

# In-Hospital Sepsis

Name	In-Hospital Sepsis
Short/Other Names	Not applicable
Description	The risk-adjusted rate of sepsis that is identified after admission. For further details, please see the <a href="#">General Methodology Notes</a> .
Interpretation	A lower rate for this indicator is desirable.
HSP Framework Dimension	Health System Outputs: Safe
Areas of Need	Getting Better
Geographic Coverage	All provinces/territories
Reporting Level/Disaggregation	National, Province/Territory, Region, Facility
Indicator Results	<a href="#">Accessing Indicator Results on Your Health System: In Depth</a>

## Identifying Information

Name In-Hospital Sepsis

Short/Other Names Not applicable

Indicator Description and Calculation

Description The risk-adjusted rate of sepsis that is identified after admission.

For further details, please see the [General Methodology Notes](#).

This indicator measures the rate of in-hospital sepsis per 1,000 discharges.

Calculation: 2 logistic regression models were built separately for children (younger than 18 years) and adults (18 years and older) to calculate the risk-adjusted results.

Description Risk-adjusted rate = Observed cases ÷ Expected cases × Canadian average

Unit of analysis: Single admission

Calculation:

Geographic Place of service

Assignment

Calculation:

Type of Rate - Rate—per 1,000

Measurement

Calculation:

Adjustment The following covariates are used in risk adjustment:

Applied For a detailed list of covariates used in risk adjustment, please refer to the [Model Specification](#) document.

Calculation:

Method of Logistic regression

Adjustment

### Description:

Number of discharges from an acute care institution within a fiscal year

### Inclusions:

1. Sex recorded as male or female

2. Length of stay of 2 days and longer

### Exclusions:

1. Records with invalid age

Denominator 2. Records with invalid admission or discharge dates

3. Mental illness (major clinical category [MCC] of Mental Diseases and Disorders [MCC = 17]): This is to account for differences in data collection between Ontario and other provinces and territories

4. Palliative care (ICD-10-CA: Z51.5) coded as most responsible diagnosis (MRDx). For Quebec data: palliative care (ICD-10-CA: Z51.5) coded as MRDx, or cancer (ICD-10-CA: C00–C97) coded as MRDx and Z51.5 coded in any secondary diagnosis field

5. 2018–2019 data onward: Medical assistance in dying (MAID) (Discharge Disposition Code = 73)

6. Age at admission younger than 1 year; infants are excluded because they have different mechanisms and risk factors for developing sepsis, as well as different coding standards

### Description:

A subset of the denominator: hospital discharges with an in-hospital sepsis event identified during a hospital stay

**Inclusions:**

Based on clinical input, the most commonly occurring and significant codes for clinical practice are included in the indicator.

Sepsis events are identified as follows:

Non-Quebec abstracts:

1. Sepsis (ICD-10-CA: A40, A41, B37.7, R65.1, R57.2) as type (2)

**OR**

2. Sepsis as a post-procedural complication **in the same cluster:**

a. Sepsis (ICD-10-CA: A40, A41, B37.7, R65.1, R57.2) as type (3) **and** infection following a procedure (ICD-10-CA: T80.2, T81.4, T82.6, T82.7, T83.5, T83.6, T84.5, T84.6, T84.7, T85.7, T88.0) as type (2) **and** external cause code (ICD-10-CA: Y60–Y84) as type (9) **OR**

b. Septic shock (ICD-10-CA: R57.2) as type (3) **and** shock during or resulting from a procedure (ICD-10-CA: T81.1) as type (2) **and** external cause codes (ICD-10-CA: Y60–Y84) as type (9)

**OR**

3. Sepsis in obstetric patients:

a. Puerperal sepsis (ICD-10-CA: O85.002) as type (M), (1), (2), (W), (X) or (Y) **OR**

b. Sepsis (ICD-10-CA: A40, A41, B37.7, R65.1, R57.2) as type (3) **and**

– Abortive outcome complicated by infection (ICD-10-CA: O03.0, O03.5, O04.0, O04.5, O05.0, O05.5, O07.3, O08.0) as type (2) **OR**

**R**

– Other obstetric infections (ICD-10-CA: O98.502, O98.802) as type (M), (1), (2), (W), (X) or (Y)

Quebec abstracts:

1. Sepsis (ICD-10-CA: A40, A41, B37.7, R65.1, R57.2) as type (2)

**OR**

2. Sepsis as a post-procedural complication **on the same abstract:**

a. Sepsis (ICD-10-CA: A40, A41, B37.7, R65.1, R57.2) as type (3) **and** infection following a procedure (ICD-10-CA: T80.2, T81.4, T82.6, T82.7, T83.5, T83.6, T84.5, T84.6, T84.7, T85.7, T88.0) as type (2) **and** external cause code (ICD-10-CA: Y60–Y84) as type (9) **OR**

b. Septic shock (ICD-10-CA: R57.2) as type (3) **and** shock during or resulting from a procedure (ICD-10-CA: T81.1) as type (2) **and** external cause codes (ICD-10-CA: Y60–Y84) as type (9)

**OR**

3. Sepsis in obstetric patients:

a. Puerperal sepsis (ICD-10-CA: O85.002) as type (M), (C), (2), (W), (X) or (Y) **OR**

b. Sepsis (ICD-10-CA: A40, A41, B37.7, R65.1, R57.2) as type (3) **and**

– Abortive outcome complicated by infection (ICD-10-CA: O03.0, O03.5, O04.0, O04.5, O05.0, O05.5, O07.3, O08.0) as type (2) **OR**

**R**

– Other obstetric infections (ICD-10-CA: O98.502, O98.802) as type (M), (C), (2), (W), (X) or (Y)

