.1, Z50.8, Z50.9, Z54.0, Z54.4, Z54.7, Z54.8 or Z54.9 are coded as MRDx and hip fracture coded as diagnosis type (1) or [(W), (X), (Y), but not also as a diagnosis type (2)].
2. Criterion 1 (a, b, c) along with a relevant CCI procedure code:[xxix]
   a) 1.VA.74.^^—Fixation, hip joint
   b) 1.VA 53.^^—Implantation of internal device, hip joint
   c) 1.VC.74.^^—Fixation, femur
   d) 1.SQ.53.^^—Implantation of internal device, pelvis
3. Age at admission 65 years and older
4. Sex recorded as male or female

xxix. Code may be recorded in any position. Procedures with status attribute A (abandoned after onset) or OOH indicator flag Y (out-of-hospital intervention) are excluded.

5. Admission to an acute care institution
6. Admission category recorded as emergent/urgent
7. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission or time
4. Records with an invalid discharge date or time
5. Records with an invalid procedure date or time
6. Discharged as self sign-out or did not return from a pass
7. A hip fracture event where hip fracture is coded as post-admission diagnosis [diagnosis type (2)] on the index hospitalization or the surgery hospitalization (regardless of the admission category)

Numerator

The numerator is a subset of the denominator that represents the number of hip fractures that were surgically treated within 48 hours.

2.3 Percentage of Patients With Repeat Hospitalizations for a Mental Illness

Unit of Analysis

The unit of analysis is an episode of care. An episode of care refers to all contiguous hospitalizations in general hospitals.[xxx] To construct an episode of care, a transfer is assumed to have occurred if the following condition is met:

- Admission to a general hospital/day surgery facility occurs on the same day as discharge from another general hospital.

Denominator

Number of individuals with at least one episode of care for mental illness within a year. An episode of care for mental illness is identified as follows:

Inclusion criteria:

1. A selected mental illness is coded as most responsible diagnosis (MRDx)

xxx. Excludes free-standing psychiatric facilities.

2. Diagnosis codes for selected mental illness:
   a) Substance-related disorders—ICD-10-CA: F55, F10 to F19; DSM-IV: 291.x (0, 1, 2, 3, 5, 81, 89, 9), 292.0, 292.11, 292.12, 292.81, 292.82, 292.83, 292.84, 292.89, 292.9, 303.xx (00, 90), 304.xx (00, 10, 20, 30, 40, 50, 60, 80, 90), 305.xx (00, 10 to 90 excluding 80); Provisional diagnosis[xxxi]: (d) substance-related disorder; or
   b) Schizophrenia, delusional and non-organic psychotic disorders—ICD-10-CA: F20 (excluding F20.4), F22, F23, F24, F25, F28, F29, F53.1; DSM-IV: 295.xx (10, 20, 30, 40, 60, 70, 90), 297.1, 297.3, 298.8, 298.9; Provisional diagnosis[xxxi]: (e) schizophrenia disorder; or
   c) Mood/affective disorders—ICD-10-CA: F30, F31, F32, F33, F34, F38, F39, F53.0; DSM-IV: 296.0x, 296.2x, 296.3x, 296.4x, 296.5x, 296.6x, 296.7, 296.80, 296.89, 296.90, 300.4, 301.13; Provisional diagnosis[xxxi]: (f) mood disorders; or
   d) Anxiety disorders—ICD-10-CA: F40, F41, F42, F43, F48.8, F48.9, F93.8; DSM-IV: 300.xx (00, 01, 02, 21, 22, 23, 29), 300.3, 308.3, 309.x (0, 3, 4, 9), 309.24, 309.28, 309.81; Provisional diagnosis[xxxi]: (g) anxiety disorders or (o) adjustment disorders; or
   e) Selected disorders of adult personality and behaviour—ICD-10-CA: F60, F61, F62, F68, F69, F21; DSM-IV: 301.0, 300.16, 300.19, 301.20, 301.22, 301.4, 301.50, 301.6, 301.7, 301.81, 301.82, 301.83, 301.9; Provisional diagnosis[xxxi]: (p) personality disorders.
3. Age at admission is 15 years or older
4. Sex recorded as male or female
5. Admission to a general hospital
6. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission date
4. Records with an invalid discharge date
5. Discharged as a death

Numerator

Number of individuals with three or more episodes of care for a mental illness within a year. After the first episode of care, all individuals have one year of follow-up; the second and other subsequent episodes of care are identified within a year of discharge of the first episode of care. Therefore, two fiscal years are necessary to obtain the numerator. An episode of care for a mental illness is identified using the same inclusion and exclusion criteria as for the denominator.

xxxi. Only for data extracted from the Ontario Mental Health Reporting System (OMHRS) with no DSM-IV code recorded.

2.4 30-Day Mental Illness Readmission Rate

Unit of Analysis

The unit of analysis is an episode of care. An episode of care refers to all contiguous inpatient hospitalizations in general hospitals[xxxii] and day surgery visits regardless of diagnoses. To construct an episode of care, a transfer is assumed to have occurred if the following condition is met:

- Admission to a general hospital/day surgery facility occurs on the same day as discharge from another general hospital.

Denominator (Index Episode)

Number of episodes of care for selected mental illness. These episodes are identified as follows:

Inclusion criteria:

1. A selected mental illness is coded as most responsible diagnosis (MRDx)
2. Diagnosis codes for selected mental illness:
   a) Substance-related disorders—ICD-10-CA: F55, F10 to F19; DSM-IV: 291.x (0, 1, 2, 3, 5, 81, 89, 9), 292.0, 292.11, 292.12, 292.81, 292.82, 292.83, 292.84, 292.89, 292.9, 303.xx (00, 90), 304.xx (00, 10, 20, 30, 40, 50, 60, 80, 90), 305.xx (00, 10 to 90 excluding 80); Provisional diagnosis[xxxiii]: (d) substance-related disorder; or
   b) Schizophrenia, delusional and non-organic psychotic disorders—ICD-10-CA: F20 (excluding F20.4), F22, F23, F24, F25, F28, F29, F53.1; DSM-IV: 295.xx (10, 20, 30, 40, 60, 70, 90), 297.1, 297.3, 298.8, 298.9; Provisional diagnosis[xxxiii]: (e) schizophrenia disorder; or
   c) Mood/affective disorders—ICD-10-CA: F30, F31, F32, F33, F34, F38, F39, F53.0; DSM-IV: 296.0x, 296.2x, 296.3x, 296.4x, 296.5x, 296.6x, 296.7, 296.80, 296.89, 296.90, 300.4, 301.13; Provisional diagnosis[xxxiii]: (f) mood disorders; or
   d) Anxiety disorders—ICD-10-CA: F40, F41, F42, F43, F48.8, F48.9, F93.8; DSM-IV: 300.xx (00, 01, 02, 21, 22, 23, 29), 300.3, 308.3, 309.x (0, 3, 4, 9), 309.24, 309.28, 309.81; Provisional diagnosis[xxxiii]: (g) anxiety disorders or (o) adjustment disorders; or
   e) Selected disorders of adult personality and behaviour—ICD-10-CA: F60, F61, F62, F68, F69, F21; DSM-IV: 301.0, 300.16, 300.19, 301.20, 301.22, 301.4, 301.50, 301.6, 301.7, 301.81, 301.82, 301.83, 301.9; Provisional diagnosis[xxxiii]: (p) personality disorders.
3. Discharges between April 1 and March 1 of the following year (period of case selection ends on March 1 to allow for 30 days of follow-up)
4. Age at admission is 15 years or older
5. Sex recorded as male or female

xxxii. Excludes free-standing psychiatric facilities.

xxxiii. Only for data extracted from the Ontario Mental Health Reporting System (OMHRS) with no DSM-IV code recorded.

6. Admission to a general hospital
7. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission date
4. Records with an invalid discharge date
5. Discharged as a death

Numerator

Inclusion criteria:

An episode of care is considered a readmission if the two following conditions are met:

- It has occurred within 30 days of discharge of an index episode; and
- A diagnosis of mental illness was recorded (see denominator for criteria to select diagnosis).

