



Frequently Asked Questions — Understanding the High Users of Hospital Beds Indicator

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Background

What is the High Users of Inpatient Acute Care Services indicator (also known as the High Users of Hospital Beds indicator)?

Research has demonstrated that a small proportion of the population uses a large percentage of health care resources; however, there is no pan-Canadian indicator measuring high users of inpatient acute care services. The Canadian Institute for Health Information (CIHI) has developed a comparable pan-Canadian indicator to monitor provincial/territorial and regional variations in High Users of Inpatient Acute Care Services. This indicator is a measure of health system performance as it relates to appropriateness and efficiency of care among all inpatients (regardless of clinical condition) receiving care in acute hospitals.

What is the goal of this indicator?

The goal is to provide a pan-Canadian perspective of high users of inpatient acute care services from both an effectiveness (repeat hospitalizations) and an efficiency (cumulative length of stay [LOS]) lens. This indicator can help policy-makers and health care planners monitor the impact of high users of inpatient acute care services and identify populations at risk. This information can then be used to design strategies or community programs that will potentially reduce high-intensity use of inpatient acute care services.

Methodology

How was the methodology for identifying high users developed?

Based on the literature and an environmental scan of current research in this field, exploratory analyses were carried out to determine an appropriate threshold of repeat hospitalizations and cumulative LOS to classify patients as high users of inpatient acute care services. The final decision was made in consultation with expert advisors across the country; they helped us decide to use 3 or more hospitalizations and more than 30 cumulative patient days because this allows us to identify approximately 5% of patients as high users of inpatient acute care services.

Our starting point in our exploratory analyses was looking at repeat hospitalizations. Using 5 or more hospitalizations captured only about 2% of patients. Using 3 or more captured 10% of patients, which is much more than the literature and current research classify as frequent or high resource users.

We then considered cumulative LOS because we are interested not only in patients who went to the hospital frequently but also in those who went frequently and were resource-intensive. The median cumulative LOS for patients who had 3 or more hospitalizations is 26 days. To be consistent with the literature, we chose 30 days.

Additional information on our methodological process can be found on the [Canadian Association for Health Services and Policy Research \(CAHSPR\) Conference 2015 website](#).

How are high users identified?

High users of inpatient acute care services are defined as patients who had 3 or more acute care hospital admissions (episodes of care) within a 1-year period (365 days) with a cumulative LOS of longer than 30 days. The calculation is as follows:

1. Episodes of care (i.e., all contiguous inpatient hospitalizations and day procedure visits) are constructed so that the patient's care journey can be followed even if he or she is transferred to another facility, thus avoiding analyzing transfers as 2 separate hospital admissions.
2. The index episode of care is identified as the most recent admission date.
3. Any previous episodes of care that occurred within a 365-day period (look-back period) from the index admission are counted to identify patients with 3 or more episodes of care. To ensure that all patients admitted to acute care in the fiscal year of reporting are followed up during the 365-day period, 3 fiscal years of data are used.
4. Cumulative LOS is calculated for each patient by calculating the sum of LOS (including alternate level of care [ALC] days and day surgery) across all episodes of care within the look-back period.

Why isn't cost used to define high users?

High users are not defined using costing methodologies because cost may not measure health system performance accurately. Our goal is to provide a tool that will help health care planners devise strategies and target them at specific patient populations to reduce the need for acute care hospitalizations. When cost is used, patients who had unique hospitalizations for high-cost procedures may be identified as high-cost users; while this information can help hospital administrators allocate resources for specialized services, cost may not appropriately identify patients amenable to change for performance improvement purposes.

Why does the methodology use patients discharged from an acute care facility for the denominator instead of the population?

Currently, CIHI's indicator focuses on inpatient acute care services. Our expert advisory group suggested using patients discharged from acute care as the denominator because this is a performance indicator that focuses on the group of patients that already makes use of inpatient acute care services. With the indicator calculated at the patient level, health care planners can drill down and start focusing on strategies for the group of patients amenable to change. With future improvements in data availability across the continuum of care (e.g., emergency department, rehabilitation), we may be able to develop a high user indicator that will focus on all health care services provided to the population.

Why does the methodology for episode-building use the same-day time frame?

Due to the absence of time of admission/discharge variables in the Ontario Mental Health Reporting System (OMHRS), episode-building involving these mental health records can be done using only date of admission/discharge variables. A transfer is assumed if admission to an institution occurred within the same date as discharge from another institution (including overlapping hospitalizations on the same day). For more information, please see the [General Methodology Notes](#) in the Indicator Library.

