

# Defining High Users in Acute Care: An Examination of Different Approaches



July 2015



## Our Vision

Better data. Better decisions. Healthier Canadians.

## 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





Please cite as follows:  
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### **Additional Resources**

The following companion products are available on CIHI's website:

- Data tables

### **Talk to Us**

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3



## **About this report**



- It has been known for a long time that a small number of individuals — known as high users — use a large percentage of health care services and incur a large percentage of costs.
- Close examinations of these high user populations provide insight into our health care system and highlight opportunities for improvement.

4



## About this report



In 2014, CIHI hosted a summit with researchers and decision-makers from across the country to explore issues around high users of health services.

Participants identified 2 distinct approaches to high use:

- The **conceptual** approach, which seeks to predict high users with the goal of prevention
- The **operational** approach, which seeks to identify high users with the goal of management and reduction

Participants also highlighted the need to explore different definitions of high users and noted that both high cost and frequent use were a concern.

See the [Pan-Canadian Forum on High Users of Health Care: Summary Report](#) for more information.

5



## About this report



Statistics Canada and CIHI have developed a joint analytical plan committed to exploring the topic of high users. This report, which explores various definitions of high users, is one of the deliverables of this plan.

### **Current report**

In line with the operational approach, this report highlights the differences and similarities of various methods of defining high users in acute care.

Because acute care is expensive, and many patients strive to receive care in alternate settings (e.g., home and continuing care), acute care-based definitions of high users can help to measure health care system performance as a whole, even while assessing only 1 portion.

6



## About this report



In addition, CIHI is preparing/has prepared other tools in the area of high users:

### **Predictive tool (currently available)**

To support the conceptual approach to predicting high users of health care, CIHI and Health Quality Ontario have developed a tool — the [Hospital Admission Risk Prediction](#) (HARP) — to predict the risk of patients being readmitting to hospital.

7



## About this report



### **Indicator (private release fall 2015)**

With the help of national and international experts and in close consultation with key stakeholders across the country, CIHI is developing the indicator [High Users of Inpatient Acute Care Services](#).

This indicator will be highlighted throughout this report.

8



## About this report



### Grouping methodology (public release March 2016)

CIHI is developing a new population grouping methodology that

- Profiles clinical groups across multiple sectors of care (acute care, day surgery, long-term care, primary care)
- Estimates current costs to the health care system
- Predicts future costs to the health care system

9



## Methodology



High users in acute care can be defined in different ways. 3 common ways are

- Multiple stays
- Length of stay
- Health care cost



Multiple stays



Length of stay



Cost

10



## Methodology



Definitions based on multiple stays highlight the **effectiveness** of the health care system as a whole.

Definitions based on length of stay highlight the **efficiency** of health care, including the availability of home and continuing care.

Cost definitions highlight health care **resource use**.

*For more details, please see the Methodological Notes (slides 26 to 28).*



Multiple stays



Length of stay



Cost

11



## Defining high users of acute care



In this report, we present 6 definitions of high use that are based on multiple stays, length of stay and estimated cost:

- **3+ Stays** 3 or more hospital stays
- **5+ Stays** 5 or more hospital stays
- **30+ Days** Cumulative length of stay of 30 days or more
- **3+ Stays, 30+ Days** 3 or more hospital stays **and** cumulative length of stay of 30 days or more — **CIHI indicator (CI)**
- **5% Cost** Top 5% of patients by estimated cost
- **1% Cost** Top 1% of patients by estimated cost



*Patients included in these analyses were hospitalized in an acute care facility in 2013–2014 and were age 18 and older.*

12



## Characteristics of high users



Slides **14** and **15** describe the proportion of the acute care population and of health care costs captured by each definition.