2.5 Ambulatory Care Sensitive Conditions (ACSCs) Hospitalization Rate

Numerator

Inclusion criteria:[xxxiv]

Any most responsible diagnosis code of

- Grand mal status and other epileptic convulsions
  ICD-9/9-CM: 345
  ICD-10-CA: G40, G41
- Chronic obstructive pulmonary diseases (COPD)
  - Any most responsible diagnosis (MRDx) code of
    ICD-9/9-CM: 491, 492, 494, 496
    ICD-10-CA: J41, J42, J43, J44, J47
  - MRDx of acute lower respiratory infection, only when a secondary diagnosis[xxxv] of J44 in ICD-10-CA or 496 in ICD-9/9-CM is also present
    ICD-9/9-CM: 466, 480–486, 487.0
    ICD-10-CA: J10.0, J11.0, J12–J16, J18, J20, J21, J22
- Asthma
  ICD-9/9-CM: 493
  ICD-10-CA: J45

xxxiv. The following diagnosis categories are presented to broadly classify ACSC cases into composite conditions and are not intended to be used for producing rates outside of the ACSC context.

xxxv. "Secondary diagnosis" refers to a diagnosis other than the most responsible one.

- Diabetes
  ICD-9: 250.0, 250.1, 250.2, 250.7
  ICD-9-CM: 250.0, 250.1, 250.2, 250.8
  ICD-10-CA: E10.0^^, E10.1^^, E10.63, E10.64, E10.9^^
  E11.0^^, E11.1^^, E11.63, E11.64, E11.9^^
  E13.0^^, E13.1^^, E13.63, E13.64, E13.9^^
  E14.0^^, E14.1^^, E14.63, E14.64, E14.9^^
- Heart failure and pulmonary edema*
  ICD-9/9-CM: 428, 518.4
  ICD-10-CA: I50, J81

  * Excluding cases with cardiac procedures.
- Hypertension*
  ICD-9/9-CM: 401.0, 401.9, 402.0, 402.1, 402.9
  ICD-10-CA: I10.0, I10.1, I11

  * Excluding cases with cardiac procedures.
- Angina*
  ICD-9: 411, 413
  ICD-9-CM: 411.1, 411.8, 413
  ICD-10-CA: I20, I23.82, I24.0, I24.8, I24.9

  * Excluding cases with cardiac procedures.

List of cardiac procedure codes[xxxvi] for exclusion:

CCP: 47^^, 480^–483^, 489.1, 489.9, 492^–495^, 497^, 498^
ICD-9-CM: 336, 35^^, 36^^, 373^, 375^, 377^, 378^, 379.4–379.8
CCI: 1HA58, 1HA80, 1HA87, 1HB53, 1HB54, 1HB55, 1HB87, 1HD53, 1HD54, 1HD55, 1HH59, 1HH71, 1HJ76, 1HJ82, 1HM57, 1HM78, 1HM80, 1HN71, 1HN80, 1HN87, 1HP76, 1HP78, 1HP80, 1HP82, 1HP83, 1HP87, 1HR71, 1HR80, 1HR84, 1HR87, 1HS80, 1HS90, 1HT80, 1HT89, 1HT90, 1HU80, 1HU90, 1HV80, 1HV90, 1HW78, 1HW79, 1HX71, 1HX78, 1HX79, 1HX80, 1HX83, 1HX86, 1HX87, 1HY85, 1HZ53 rubric (except 1HZ53LAKP), 1HZ55 rubric (except 1HZ55LAKP), 1HZ56, 1HZ57, 1HZ59, 1HZ80, 1HZ85, 1HZ87, 1IF83, 1IJ50, 1IJ55, 1IJ57, 1IJ76, 1IJ86, 1IJ80, 1IK57, 1IK80, 1IK87, 1IN84, 1LA84, 1LC84, 1LD84, 1YY54LANJ

Exclusion criteria:

1. Death before discharge
2. Individuals age 75 years and older
3. Admission category recorded as newborn, stillbirth or cadaveric donor

xxxvi. Code may be recorded in any position. Procedures coded as abandoned after onset are excluded.

Comments

A new combination code for acute lower respiratory infections in patients with chronic obstructive pulmonary disease (COPD), J44.0, was introduced with ICD-10-CA and has no equivalents in ICD-9/ICD-9-CM. According to the Canadian Coding Standards, if COPD patients present with acute respiratory infections, only J44.0 should be used, not the other codes from the J44 rubric. This code should be assigned as most responsible diagnosis (MRDx), with pneumonia assigned as a secondary diagnosis. To ensure that COPD patients who present with acute lower respiratory infections are captured and to correct evident erroneous application of the combination code, cases coded with a primary diagnosis of an acute lower respiratory infection and a secondary diagnosis of J44 are also included in the COPD case count.

A unique code for diabetes with hypoglycemia (ICD-10-CA: E10.63, E11.63, E13.63, E14.63) does not exist in the ICD-9/ICD-9-CM classification systems. This condition was coded using ICD-9 code 250.7 and ICD-9-CM code 250.8, which also included diabetes with other specific manifestations. However, this should have minimal effect on the comparability of rates coded based on ICD-9 and ICD-10 coding systems.

2.6 30-Day Acute Myocardial Infarction In-Hospital Mortality Rate

Unit of Analysis

The unit of analysis is an episode of care. An episode of care refers to all contiguous inpatient acute care hospitalizations. For episodes with transfers within or between facilities, transactions were linked regardless of diagnoses. To construct an episode of care, a transfer is assumed to have occurred if admission to an acute care institution occurs on the same day as or prior to discharge from another inpatient hospitalization.

Denominator (Index Episode)

Inclusion criteria:

1. a) Acute myocardial infarction (AMI) (ICD-10-CA: I21, I22; ICD-9/ICD-9-CM: 410) is coded as MRDx but not also as a diagnosis type (2); or
   b) Where another diagnosis is coded as MRDx and also a diagnosis type (2), and a diagnosis of AMI is coded as a type (1), or [type (W), (X) or (Y) but not also as type (2)]; or
   c) Where coronary artery disease (ICD-10-CA: I25.0, I25.1, I25.8, I25.9; ICD-9/ICD-9-CM: 429.2, 414.0, 414.8, 414.9) is coded as MRDx, AMI as type (1), or [type (W), (X) or (Y) but not also as type (2)]; along with revascularization procedure (percutaneous coronary intervention [CCI: 1.IJ.50^^, 1.IJ.57.GQ^^, 1.IJ.54.GQ-AZ[xxxvii]; CCP: 48.02, 48.03; ICD-9-CM: 36.01, 36.02, 36.05] or coronary artery bypass [CCI: 1.IJ.76^^; CCP: 48.1^; ICD-9-CM: 36.1^])
2. Admission between April 1 and March 1 of the following year (period of case selection ends March 1 to allow for 30 days of follow-up)

xxxvii. Use for 2006–2007 to 2008–2009 only.

3. Age at admission between 20 and 105 years
4. Sex recorded as male or female
5. Admission to an acute care institution
6. Admission category recorded as urgent/emergent
7. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission date
4. Records with an invalid discharge date
5. Records with an AMI admission within one year prior to the admission date of the index episode
6. Records where the AMI coded as most responsible is also coded as a post-admission diagnosis [diagnosis type (2)]

Numerator

The numerator is a subset of the denominator meeting the following condition:

- All-cause in-hospital death within 30 days of admission for AMI.

2.7 30-Day Stroke In-Hospital Mortality Rate

Unit of Analysis

The unit of analysis is an episode of care. An episode of care refers to all contiguous inpatient acute care hospitalizations. For episodes with transfers within or between facilities, transactions were linked regardless of diagnoses. To construct an episode of care, a transfer is assumed to have occurred if admission to an acute care institution occurs on the same day as or prior to discharge from another inpatient hospitalization.