Are day surgery visits included in this indicator?

Day surgery visits are used to build episodes of care when patients are transferred between an acute care bed and day surgery. This avoids analyzing transfers as 2 separate hospitalizations. Day surgery visits are also included for calculating the cumulative LOS. However, no clinical information from day surgery visits is used for risk adjustment.

Are mental health facilities included in the indicator?

Mental health facilities are not included in the indicator. Admissions for mental illness in a general hospital are captured via OMHRS in Ontario. This information is submitted to the Discharge Abstract Database (DAD) or the Hospital Morbidity Database (HMDB) for the rest of the provinces.

Are alternate level of care days included in the indicator?

Currently, ALC days are included in the calculation of this indicator. We acknowledge that ALC service and its definition vary among hospitals and patient populations; thus maintaining data comparability across all jurisdictions can be challenging. However, only ALC-designated patients who had multiple acute care hospitalizations are identified as high users in our methodology. This may help health care planners identify strategies to potentially reduce the number of repeat hospitalizations for both acute care patients and ALC patients.

Why and how is logistic regression and risk adjustment done for this indicator?

Logistic regression is used to calculate the predicted or expected probability that a patient is a high user in order to adjust for potential differences in patient characteristics across health regions or provinces/territories. It enables us to fairly compare the indicator across jurisdictions that potentially have different patient demographics and clinical characteristics such as age, sex, admission category (elective versus urgent) and patient clinical groups (palliative care, mental illness, obstetric, surgical, medical conditions). For a detailed description of the logistic regression, please refer to the High Users Appendix in the [Indicator Library](#).

Coefficients derived from the logistic regression model are used to calculate the probability that a patient could be a high user of inpatient acute care services. The expected number of high users for a regional health authority is the sum of the probabilities in that region. The risk-adjusted rate of high users is calculated by dividing the observed number of high users in each region by the predicted number of high users in the region and multiplying by the Canadian average rate of high users. This rate is expressed per 100 patients.

How are the patient clinical groups identified for risk adjustment calculation?

We select patient clinical characteristics for the risk adjustment calculation from the most recent hospitalization (the index episode of care). The purpose is to control for these patient characteristics to ensure that fair comparisons can be made across jurisdictions for this indicator.

Patient clinical groups were identified based on the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada* (ICD-10-CA), major clinical categories (MCCs) and MCC Intervention and Diagnosis partition codes; they include palliative care, mental illness, obstetric, surgical and medical conditions. Clinical groups for risk adjustment were developed to allow for the inclusion of admissions for mental illness in a general hospital in Ontario, whose records are captured via OMHRS. This database does not collect diagnoses using the ICD-10-CA classification system; thus CIHI's grouping methodologies were not used.

To ensure that a unique patient clinical group is assigned to the index episode of care, clinical groups are hierarchically identified. Thus when the index episode of care has a combination of conditions that fall under multiple clinical groups (e.g., palliative care and other medical conditions), the clinical group at the top of the hierarchy will be assigned based on the following order: palliative care, mental illness, obstetric, surgical, medical conditions. For a detailed description, please refer to the High Users Appendix in the [Indicator Library](#).

Interpretation

How can I use the indicator?

The indicator is the risk-adjusted rate of high users of inpatient acute care services. Variations in this indicator across jurisdictions may reflect differences in service delivery. A lower rate for this indicator is desirable. Policy-makers and health care planners may use the results from the indicator to do the following:

- Compare their results against the national average or against results from other regional health authorities to learn best practices from other regions that may have a more desirable rate. Lower rates in some regional health authorities may reflect current efforts to reduce the need for hospital admission by providing appropriate community services to patients after discharge.
- Identify and monitor a population of high users of inpatient acute care services and drill down to further understand the characteristics of this population.
- Monitor the effectiveness of the strategies or initiatives created to reduce the number of high users. Future publications of this indicator will enable jurisdictions to track progress over time.

What should I consider when interpreting a risk-adjusted rate of high users?

Due to the limitations of administrative data, adjustment for all potential risk factors is impossible; therefore, the results of this indicator alone should not be used to draw conclusions about a jurisdiction's general performance. It is important to consider different aspects as well as contextual information, such as hospital and community characteristics. However, the indicator results can be viewed as a starting point for comparison and tracking progress over time.

What do variations across regions mean?