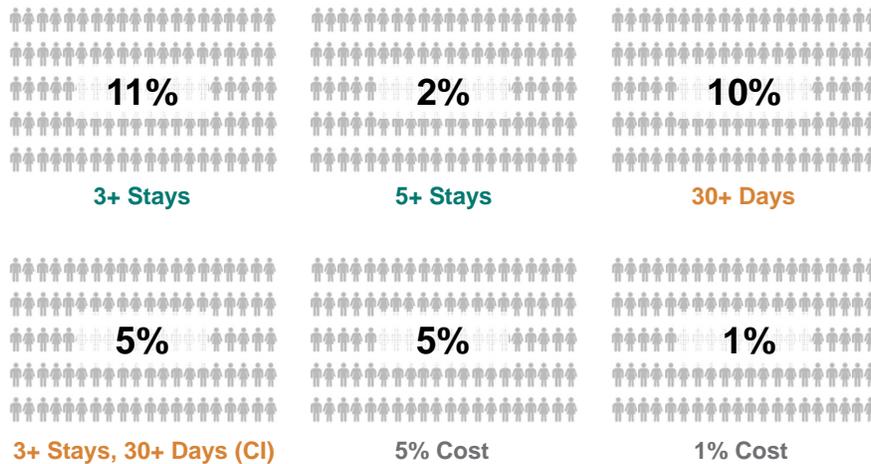
Slide **16** highlights similarities between the definitions of acute care high users.

Slides **17** to **19** highlight differences between the definitions of acute care high users.

13



## Percentage of acute care population captured by different definitions



14



## Estimated acute care costs captured by different definitions



Definition	Estimated cost of high user group (\$ millions, % of total cost)	Estimated cost per average high user (\$ thousands)
3+ Stays	\$8,057 (31%)	\$39
5+ Stays	\$2,355 (9%)	\$60
30+ Days	\$10,779 (42%)	\$57
3+ Stays, 30+ Days (CI)	\$5,503 (21%)	\$63
5% Cost	\$8,548 (33%)	\$88
1% Cost	\$3,347 (13%)	\$172

Average cost per patient: \$13,000

Please see the Methodological Notes (slide 26) for details on cost calculations.

15



## Common patient characteristics across definitions of high user groups



- In terms of socio-economic characteristics, high user groups are similar to each other.
- High user groups include
  - 21% to 24% of **rural** patients (who make up 21% of Canadian acute care population)
  - 25% to 28% of patients living in **low-income** neighbourhoods (who make up 22% of Canadian acute care population)

16



## Definitions focused on length of stay capture the highest percentage of seniors (75 and older)



### Percentage of seniors (75+) in each high user group



- 3+ Stays 38%
- 5+ Stays 34%
- **30+ Days 50%**
- **3+ Stays, 30+ Days (CI) 45%**
- 5% Cost 42%
- 1% Cost 34%

*Canadian acute care population* 25%

17



## High users are several times more likely\* to be hospitalized with certain conditions



High users with multiple stays are

- **3 times** as likely to have **chronic obstructive pulmonary disease (COPD)**
- **3.5 times** as likely to have **heart failure**
- **4.5 times** as likely to be **palliative patients**

High users with a length of stay of 30 days or more are

- **8.5 times** as likely to have a **mental organic disorder**
- **6 times** as likely to have a **schizophrenic or psychotic disorder**

The top 1% most expensive users are

- **4 times** as likely to have a **sepsis infection** and **18 times** as likely to have a **surgical site infection**

\* Compared with patients who do not fall into the high user group

18



## Each definition captures conditions differently



	3+ Stays	5+ Stays	30+ Days	3+ Stays, 30+ Days (CI)	5% Cost	1% Cost
<b>COPD</b>	2.7	3.4		2.7		
<b>Heart failure</b>	3.7	3.7	3.0	4.1	2.7	
<b>Palliative</b>	4.4	4.3	4.2	5.0	2.9	
<b>Schizophrenia</b>	2.0	2.1	5.9	3.3	2.5	
<b>Organic mental disorders</b>			8.5	2.5	3.8	3.2
<b>Mood disorders</b>			3.3	2.0		
<b>Sepsis</b>				2.9	3.2	3.8
<b>Respiratory failure</b>						8.1
<b>Surgical site infection</b>						18.0

*Prevalence ratio for the top 10 Case Mix Groups compared with non-high users  
Includes only ratios equal to or greater than 2.0*



## Summary



- High use can be defined using multiple stays, length of stay and cost, or a combination of these.
- Patients with multiple stays are not always high-cost patients.
- Definitions based on multiple stays and length of stay can complement cost-based definitions by providing a way to measure progress and assess the effectiveness of interventions.