Denominator (Index Episode)

Inclusion criteria:

1. a) Stroke[xxxviii] (ICD-10-CA: I60–I64; ICD-9-CM: 430–432; 433–434 with **fifth** digit of 1; 436) is coded as MRDx but not also as a diagnosis type (2); or
   b) Where another diagnosis is coded as MRDx and also a diagnosis type (2), and a diagnosis of stroke is coded as a type (1), or [type (W), (X) or (Y) but not also as type (2)]; or
   c) Where rehabilitation (ICD-10: Z50.1, Z50.4–Z50.9; ICD-9-CM: V57) is coded as MRDx and stroke as a type (1), or [type (W), (X) or (Y) but not also as type (2)].

xxxviii. Cerebral infarctions due to thrombosis/embolism of precerebral arteries (ICD-10-CA: I63.0, I63.1, I63.2; ICD-9-CM: 433 with **fifth** digit of 1) cannot be uniquely identified in ICD-9; therefore, the current definition is not recommended for the ICD-9 coding system.

2. Admission between April 1 and March 1 of the following year (period of case selection ends March 1 to allow for 30 days of follow-up)
3. Age at admission between 20 and 105 years
4. Sex recorded as male or female
5. Admission to an acute care institution
6. Admission category recorded as urgent/emergent
7. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission date or time
4. Records with an invalid discharge date or time
5. Records with a stroke admission within one year prior to the admission date of the index episode
6. Records where the stroke coded as most responsible is also coded as a post-admission diagnosis [diagnosis type (2)]

Numerator

The numerator is a subset of the denominator meeting the following condition:

- All-cause in-hospital death within 30 days of admission for stroke.

2.8 30-Day Acute Myocardial Infarction Readmission Rate

Unit of Analysis

The unit of analysis is an episode of care. An episode of care refers to all contiguous in-patient hospitalizations and same day surgery visits. For episodes with transfers within or between facilities, transactions were linked regardless of diagnoses. To construct an episode of care, a transfer is assumed to have occurred if either of the following conditions is met:

- Acute care hospitalization or same day surgery visit occurs within six hours of discharge from previous acute care hospitalization or same day surgery visit, regardless of whether the transfer is coded;
- Acute care hospitalization or same day surgery visit occurs within 6–12 hours of discharge from the previous acute care hospitalization or same day surgery visit, and at least one of the hospitalizations or visits has coded the transfer.

Denominator (Index Episode)

Inclusion criteria:

1. a) Acute myocardial infarction (AMI) (ICD-10-CA: I21, I22; ICD-9/ICD-9-CM: 410) is coded as MRDx but not also as a diagnosis type (2); or
   b) Where another diagnosis is coded as MRDx and also as a diagnosis type (2), and a diagnosis of AMI is coded as a type (1) or [type (W), (X) or (Y) but not also as type (2)]; or
   c) Where coronary artery disease (ICD-10-CA: I25.0, I25.1, I25.8, I25.9; ICD-9/ICD-9-CM: 429.2, 414.0, 414.8, 414.9) is coded as MRDx, AMI is coded as type (1) or [type (W), (X) or (Y) but not also as type (2)] along with a revascularization procedure (percutaneous coronary intervention [CCI: 1.IJ.50^^, 1.IJ.57.GQ^^, 1.IJ.54.GQ-AZ;[xxxix] CCP: 48.02, 48.03; ICD-9-CM: 36.01, 36.02, 36.05] or coronary artery bypass [CCI: 1.IJ.76^^; CCP: 48.1^; ICD-9-CM: 36.1^]).
2. Episodes involving inpatient care. An episode may start or end in a day surgery setting. Episodes that both start and end in day surgery settings are not included.
3. Discharge between April 1 and March 1 of the following year (period of case selection ends March 1 to allow for 30 days of follow-up)
4. Age 20 years and older
5. Sex recorded as male or female
6. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission date or time
4. Records with an invalid discharge date or time
5. Discharged as a death or self sign-out or did not return from a pass
6. Any one of the following diagnoses recorded in any position in the index episode:
   - Cancer (ICD-9/ICD-9-CM: 140–208, V58.1, V58.0; or ICD-10-CA: C00–C97, Z51.0 and Z51.1)
   - HIV (ICD-9: 042, 043, 044, 795.8; or ICD-9-CM: 042, 043, 044, 795.71, V08; or ICD-10-CA: B24, Z21, R75 and O98.7)
   - Trauma (ICD-9/ICD-9-CM: E800–848, E880–886, E888, E890–899, E900–910, E913–926, E928, E950–958, E960–968, E970–976, E990–998; or ICD-10-CA:
     – One of the following external cause codes: V01–V99, W00–W23, W25–W27, W30, W31, W33–W40, W44, W45, W50–W60, W64–W70, W73–W77, W81, W83–W84, W85–W99, X00–X09, X10–X19, X20–X29, X30, X31, X33–X38, X51, X53, X54, X57, X60–X84, X85–Y09, Y35.0–Y35.4, Y35.6, Y35.7 and Y36

xxxix. Use for 2006–2007 to 2008–2009 only.

– **and** at least one S or T code but not one of the following: S00, S10, S20, S30, S40, S50, S60, S70, S80, S90, T00, T090, T110, T130, T140, T201, T205, T211, T215, T221, T225, T231, T235, T241, T245, T251, T255, T291, T295, T301, T305, T33, T350, T900, T36–T65, T96, T97, T78 or T80–T88)

Numerator

Inclusion criteria:

1. Cases within the denominator with a readmission within 30 days of discharge after the index episode of care
2. Emergent or urgent (non-elective) readmission to an acute care hospital

2.9 30-Day Obstetric Readmission Rate

Unit of Analysis

The unit of analysis is an episode of care. An episode of care refers to all contiguous in-patient hospitalizations and same day surgery visits. For episodes with transfers within or between facilities, transactions were linked regardless of diagnoses. To construct an episode of care, a transfer is assumed to have occurred if either of the following conditions is met:

- An acute care hospitalization or a same day surgery visit occurs within six hours of discharge from the previous acute care hospitalization or same day surgery visit, regardless of whether the transfer is coded;
- An acute care hospitalization or same day surgery visit occurs within 6–12 hours of discharge from the previous acute care hospitalization or same day surgery visit, and at least one of the hospitalizations or visits has coded the transfer.

Denominator (Index Episode)

Please refer to the flowchart (Appendix IV) for an illustration.

Inclusion criteria:

1. Episodes involving inpatient care. An episode may start or end in a day surgery setting. Episodes that both start and end in day surgery settings are not included.
2. Presence of at least one record in the episode with major clinical category (MCC) 13 (Pregnancy and Childbirth)
3. Discharge between April 1 and March 1 of the following year (period of case selection ends on March 1 of the following year to allow for 30 days of follow-up)
4. Sex recorded as female
5. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission date or time
4. Records with an invalid discharge date or time
5. Records with admission category of newborn
6. Records with admission category of stillbirth or cadaveric donor
7. Episodes with discharge as death or self sign-out
8. Presence of at least one record in the episode with MCC 17 (Mental Diseases and Disorders)
9. Presence of at least one record in the episode with palliative care (ICD-10-CA: Z51.5) coded as most responsible diagnosis (MRDx). (For Quebec MED-ÉCHO data: Z51.5 coded as MRDx or cancer (C00–C97) coded as MRDx and Z51.5 coded in any secondary diagnosis field)

Numerator

Inclusion criteria:

1. Cases within the denominator with a readmission within 30 days of discharge after the index episode of care
2. Emergent or urgent (non-elective) readmission to an acute care hospital

Exclusion criteria:

Presence of at least one record in the episode with one of the following:

- Delivery (ICD-10-CA: O10–O16, O21–O29, O30–O37, O40–O46, O48, O60–O69, O70–O75, O85–O89, O90–O92, O95, O98, O99 with a sixth digit of 1 or 2; or Z37 recorded in any diagnosis field)
- Chemotherapy for neoplasm (ICD-10-CA: Z51.1) as MRDx

2.10 30-Day Readmission—Patients Age 19 and Younger

Unit of Analysis

The unit of analysis is an episode of care. An episode of care refers to all contiguous in-patient hospitalizations and same-day surgery visits. For episodes with transfers within or between facilities, transactions were linked regardless of diagnoses. To construct an episode of care, a transfer is assumed to have occurred if either of the following conditions is met:

- An acute care hospitalization or a same day surgery visit occurs within six hours of discharge from the previous acute care hospitalization or same day surgery visit, regardless of whether the transfer is coded;
- An acute care hospitalization or same day surgery visit occurs within 6–12 hours of discharge from the previous acute care hospitalization or same day surgery visit, and at least one of the hospitalizations or visits has coded the transfer.