When looking at regional rates, one should remember that they are best used as a starting point for assessment. A higher rate can be explained by several reasons other than the extent to which high use of inpatient acute care services is prevented:

- Variation in indicator rates across regions may be attributable to factors related to patient characteristics. For these factors, risk adjustment is applied to improve comparisons; however, there are several other known and unknown factors that the rates are not adjusted for.
- Variation in indicator rates across regions can also be attributed to population-level characteristics of the community that the region serves, overall health prevention programs, resource availability, access to community services, etc.
- Higher rates can also be due to random variation.

Exploring variations in indicator results is a starting point to identify potential opportunities for improvement. The above factors should be taken into consideration when interpreting high rates.

How can I compare the results of this indicator?

The best way to interpret the risk-adjusted rate is to compare it with the national average. The Your Health System: In Depth web tool displays colour-coded indicator results. The colour difference from the average is based on a statistical assessment and the desirable direction of the indicator. Any 95% confidence intervals (CIs) that do not contain the national average can be considered statistically significantly different than the national average. For this indicator, a lower rate is desirable; therefore, a result that is lower than the national average is colour-coded as above average (or green). A result that is higher than the national average is colour-coded as below average (or pink). If the CIs cover the national average, the result is considered the same as average and colour-coded blue.

The CIs for this indicator are relatively narrow, reflecting the low degree of variability associated with the risk-adjusted rate. Therefore, a large proportion of results are labelled as being significantly different than the national average.

Will CIHI provide results separately for number of hospitalizations and LOS?

This indicator provides a pan-Canadian perspective of high users of inpatient acute care services from both an effectiveness (repeat hospitalizations) and efficiency (cumulative LOS) lens. Thus CIHI's high users definition utilizes both repeat hospitalizations and cumulative LOS and will not report these separately. The rationale is that if a patient had an episode of care with a long stay in an acute care bed and did not come back, it might indicate that the care provided was appropriate or that further services might have been provided to keep the patient outside of an acute care bed. Also, looking at the combination of multiple hospitalizations and LOS will allow us to account for variations in the provision of services, particularly in jurisdictions with a longer LOS.

Why was this indicator developed at the regional level and not the facility level?

Some of our stakeholders expressed interest in identifying a group of patients who make frequent use of acute care hospitalizations in their jurisdictions to examine how hospitalizations can be avoided with alternate care in the community. Repeat hospitalizations can occur at more than one facility; therefore, this indicator will be reported at the national, provincial/territorial and regional levels.

Additional information and requests

Is there a plan to develop an indicator for emergency departments or for the pediatric population?

We are not currently considering high users of emergency departments (EDs) as part of this indicator because we do not have complete ED data submission across the country.

Several of our stakeholders have asked for a high users of EDs indicator. We will therefore investigate how we can best meet the needs of our stakeholders in this regard.

We are currently developing a feasibility assessment for the pediatric population.

Where can I get the SAS code and coefficient files?

The SAS code created to report the high users indicator is publicly available; however, the code is specific to CIHI's databases and data elements. For this reason, clients will be required to modify the codes according to their own database structures and elements.

How does CIHI’s indicator differ from work developed by other organizations or jurisdictions?

Efforts have been made across jurisdictions to define high-cost users or frequent users of health care services; some examples include the following:

High-cost health care users, Ontario

A predictive model to identify high-cost users (HCUs) was developed by the Health Analytics branch of the Ontario Ministry of Health and Long-Term Care. HCUs of health care were defined as the top 5% cost-incurring health care users; the calculation was based on the sum of costs across care types (inpatient acute care, day surgery, ED, inpatient mental health, inpatient rehabilitation, complex continuing care and home care).

Heavy users of hospital days, Manitoba

Developed by the Manitoba Centre for Health Policy, this project defined “heavy users” as the group of people who were the top 5% of users of days of hospital care (i.e., not necessarily the most frequently admitted or the most costly, but those with the most days used).

Hot-spotting initiative, Saskatchewan

The Government of Saskatchewan is developing a patient-centred care model that identifies patients with complex needs who repeatedly need hospital services or visit EDs. A second pilot is under way in the Saskatoon Health Region to focus on patients with mental health and addictions issues.

For additional information, please refer to the summary report from the [Pan-Canadian Forum on High Users of Health Care](#).

If your organization would like to share your methodology for identifying high users of health care services or other initiatives in this area, please contact us at indicators@cihi.ca.

Contact us

Please send additional questions or feedback on this indicator to indicators@cihi.ca.