## Summary



- Typical high users are complex: seniors, those with chronic conditions or mental health conditions, those receiving palliative care, those with socio-economic factors such as poverty.
- However, the definitions capture different subpopulations of these complex patients:
  - Some high user definitions capture more patients than others (1% to 11%). CIHI's indicator captures a mid-size population (5%) relative to the other definitions.
  - Definitions focused on length of stay capture the highest percentage of seniors (75 and older). This population might require strategies that focus on home and long-term care.
  - CIHI's indicator captures a high proportion of common high user conditions such as chronic diseases, mental health disorders and infections, which makes it useful for assessing a variety of interventions.

21



## Summary



- Characteristics of high users at the provincial level reflect the population and health care picture in each jurisdiction (e.g., size of rural or low-income populations).
- Provincial-level data is available upon request: [hsr@cihi.ca](mailto:hsr@cihi.ca)

22



## Opportunities for improvement



- Integration and continuity of clinical and social care, particularly for those with multiple chronic conditions<sup>1, 2</sup>
- Increased resources for home care and long-term care, particularly for palliative patients and those with organic mental disorders<sup>3</sup>
- Increased focus on disease prevention and health promotion, particularly in primary care<sup>4, 5</sup>
- Strategies targeted at preventing surgical site infections in acute care institutions<sup>6</sup>

23



## CIHI tools on high users



### Hospital Admission Risk Prediction (HARP)

- Tool for identifying patients at high risk of hospital readmission
- Visit [cihi.ca](http://cihi.ca)

### High Users of Inpatient Acute Care Services indicator

- Rate of acute care patients with 3 or more hospital stays and a cumulative length of stay of 30 days or more
- Private release fall 2015

### Population grouping methodology

- All individuals classified into clinical groups based on acute care, day surgery, primary care and long-term care
- Release March 2016

24



## Questions?



Email [hsr@cihi.ca](mailto:hsr@cihi.ca)

25



## Methodological notes



This report assesses high users of inpatient acute care. 3 CIHI databases were used in these analyses: Discharge Abstract Database (DAD), Hospital Morbidity Database (HMDB) and Ontario Mental Health Reporting System (OMHRS) for fiscal year 2013–2014.

Patients younger than age 18 or with a length of stay greater than 365 days were excluded. Number of stays for each patient was calculated using a 365-day window from the date of admission for the last hospitalization. Patient characteristics were derived from the last hospitalization in 2013–2014.

Patient costs were estimated using Resource Intensity Weights (RIWs) and Cost of a Standard Hospital Stay. For OMHRS patients, group-wise RIWs were estimated from DAD patients for each of the 7 mental health groups (see next slide). Cost data does not include physician costs.

26



## Methodological notes



Neighbourhood income quintile and rural status were determined by linking patient postal codes to Statistics Canada's 2006 Census geography.

Diagnostic characteristics for high user patients from the DAD and HMDB were determined using case mix methodologies. Patients from OMHRS and mental health patients from the DAD were classified into 1 of 7 mental health groups:

- Organic disorders
- Substance-related disorders
- Schizophrenic and psychotic disorders
- Mood disorders
- Anxiety disorders
- Personality disorders
- Other mental health disorders

27



## Methodological notes



Relative prevalence of diagnostic characteristics was assessed by comparing the prevalence of case mix groups in patients who were classified as high users with the prevalence among patients not classified as high users.

These calculations were performed separately for each high user definition; thus the non-high users group was defined independently for each definition.

28



## References



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  2. Veillard J, Denny K, eds. [Can better care for complex patients transform the health system?](#) *Healthcare Papers* [theme issue]. 2014.
  3. Fransoo R, Martens P, The Need To Know Team, Prior H, Burchill C, Koseva I, Rajotte L. [Who Is in Our Hospitals . . . And Why?](#) 2013.
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  5. Rosella LC, Fitzpatrick T, Calzavara A, Manson H, Wodchis W, Goel V. High-users of Ontario's health care system: applying a population perspective to the determinants of high cost use. *BMC Health Services Research*. 2014.
  6. Safer Healthcare Now! [Prevent Surgical Site Infections Getting Started Kit](#). 2014.
- A more [comprehensive list](#) of publications on high users is available on our website.

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