Denominator (Index Episode)

Please refer to the flowchart (Appendix IV) for an illustration.

Inclusion criteria:

1. Episodes involving inpatient care. An episode may start or end in a day surgery setting. Episodes that both start and end in day surgery settings are not included.
2. Age younger than 20 years
3. Discharge between April 1 and March 1 of the following year (period of case selection ends on March 1 of the following year to allow for 30 days of follow-up)
4. Sex recorded as male or female
5. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission date or time
4. Records with an invalid discharge date or time
5. Records with admission category of newborn
6. Records with admission category of stillbirth or cadaveric donor
7. Episodes with discharge as death or self sign-out
8. Presence of at least one record in the episode with major clinical category (MCC) 17 (Mental Diseases and Disorders)
9. Presence of at least one record in the episode with MCC 13 (Pregnancy and Childbirth)
10. Presence of at least one record in the episode with palliative care (ICD-10-CA: Z51.5) coded as most responsible diagnosis (MRDx). (For Quebec MED-ÉCHO data: Z51.5 coded as MRDx or cancer (C00–C97) coded as MRDx and Z51.5 coded in any secondary diagnosis field)

Numerator

Inclusion criteria:

1. Cases within the denominator with a readmission within 30 days of discharge after the index episode of care
2. Emergent or urgent (non-elective) readmission to an acute care hospital

Exclusion criteria:

Presence of at least one record in the episode with one of the following:

- Delivery (ICD-10-CA: O10–O16, O21–O29, O30–O37, O40–O46, O48, O60–O69, O70–O75, O85–O89, O90–O92, O95, O98, O99 with a sixth digit of 1 or 2; or Z37 recorded in any diagnosis field)
- Chemotherapy for neoplasm (ICD-10-CA: Z51.1) as MRDx

2.11 30-Day Surgical Readmission Rate

Unit of Analysis

The unit of analysis is an episode of care. An episode of care refers to all contiguous in-patient hospitalizations and same day surgery visits. For episodes with transfers within or between facilities, transactions were linked regardless of diagnoses. To construct an episode of care, a transfer is assumed to have occurred if either of the following conditions is met:

- An acute care hospitalization or a same day surgery visit occurs within six hours of discharge from the previous acute care hospitalization or same day surgery visit, regardless of whether the transfer is coded;
- An acute care hospitalization or same day surgery visit occurs within 6–12 hours of discharge from the previous acute care hospitalization or same day surgery visit, and at least one of the hospitalizations or visits has coded the transfer.

Denominator (Index Episode)

Please refer to the flowchart (Appendix IV) for an illustration.

Inclusion criteria:

1. Episodes involving inpatient care. An episode may start or end in a day surgery setting. Episodes that both start and end in day surgery settings are not included.
2. Major clinical category (MCC) partition is “intervention”
3. Discharge between April 1 and March 1 of the following year (period of case selection ends on March 1 of the following year to allow for 30 days of follow-up)
4. Age 20 years and older
5. Sex recorded as male or female
6. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission date or time
4. Records with an invalid discharge date or time
5. Records with admission category of newborn
6. Records with admission category of stillbirth or cadaveric donor
7. Episodes with discharge as death or self sign-out
8. Presence of at least one record in the episode with MCC 17 (Mental Diseases and Disorders)

9. Presence of at least one record in the episode with MCC 13 (Pregnancy and Childbirth)
10. Presence of at least one record in the episode with palliative care (ICD-10-CA: Z51.5) coded as most responsible diagnosis (MRDx). (For Quebec MED-ÉCHO data: Z51.5 coded as MRDx or cancer (C00–C97) coded as MRDx and Z51.5 coded in any secondary diagnosis field)

Numerator

Inclusion criteria:

1. Cases within the denominator with a readmission within 30 days of discharge after the index episode of care
2. Emergent or urgent (non-elective) readmission to an acute care hospital

Exclusion criteria:

Presence of at least one record in the episode with one of the following:

- Delivery (ICD-10-CA: O10–O16, O21–O29, O30–O37, O40–O46, O48, O60–O69, O70–O75, O85–O89, O90–O92, O95, O98, O99 with a sixth digit of 1 or 2; or Z37 recorded in any diagnosis field)
- Chemotherapy for neoplasm (ICD-10-CA: Z51.1) as MRDx

2.12 30-Day Medical Readmission Rate

Unit of Analysis

The unit of analysis is an episode of care. An episode of care refers to all contiguous in-patient hospitalizations and same day surgery visits. For episodes with transfers within or between facilities, transactions were linked regardless of diagnoses. To construct an episode of care, a transfer is assumed to have occurred if either of the following conditions is met:

- An acute care hospitalization or a same day surgery visit occurs within six hours of discharge from the previous acute care hospitalization or same day surgery visit, regardless of whether the transfer is coded;
- An acute care hospitalization or same day surgery visit occurs within 6–12 hours of discharge from the previous acute care hospitalization or same day surgery visit, and at least one of the hospitalizations or visits has coded the transfer.

Denominator (Index Episode)

Please refer to the flowchart (Appendix IV) for an illustration.

Inclusion criteria:

1. Episodes involving inpatient care. An episode may start or end in a day surgery setting. Episodes that both start and end in day surgery settings are not included.
2. Major clinical category (MCC) partition is not “intervention”
3. Discharge between April 1 and March 1 of the following year (period of case selection ends on March 1 of the following year to allow for 30 days of follow-up)

4. Age 20 years and older
5. Sex recorded as male or female
6. Canadian resident

Exclusion criteria:

1. Records with an invalid health card number
2. Records with an invalid date of birth
3. Records with an invalid admission date or time
4. Records with an invalid discharge date or time
5. Records with admission category of newborn
6. Records with admission category of stillbirth or cadaveric donor
7. Episodes with discharge as death or self sign-out
8. Presence of at least one record in the episode with MCC 17 (Mental Diseases and Disorders)
9. Presence of at least one record in the episode with MCC 13 (Pregnancy and Childbirth)
10. Presence of at least one record in the episode with palliative care (ICD-10-CA: Z51.5) coded as most responsible diagnosis (MRDx). (For Quebec MED-ÉCHO data: Z51.5 coded as MRDx or cancer (C00–C97) coded as MRDx and Z51.5 coded in any secondary diagnosis field)

Numerator

Inclusion criteria:

1. Cases within the denominator with a readmission within 30 days of discharge after the index episode of care
2. Emergent or urgent (non-elective) readmission to an acute care hospital

Exclusion criteria:

Presence of at least one record in the episode with one of the following:

- Delivery (ICD-10-CA: O10–O16, O21–O29, O30–O37, O40–O46, O48, O60–O69, O70–O75, O85–O89, O90–O92, O95, O98, O99 with a sixth digit of 1 or 2; or Z37 recorded in any diagnosis field)
- Chemotherapy for neoplasm (ICD-10-CA: Z51.1) as MRDx

2.14 Potentially Avoidable Mortality and Mortality From Preventable and Treatable Causes

Numerator: Deaths at age younger than 75 with one of the following underlying causes of death.