**Exclusions:**

Abstracts where sepsis is also identified as a pre-admit condition are excluded from the numerator:

— Abstracts with sepsis codes (ICD-10-CA: A40, A41, B37.7, R65.1, R57.2) or the associated post-procedural complication codes (ICD-10-CA: T80.2, T81.1, T81.4, T82.6, T82.7, T83.5, T83.6, T84.5, T84.6, T84.7, T85.7, T88.0) identified as pre-admit [type (M), (1) [(C) for Quebec data], (W), (X) or (Y)]

— Abstract with sepsis in obstetric patients where the puerperal sepsis code or the associated obstetric infection code is identified as pre-admit (ICD-10-CA: O85.004, O85.009, O98.501, O98.503, O98.504, O98.509, O98.801, O98.803, O98.804, O98.809 — any diagnosis type **or** O03.0, O03.5, O04.0, O04.5, O05.0, O05.5, O07.3, O08.0 as type (M), (1) [(C) for Quebec data], (W), (X) or (Y))

As an exception, sepsis is not considered as a pre-admit condition when the above codes identified as type (M), (W), (X) or (Y) also appear as type (2) or within a post-admit sepsis coding scenario:

- sepsis code as type (2); or sepsis code as type (3) with an associated infection code as type (2) in sepsis as post-procedural or obstetric complications.

Background, Interpretation and Benchmarks

Sepsis is a clinical syndrome that occurs as a complication of infections. It is defined as a systemic inflammatory response

Rationale	<p>due to infection. Sepsis is a leading cause of mortality and is linked to increased hospital resource utilization and prolonged stays in intensive care units. Appropriate preventive and therapeutic measures during a hospital stay can reduce the rate of infections and/or progression of infection to sepsis.</p> <p>The indicator addresses the extent to which acute care hospitals are effective in preventing the development of sepsis. It will help hospitals improve patient safety and learn from their peers regarding best practice methods for appropriate treatment of infections and prevention of sepsis.</p>
Interpretation	A lower rate for this indicator is desirable.
HSP Framework Dimension	Health System Outputs: Safe
Areas of Need	Getting Better
Targets/Benchmarks	Not applicable
References	<p>Agency for Healthcare Research and Quality. Technical Specifications: Patient Safety Indicators Appendices Version 4.5. <a href="http://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V45/TechSpecs/PSI%20Appendices.pdf">http://www.qualityindicators.ahrq.gov/Downloads/Modules/PSI/V45/TechSpecs/PSI%20Appendices.pdf</a>. Accessed October 2013.</p> <p>Angus DC, Linde-Zwirble WT, Lidicker J, et al. Epidemiology of severe sepsis in the United States: analysis of incidence, outcome, and associated costs of care. <i>Crit Care Med</i>. 2001;29:1303-1310.</p> <p>Canadian Institute for Health Information. In Focus: A National Look at Sepsis. <a href="https://secure.cihi.ca/free_products/HSMR_Sepsis2009_e.pdf">https://secure.cihi.ca/free_products/HSMR_Sepsis2009_e.pdf</a>. Accessed December 2009.</p> <p>Canadian Institute for Health Information. Canadian Coding Standards for Version 2012 ICD-10-CA and CCI. Ottawa, ON: CIHI; 2012.</p> <p>Drosler S. Organisation for Economic Co-operation and Development: Health Care Quality Indicators Project, Patient Safety Indicators—Report 2009. <a href="http://www.oecd.org/els/health-systems/44193189.pdf">http://www.oecd.org/els/health-systems/44193189.pdf</a>. Accessed October 22, 2013.</p> <p>Levy MM, Dellinger RP, Townsend SR, et al. The Surviving Sepsis Campaign: Results of an international guideline-based performance improvement program targeting severe sepsis. <i>Crit Care Med</i> 2010;38:367-374.</p> <p>Levy MM, Fink MP, Marshall JC et al. 2001 SCCM/ESICM/ACCP/ATS/SIS International Sepsis Definitions Conference. <i>Crit Care Med</i> 2003;31:1250-1256.</p> <p>Martin CM, Priestap F, Fisher H et al. A prospective, observational registry of patients with severe sepsis: the Canadian Sepsis Treatment and Response Registry. <i>Crit Care Med</i> 2009;37:81-88.</p> <p>Quan H, Li B, Couris CM, et al. Updating and validating the Charlson comorbidity index and score for risk adjustment in hospital discharge abstracts using data from 6 countries. <i>Am J Epidemiol</i> 2011;173:676-82.</p>
Availability of Data Sources and Results	
Data Sources	DAD, HMDB
	<b>Type of Year:</b> Fiscal
Available Data Years	<b>First Available Year:</b> 2013 <b>Last Available Year:</b> 2017
Geographic Coverage	All provinces/territories
Reporting Level/Disaggregation	National, Province/Territory, Region, Facility
Result Updates	
Update Frequency	Every year
	<b>Web Tool:</b> Your Health System: In Depth
Indicator Results	<b>URL:</b> <a href="#">Accessing Indicator Results on Your Health System: In Depth</a>
Updates	Not applicable
Quality Statement	
Caveats	In-hospital sepsis events can be due to either community- or hospital-acquired infections. Therefore, the in-hospital sepsis indicator and does not necessarily capture hospital-acquired infections only. In addition, despite the implementation of national coding standards, Limitations there may be variations in charting and coding practices across the country that could affect the results.
Trending Issues	Not applicable
	Indicator results are also available in
Comments	<p>• <a href="#">Your Health System: Insight</a>; data is updated monthly starting from 2013–2014.</p> <p>For additional information, please view the <a href="#">In-Hospital Sepsis FAQ</a> document.</p>