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 General Methodology Notes.
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: Accessing Indicator Results on Your Health System: In Depth

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

Calculation:
Geographic Assignment: Place of service
Type of Measurement: Rate - Rate—per 1,000
Adjustment:
The following covariates are used in risk adjustment:
For a detailed list of covariates used in risk adjustment, please refer to the Model Specification document.

Adjustment: Applied
Method of Adjustment: Logistic regression

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
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
      − 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 (2) 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
      − 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, O98.001, O98.503, O98.504, O98.508, 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 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. 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.


Canadian Institute for Health Information. Canadian Coding Standards for Version 2012 ICD-10-CA and CCI. Ottawa, ON: CIHI; 2012.