Causes of Death	ICD-9 Codes	ICD-10 Codes	Preventable (Incidence Reduction)	Treatable (Case-Fatality Reduction)
Infections				
Enteritis and other diarrhoeal disease	001–009	A00–A09	x	
Tuberculosis	010–018 137	A16–A19 B90 J65		x
Vaccine-preventable diseases	032, 033, 036, 037 038.2 041.5, 045 052, 055, 056 481, 482.2, 487 320.0, 320.1	A35–A37, A39 A40.3, A41.3 A49.2, A80 B01, B05, B06 J09–J11, J13, J14 G00.0, G00.1	x	
Selected invasive bacterial infections	034.1 482.8 041.0	A38, A48.1 A49.1		x
Sepsis	038 (except 038.2)	A40 (except A40.3) A41 (except A41.3)		x
Malaria	084	B50–B54		x
Meningitis	320.2,3,8,9	G00.2,3,8,9		x
Cellulitis	035 681, 682	A46 L03		x
Pneumonia	480, 482.0,1,3,4 483, 485, 486, 514	J12, J15, J16, J18		x
Sexually transmitted infections, except HIV/AIDS	131, 054.1,7 078.1, 090–098 099.0,1,2,8,9	A50–A60, A63, A64	x	
Viral hepatitis	070	B15–B19	x	
HIV/AIDS	042.0–044.9	B20–B24	x	
Neoplasms				
Lip, oral cavity and pharynx cancer	140–149	C00–C14	x	
Esophageal cancer	150	C15	x	
Stomach cancer	151	C16	x	
Colorectal cancer	153, 154	C18–C21		x
Liver cancer	155	C22	x	
Lung cancer	162	C33, C34	x	
Melanoma skin cancer	172	C43	x	

Causes of Death	ICD-9 Codes	ICD-10 Codes	Preventable (Incidence Reduction)	Treatable (Case-Fatality Reduction)
Neoplasms (cont'd)				
Non-melanoma skin cancer	173	C44	x	
Malignant neoplasm of breast	174	C50		x (female only)
Cervical cancer	180	C53		x
Uterus cancer	179, 182	C54, C55		x
Testicular cancer	186	C62		x
Bladder cancer	188	C67		x
Thyroid cancer	193	C73		x
Hodgkin's disease	201	C81		x
Leukemia	204.0,1; 205.1	C91.0, C91.1, C92.1		x (age <45)
Benign neoplasms	210–229	D10–D36		x
Diseases of the Circulatory System				
Rheumatic heart disease	391–398	I01, I02, I05–I09	x	
Hypertensive diseases	401 402–405	I10 I11–I13, I15		x
Cerebrovascular diseases	430–432 433, 434, 436–438	I60–I62 I63–I64, I67, I69	x (50%)	x (50%)
Ischaemic heart disease	410–414 423.0,9; 429.5,6,8	I20–I25	x (50%)	x (50%)
Other atherosclerosis	440, 443.9	I70, I73.9	x (50%)	x (50%)
Aortic aneurysm	441	I71	x	
Venous thromboembolism	415 451 453.9	I26 I80 I82.9	x	
Diseases of the Respiratory System				
Chronic obstructive pulmonary disorders	490–492, 496	J40–J44	x	
Asthma and bronchiectasis	493, 494	J45, J47		x
Acute lower respiratory infections	466.0	J20, J22		x
Upper respiratory infections	034.0, 460–465 470–478	J00–J06 J30–J39		x
Lung diseases due to external agents	117.3, 495 500–508 511.0, 518.3	C45, J60–J64, J66–J70, J82, J92	x	

Causes of Death	ICD-9 Codes	ICD-10 Codes	Preventable (Incidence Reduction)	Treatable (Case-Fatality Reduction)
Diseases of the Respiratory System (cont'd)				
Adult respiratory distress syndrome	518.5	J80		x
Pulmonary oedema	518.4	J81		x
Abscess of lung and mediastinum; pyothorax	513, 510	J85, J86		x
Other pleural disorders	511.9, 512	J90, J93, J94		x
Other respiratory disorders	518.0,1,2,8 519.1,3,4,8,9	J98		x
Diseases of the Digestive System				
Peptic ulcer disease	531–534	K25–K28		x
Diseases of appendix; hernia; disorders of gallbladder, biliary tract and pancreas	540–543 550–553 574–576 577	K35–K38 K40–K46 K80–K83 K85.0,1,3,8,9 K86.1,2,3,8,9		x
Chronic liver disease (excluding alcohol-related disease)	571.4,5,9	K73, K74.0,1,2,6	x	
Diseases of the Genitourinary System				
Nephritis and nephrosis	580–583	N00–N07		x
Renal failure	584–586	N17–N19		x
Obstructive uropathy, urolithiasis and prostatic hyperplasia	590.8, 591, 592 593.3,5,7; 594 598, 599.6, 600	N13, N20, N21, N23 N35, N40		x
Inflammatory diseases of genito-urinary system	099.4, 614, 615 616.0,2,3,4,5	N34.1, N70–N73 N75.0, N75.1, N76.4 N76.6		x
Disorders resulting from impaired renal tubular function	588	N25		x
Infant and Maternal Causes				
Complications of perinatal period	771.3	A33	x	
	363.4 760–779 (except 779.4)	H31.1 P00–P96		x
Congenital malformations, deformations and chromosomal anomalies	740–759	Q00–Q99		x

Causes of Death	ICD-9 Codes	ICD-10 Codes	Preventable (Incidence Reduction)	Treatable (Case-Fatality Reduction)
Infant and Maternal Causes (cont'd)				
Pregnancy, childbirth and the puerperium	630–676	O00–O99		x
Unintentional Injuries				
Transport accidents	E800–E848	V01–V99	x	
Falls	E880–E886, E888	W00–W19	x	
Other external causes of accidental injury	E887, E900–E909 E911–E928	W20–W64 W75–W99 X10–X39, X50–X59	x	
Drowning	E910	W65–W74	x	
Fires and flames	E890–E899	X00–X09	x	
Accidental poisonings	E850–E858 E860–E869	X40–X49	x	
Injuries of Undetermined Intent				
Injuries of undetermined intent	E980–E989	Y10–Y34	x	
Intentional Injuries				
Suicide and self-inflicted injuries	E950–E959	X60–X84, Y87.0	x	
Assault	E960–E969	X85–X99 Y00–Y09, Y87.1	x	
Alcohol and Drug Use Disorders				
Alcohol-related diseases, excluding external causes	291, 303, 305.0 357.5, 425.5 535.3 571.0,1,2,3	F10, G31.2 G62.1, I42.6 K29.2 K70, K85.2, K86.0	x	
Drug use disorders	292, 304 305 (except 305.0,1)	F11–F16, F18, F19	x	
Nutritional, Endocrine and Metabolic Disorders				
Nutritional deficiency anaemia	280, 281	D50–D53	x	
Thyroid disorders	240.0,9 241.0,1,9 242–246	E00–E07		x
Diabetes mellitus	250	E10–E14	x (50%)	x (50%)
Adrenal disorders	255	E24, E25, E27		x
Congenital metabolic disorders	271.0,1	E74.0, E74.2		x
Neurological Disorders				
Epilepsy	345	G40, G41		x
Disorders of Musculoskeletal System				
Osteomyelitis	730.0,1,2,3	M86		x

Causes of Death	ICD-9 Codes	ICD-10 Codes	Preventable (Incidence Reduction)	Treatable (Case-Fatality Reduction)
Adverse Effects of Medical and Surgical Care				
Drugs, medicaments and biological substances causing adverse effects in therapeutic use	E930–E949	Y40–Y59	x	
Misadventures to patients during surgical and medical care	E870–E876	Y60–Y66, Y69	x	
Medical devices associated with adverse incidents in diagnostic and therapeutic use	No corresponding codes	Y70–Y82	x	
Surgical and other medical procedures as the cause of abnormal reaction	E878, E879	Y83, Y84	x	

Appendix III—Model Specifications

2.1 Wait Time for Hip Fracture Surgery (Proportion With Surgery Within 48 Hours), 2011–2012

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)	ICD-9/ICD-9-CM	ICD-10-CA	Qualifier
Intercept	1.6801	<.0001			
Sex (Male = 1, Female = 0)	-0.1970	<.0001			
Heart Failure or Pulmonary Edema	-0.8238	<.0001	428, 518.4	I50, J81	Type 1, or [type (W), (X), (Y), but not type (2)]
Chronic Obstructive Pulmonary Disease	-0.6752	<.0001	491, 492, 494, 496	J41, J42, J43, J44, J47	Type 1, or [type (W), (X), (Y), but not type (2)]
Ischemic Heart Disease (Acute)	-1.3364	<.0001	410, 411, 413	I20, I21, I22, I24,	Type 1, or [type (W), (X), (Y), but not type (2)]
Cardiac Dysrhythmias	-0.7059	<.0001	427.0–427.4; 427.6–427.9	I47, I48, I49	Type 1, or [type (W), (X), (Y), but not type (2)]
Ischemic Heart Disease (Chronic)	-0.6641	0.0008	412, 414	I25	Type 1, or [type (W), (X), (Y), but not type (2)]
Hypertension	-0.3194	0.0005	401.0, 401.1, 401.9, 402.0, 402.1, 402.9	I10.1, I10.0, I11	Type 1, or [type (W), (X), (Y), but not type (2)]
Diabetes With Complications	-0.2625	<.0001	250.1–250.9	E10.0–E10.7, E11.0–E11.7, E13.0–E13.7, E14.0–E14.7	Type 1, 3 or [type (W), (X), (Y), but not type (2)]
Age 85 to 94	-0.0338	0.4026			
Age 95 and Older	0.0157	0.8537			

2.3 Percentage of Patients With Repeat Hospitalizations for a Mental Illness, 2010–2011

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)	ICD-10-CA; DSM-IV
Intercept	-3.1939	<.0001	
Sex (Male = 1, Female = 0)	-0.0292	0.1771	
Age 20 to 50	0.3797	<.0001	
Age 51 to 64	0.6507	<.0001	
Age 65 and Older	0.4837	<.0001	
Mood Disorder	0.4550	<.0001	Refer to the Technical Notes for details
Substance Abuse–Related Disorder	0.9460	<.0001	Refer to the Technical Notes for details
Schizophrenia	0.4242	<.0001	Refer to the Technical Notes for details
Personality Disorder	0.9604	<.0001	Refer to the Technical Notes for details
Discharged Against Medical Advice (Yes = 1)	0.4555	<.0001	

2.4 30-Day Mental Illness Readmission Rate, 2011–2012

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)	ICD-10-CA; DSM-IV
Intercept	-2.2906	<.0001	
Sex (Male = 1, Female = 0)	-0.0192	0.3175	
Age 20 to 34	0.1125	0.0014	
Age 35 to 49	-0.0458	0.1972	
Age 50 to 64	-0.1461	<.0001	
Age 65 and Older	-0.3119	<.0001	
Multiple Previous Admissions for a Selected Mental Illness (Two and More) During the Past 12 Months	1.2012	<.0001	Refer to the Technical Notes for details
Discharged Against Medical Advice (Yes = 1)	0.8520	<.0001	
Substance Abuse–Related Disorder	-0.1149	<.0001	Refer to the Technical Notes for details
Schizophrenia	0.1494	<.0001	Refer to the Technical Notes for details
Anxiety Disorder	-0.3248	<.0001	Refer to the Technical Notes for details
Personality Disorder	0.2338	<.0001	Refer to the Technical Notes for details

2.6 30-Day AMI In-Hospital Mortality Rate, 2009–2010 to 2011–2012

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)	ICD-9/ICD-9-CM	ICD-10-CA	Qualifier
Intercept	-4. 5760	<0.0001			
Sex (Male = 0, Female = 1)	0.1089	<0.0001			
Age 50 to 64	0.6069	<0.0001			
Age 65 to 74	1.3942	<0.0001			
Age 75 and Older	2.3570	<0.0001			
Shock	2.5334	<0.0001	785.5	R57	Type 1, or [type (W), (X), (Y), but not type (2)]
Diabetes With Complications	0.0887	0.0017	250.1–250.9	E100–E107, E110–E117, E130–E137, E140–E147	Type 1, or [type (W), (X), (Y), but not type (2)]
Heart Failure	0.5644	<0.0001	428.x	I50	Type 1, or [type (W), (X), (Y), but not type (2)]
Cancer	0.8617	<0.0001	140.x–208.x, V58.0, V58.1	C00–C26, C30–C44, C45–C97, Z51.0, Z51.1	Type 1, or [type (W), (X), (Y), but not type (2)]
Cerebrovascular Disease	0.9255	<0.0001	430.x–438.x	I60, I61, I62, I63, I64, I65, I66, I67, I69, G45.0–G45.2, G45.4, G45.8, G45.9	Type 1, or [type (W), (X), (Y), but not type (2)]
Pulmonary Edema	0.8634	<0.0001	518.4, 514.x	J81	Type 1, or [type (W), (X), (Y), but not type (2)]
Renal Failure	0.9747	<0.0001	584.x, 585.x, 586.x, 403.x1, 404.x2, 404.x3, 788.5	N17, N18, N19 I12, I13, R34	Type 1, or [type (W), (X), (Y), but not type (2)]
Cardiac Dysrhythmias	0.1328	0.0008	427.0–427.4; 427.6–427.9	I47, I48, I49	Type 1, or [type (W), (X), (Y), but not type (2)]

2.7 30-Day Stroke In-Hospital Mortality Rate, 2009–2010 to 2011–2012

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)	ICD-9-CM	ICD-10-CA Codes	Qualifier
Intercept	-3.1595	<0.0001			
Sex (Male = 0, Female = 1)	0.0883	<0.0001			
Age 50 to 64	0.2791	<0.0001			
Age 65 to 74	0.6061	<0.0001			
Age 75 and Older	1.2991	<0.0001			
Shock	1.6510	<0.0001	785.5	R57	Type 1, or [type (W), (X), (Y), but not type (2)]
Heart Failure	0.7882	<0.0001	428.x	I50	Type 1, or [type (W), (X), (Y), but not type (2)]
Cancer	0.7685	<0.0001	140.x–208.x, V58.0, V58.1	C00–C26, C30–C44, C45–C97, Z51.0, Z51.1	Type 1, or [type (W), (X), (Y), but not type (2)]
Pulmonary Edema	1.3713	<0.0001	518.4, 514.x	J81	Type 1, or [type (W), (X), (Y), but not type (2)]
Renal Failure	0.4503	<0.0001	584.x, 585.x, 586.x, 403.x1, 404.x2, 404.x3, 788.5	N17, N18, N19, I12, I13, R34	Type 1, or [type (W), (X), (Y), but not type (2)]
Cardiac Dysrhythmias	0.00474	0.8956	427.0–427.4; 427.6–427.9	I47, I48, I49	Type 1, or [type (W), (X), (Y), but not type (2)]
Ischemic Heart Disease (Acute)	0.8936	<0.0001	410.x, 411.x, 413.x	I20, I21, I22, I24	Type 1, or [type (W), (X), (Y), but not type (2)]
Ischemic Heart Disease (Chronic)	0.0200	0.8863	412.x, 414.x	I25	Type 1, or [type (W), (X), (Y), but not type (2)]
Liver Disease	0.8160	0.0005	070.3, 070.5, 456.0, 456.1, 571.0, 571.2, 571.3, 571.4, 571.5, 571.6, 571.8, 571.9, 572.3, 572.8, V427	B16.1, B16.9, B17, B18, I85, K70.0, K70.2, K70.3, K70.4, K70.9, K72.1, K72.9, K73, K74, K76.0, K76.6, Z94.4	Type 1, or [type (W), (X), (Y), but not type (2)]
Other Unspecified Intracranial Hemorrhage	0.8171	<0.0001	432.x	I62	Refer to the Technical Notes for details
Intracerebral Hemorrhage	1.3710	<0.0001	431.x	I61	Refer to the Technical Notes for details
Acute but Ill-Defined Cerebrovascular Disease	0.1287	<0.0001	436.x	I64	Refer to the Technical Notes for details
Subarachnoid Hemorrhage	1.3826	<0.0001	430.x	I60	Refer to the Technical Notes for details

2.8 30-Day AMI Readmission Rate, 2011–2012

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)	ICD-9/ICD-9-CM	ICD-10-CA	Qualifier
Intercept	-2.7421	<.0001			
Sex (Male = 1, Female = 0)	-0.1664	<.0001			
Age 45 to 64	0.1924	0.0517			
Age 65 to 74	0.4960	<.0001			
Age 75 and Older	0.8748	<.0001			
1 or More Previous AMI Episodes Within 365 Days Preceding the Current AMI Episode	0.5082	<.0001	410	I21, I22	Type M, 1, 2, W, X or Y
Diabetes With Complications	0.3074	<.0001	250.1–250.9	E10.0–E10.7, E11.0–E11.7, E13.0–E13.7, E14.0–E14.7	Type 1, 3, or [type (W), (X), (Y), but not type (2)]
Heart Failure	0.4549	<.0001	428	I50	Type 1, or [type (W), (X), (Y), but not type (2)]
Renal Failure*	0.4361 0.3336 (QC)	<.0001 <.0001 (QC)	584, 585, 586	N17, N18, N19	Type 1, or [type (W), (X), (Y), but not type (2)]
Chronic Obstructive Pulmonary Disease (COPD)*	0.3406 0.1948 (QC)	0.0002 0.0101 (QC)	491, 492, 494, 496	J41, J42, J43, J44, J47	Type 1, or [type (W), (X), (Y), but not type (2)]

Notes

* This risk factor has two coefficients—one for the data submitted by Quebec and one for all other jurisdictions. Quebec-specific coefficients were included in the model to address differences in data collection.

Regression coefficients and p-values (Pr>ChiSq [Wald]) will be provided at the time of the data preview.

2.9 30-Day Obstetric Readmission Rate, 2011–2012

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
Intercept	-4.4212	<.0001
Age 25 to 34	-0.0913	0.002
Age 35 and Older	-0.0623	0.0883
One Acute Care Hospitalization in Previous Six Months	0.5967	<.0001
Two or More Acute Care Hospitalizations in Previous Six Months	1.2647	<.0001
Urgent Admission	1.5127	<.0001

2.10 30-Day Readmission—Patients Age 19 and Younger, 2011–2012

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
Intercept	-3.4978	<.0001
Age 5 to 9	-0.1240	<.0001
Age 10 to 14	-0.1340	<.0001
Age 15 and Older	-0.1097	<.0001
Sex (Male = 1, Female = 0)	-0.0121	0.526
One Acute Care Hospitalization in Previous Six Months	0.7843	<.0001
Two or More Acute Care Hospitalizations in Previous Six Months	1.6704	<.0001
Urgent Admission	0.5687	<.0001
CMG 005	1.0223	<.0001
CMG 009	0.6268	0.0073
CMG 010	1.2930	<.0001
CMG 011	1.0233	<.0001
CMG 039	0.5549	<.0001
CMG 040	0.3294	<.0001
CMG 041	0.1867	0.1792
CMG 042	0.8143	<.0001
CMG 103	-0.3586	0.002
CMG 104	-0.4897	<.0001
CMG 105	-0.2463	0.0218
CMG 135	0.8088	<.0001
CMG 136	0.2939	0.0402
CMG 141	0.0104	0.818
CMG 144	1.1534	<.0001
CMG 147	-0.5859	<.0001
CMG 149	0.5767	<.0001
CMG 163	0.3617	0.0094
CMG 198	0.5904	0.0039
CMG 202	0.5472	0.0003
CMG 209	0.8095	<.0001
CMG 221	1.2149	<.0001
CMG 226	0.2875	0.1663
CMG 231	-0.2978	0.152
CMG 233	0.3227	0.0001
CMG 234	-0.5397	<.0001
CMG 237	0.6357	<.0001
CMG 249	-0.2429	<.0001

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
CMG 253	0.7046	<.0001
CMG 254	0.4739	0.0061
CMG 255	0.4251	0.0014
CMG 256	0.2953	0.0025
CMG 257	0.3921	<.0001
CMG 258	0.4610	<.0001
CMG 286	0.2112	0.3418
CMG 287	0.6593	<.0001
CMG 288	1.1932	<.0001
CMG 359	0.1888	0.3611
CMG 361	0.3694	0.0131
CMG 405	-0.4888	0.0009
CMG 432	0.1212	0.381
CMG 433	0.4279	<.0001
CMG 435	0.3570	0.0321
CMG 436	0.6149	0.0007
CMG 437	-0.1233	0.1596
CMG 438	0.2002	0.1797
CMG 454	0.7362	<.0001
CMG 480	0.8445	<.0001
CMG 487	-0.0831	0.3202
CMG 488	-0.2848	0.0071
CMG 589	0.3439	0.0173
CMG 592	0.2464	0.0626
CMG 594	-0.0034	0.9591
CMG 601	0.1726	0.0232
CMG 610	0.9149	0.0002
CMG 625	1.5967	<.0001
CMG 629	1.2237	<.0001
CMG 633	0.0775	0.3734
CMG 634	0.5690	<.0001
CMG 635	0.4531	0.0062
CMG 636	0.9389	<.0001
CMG 637	0.1473	0.3945
CMG 638	0.6592	<.0001
CMG 654	0.1532	0.3098
CMG 661	-0.3434	0.0003
CMG 739	-1.5353	<.0001
CMG 770	-0.5742	0.0021
CMG 776	-0.6733	<.0001

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
CMG 778	-0.7913	<.0001
CMG 815	0.2678	0.0964
CMG 993	-0.2558	0.0924

Note
CMGs included in the model are those that account for the top 80% of the total number of readmissions among patients age 19 and younger.

2.11 30-Day Surgical Readmission Rate, 2011–2012

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
Intercept	-3.3471	<.0001
Age 45 to 64	0.0547	0.0008
Age 65 to 84	0.2593	<.0001
Age 85 and Older	0.4383	<.0001
Sex (Male = 1, Female = 0)	-0.00515	0.624
One Acute Care Hospitalization in Previous Six Months	0.4404	<.0001
Two or More Acute Care Hospitalizations in Previous Six Months	0.8977	<.0001
Urgent Admission	0.4414	<.0001
Charlson Score Group 1*	0.4338	<.0001
Charlson Score Group 2*	0.5714	<.0001
CMG 006	0.5404	<.0001
CMG 009	0.6987	<.0001
CMG 012	-0.3373	0.0001
CMG 086	0.1312	0.1294
CMG 112	0.2256	0.0006
CMG 115	0.5415	<.0001
CMG 117	0.6204	<.0001
CMG 162	0.8520	<.0001
CMG 165	0.5230	0.0001
CMG 166	0.5320	<.0001
CMG 168	0.5227	<.0001
CMG 170	0.4318	<.0001
CMG 172	0.4275	<.0001
CMG 174	0.0704	0.037
CMG 175	0.1059	0.0002
CMG 180	0.1868	0.0394
CMG 181	0.4316	<.0001

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
CMG 182	0.5545	<.0001
CMG 185	0.3126	<.0001
CMG 194	0.2364	0.0002
CMG 220	0.7996	<.0001
CMG 221	1.0436	<.0001
CMG 222	0.3136	<.0001
CMG 223	0.4886	<.0001
CMG 225	0.3845	<.0001
CMG 226	0.5651	<.0001
CMG 227	0.3004	<.0001
CMG 228	-0.4397	<.0001
CMG 229	-0.2335	0.0002
CMG 231	0.6727	<.0001
CMG 232	0.3286	<.0001
CMG 234	-0.6421	<.0001
CMG 237	0.4606	<.0001
CMG 274	0.6646	<.0001
CMG 275	0.5565	<.0001
CMG 278	-0.1681	<.0001
CMG 280	0.7571	<.0001
CMG 281	0.1660	0.0023
CMG 313	-0.2348	<.0001
CMG 317	0.3023	<.0001
CMG 320	-0.3195	<.0001
CMG 321	-0.3018	<.0001
CMG 382	0.1341	0.0919
CMG 387	-0.5409	<.0001
CMG 424	-0.7469	<.0001
CMG 450	1.0949	<.0001
CMG 452	1.2208	<.0001
CMG 454	0.3088	<.0001
CMG 455	0.5023	<.0001
CMG 456	0.3433	<.0001
CMG 458	0.4817	<.0001
CMG 462	-0.1221	0.0463
CMG 464	0.1576	<.0001
CMG 502	-0.1370	<.0001
CMG 503	-0.2985	0.0178

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
CMG 505	-0.0661	0.4521
CMG 615	0.7851	<.0001
CMG 617	0.3868	<.0001
CMG 650	0.5081	<.0001
CMG 726	-0.2299	<.0001
CMG 727	-0.3272	<.0001
CMG 729	-0.5271	<.0001
CMG 733	0.5932	<.0001
CMG 734	0.3338	<.0001
CMG 739	-0.8809	<.0001
CMG 747	-0.9315	<.0001
CMG 806	0.1890	<.0001
CMG 904	0.7448	<.0001
CMG 905	0.6775	<.0001
CMG 906	0.7234	<.0001
CMG 907	0.5944	<.0001
CMG 910	0.4033	<.0001

Notes

* Charlson score group 1 = Charlson score 1–2 outside Quebec and 2–4 in Quebec; Charlson score group 2 = Charlson score 3 or higher outside Quebec and 5 or higher in Quebec (reference category is Charlson score group 0 = Charlson score 0 outside Quebec and 0–1 in Quebec).

CMGs included in the model are those that account for the top 80% of the total number of readmissions among surgical patients.

2.12 30-Day Medical Readmission Rate, 2011–2012

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
Intercept	-3.2333	<.0001
Age 45 to 64	0.1107	<.0001
Age 65 to 84	0.2104	<.0001
Age 85 and Older	0.2550	<.0001
Sex (Male = 1, Female = 0)	0.0372	<.0001
One Acute Care Hospitalization in Previous Six Months	0.5058	<.0001
Two or More Acute Care Hospitalizations in Previous Six Months	1.1140	<.0001
Urgent Admission	0.6738	<.0001
Charlson Score Group 1*	0.2867	<.0001
Charlson Score Group 2*	0.4321	<.0001
CMG 026	-0.4754	<.0001
CMG 028	-0.4471	<.0001

Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
CMG 029	-0.2839	<.0001
CMG 038	0.3856	<.0001
CMG 040	-0.1140	0.0015
CMG 132	0.5249	<.0001
CMG 135	0.1879	<.0001
CMG 136	0.1773	0.0001
CMG 138	0.0380	0.0241
CMG 139	0.4272	<.0001
CMG 142	0.3113	<.0001
CMG 143	0.4975	<.0001
CMG 149	0.1399	0.0007
CMG 193	-0.0686	0.1193
CMG 194	0.4061	<.0001
CMG 196	0.4006	<.0001
CMG 200	-0.2341	<.0001
CMG 202	0.1461	<.0001
CMG 203	-0.2258	<.0001
CMG 204	0.2037	<.0001
CMG 205	-0.3232	<.0001
CMG 208	-0.2758	<.0001
CMG 209	0.0916	0.0005
CMG 248	0.3142	<.0001
CMG 250	0.5101	<.0001
CMG 253	0.4941	<.0001
CMG 254	0.0783	0.0014
CMG 255	0.2590	<.0001
CMG 256	0.1159	0.0011
CMG 257	0.3215	<.0001
CMG 258	0.3167	<.0001
CMG 284	0.5599	<.0001
CMG 285	0.9027	<.0001
CMG 287	0.2350	<.0001
CMG 288	0.3880	<.0001
CMG 362	-0.0267	0.5494
CMG 436	0.1704	<.0001
CMG 437	0.1192	<.0001
CMG 438	0.3124	<.0001
CMG 477	0.2717	<.0001

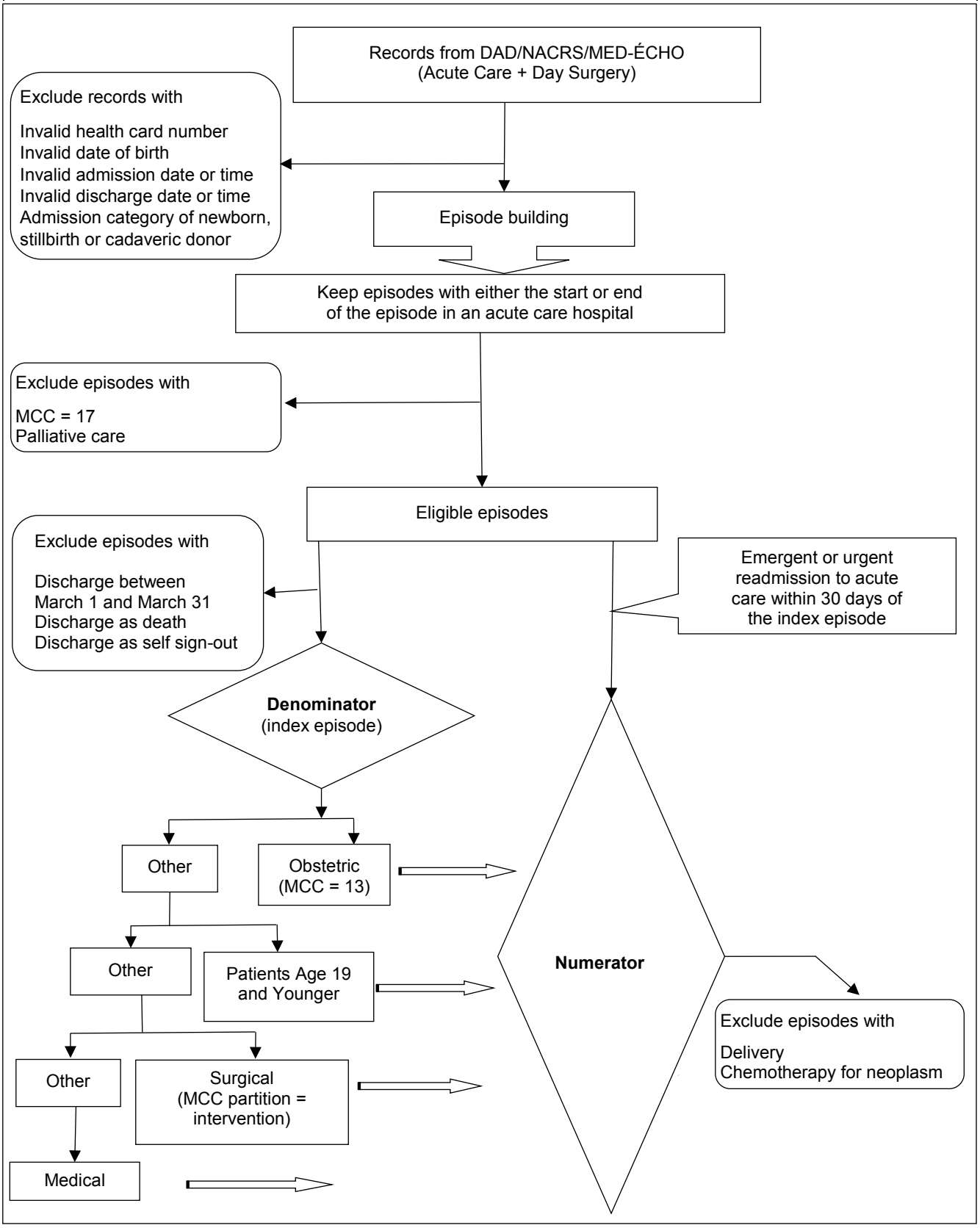
Risk Factor	Regression Coefficient	Pr > ChiSq (Wald)
CMG 484	0.1955	<.0001
CMG 486	0.2309	<.0001
CMG 487	0.0806	<.0001
CMG 488	-0.2289	<.0001
CMG 628	0.8353	<.0001
CMG 633	0.0696	0.0692
CMG 635	0.2877	<.0001
CMG 638	-0.0237	0.5293
CMG 654	0.0852	0.0058
CMG 776	-0.2562	<.0001
CMG 778	-0.4004	<.0001
CMG 780	-0.0926	0.0061
CMG 806	-0.1536	<.0001
CMG 811	-0.0419	0.0488
CMG 815	0.4030	<.0001

Notes

* Charlson score group 1 = Charlson score 1–2 outside Quebec and 2–4 in Quebec; Charlson score group 2 = Charlson score 3 or higher outside Quebec and 5 or higher in Quebec (reference category is Charlson score group 0 = Charlson score 0 outside Quebec and 0–1 in Quebec).

CMGs included in the model are those that account for the top 80% of the total number of readmissions among medical patients.

Appendix IV—Flowchart: 30-Day Obstetric/Patients Age 19 and Younger/Surgical/Medical Readmission Rate



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