CCG Outcome Indicator Set

Indicator 3.2
Emergency readmissions within 30 days of discharge from hospital.

Domain 3
Helping people to recover from episodes of ill health or following injury

Indicator specification

Version: 1.3
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Author: Clinical Indicators Team
### Document Management

#### Revision History

<table>
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<tr>
<th>Version</th>
<th>Date</th>
<th>Summary of Changes</th>
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</thead>
<tbody>
<tr>
<td>0.1</td>
<td>5 October 2012</td>
<td>Draft for internal review</td>
</tr>
<tr>
<td>0.2</td>
<td>December 2012</td>
<td>To be published on the HSCIC Portal</td>
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<tr>
<td>1.0</td>
<td>27 March 2013</td>
<td>Published on the HSCIC Portal</td>
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<tr>
<td>1.1</td>
<td>27 March 2014</td>
<td>New data period published on HSCIC Portal</td>
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<tr>
<td>1.2</td>
<td>September 2016</td>
<td>Updated branding and reviewed text</td>
</tr>
<tr>
<td>1.3</td>
<td>March 2019</td>
<td>Updated definitions for clarity with some minor changes as part of the review of the Readmissions indicators.</td>
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#### Indicator assurance

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Overview

Indicator title
Emergency readmissions within 30 days of discharge from hospital.

Indicator family name
CCG Outcomes Indicator Set (OIS) Domain 3 - Helping people to recover from episodes of ill health or following injury.

Condition / Topic area
All conditions excepting hospital admissions for cancer and obstetrics.

NHS Digital Indicator code
I00760

Detailed Descriptor

Plain English description
This indicator measures the percentage of emergency admissions to any hospital in England occurring within 30 days of the most recent discharge from hospital.
Admissions for cancer and obstetrics are excluded as they may be part of the patient’s care plan.

Technical description
Indirectly age, sex, method of admission and diagnosis/procedure standardised percentage of emergency admissions to any hospital\(^1\) in England occurring within 30 days of the last, previous discharge from hospital after admission.
Admissions for cancer and obstetrics are excluded.

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\(^1\) Includes activity in English NHS Hospitals and English NHS commissioned activity in the independent sector.
Data Sources

The records for the denominator and the numerator are taken from Hospital Episode Statistics for Admitted Patient Care (HES APC) linked as Continuous Inpatient (CIP) Spells.


Denominator

The number of finished CIP spells within selected medical and surgical specialties with a discharge date up to 31st March in the financial year of analysis.

See below in the Construction section for exclusion criteria.

Numerator

The number of finished and unfinished continuous inpatient (CIP) spells intersecting the respective financial year, plus those up to 30 days into the next financial year that are emergency admissions within 0-29 days (inclusive) of the last, previous discharge from hospital (see denominator and ‘Calculation Methodology’ below).
Construction

Calculation Methodology

Introduction

This indicator measures the percentage of emergency admissions to any hospital in England occurring within 30 days of the most recent discharge from hospital. Admissions for cancer and obstetrics are excluded.

Denominator

The number of finished CIP spells with a valid CCG value, within selected medical and surgical specialties, with a discharge date up to 31st March within the financial year of analysis. Day cases, spells with a discharge coded as death, maternity spells (based on specialty, admission or discharge episode type and primary diagnosis), and those with mention of a diagnosis of cancer or chemotherapy for cancer anywhere in the spell are excluded. Patients with mention of a diagnosis of cancer or chemotherapy for cancer anywhere in the 365 days prior to admission are also excluded.

The following fields and values are used to filter the denominator.

The CIP spell has:

1. Field Name: ADMIDATE (date of admission)
   Conditions: Filters the whole period of the financial year being reported on, e.g. between 01/04/2017 and 31/03/2018 inclusive

2. Field Name: ADMIMETH (admission method)
   Conditions: Contains: 11, 12, 13, 21, 22, 23, 24, 25, 28, 2A, 2B, 2C, 2D, 31, 32, 81, 82, 83, 84 or 89.

3. Field Name: DISDATE (discharge date)
   Conditions: Filters the whole period of the financial year being reported on, e.g. between 01/04/2017 and 31/03/2018 inclusive
   AND is equal to or after the ADMIDATE (date of admission).

4. Field Name: DISMETH (method of discharge)
   Conditions: 1, 2 or 3 (Discharged on clinical advice, Self discharged, or discharged by a mental health review tribunal, i.e. not died, a baby or still in hospital).

The FIRST episode in the CIP spell has:

5. Field Name: EPIORDER (episode order)
   Conditions: Equals 1.

6. Field Name: CCG_RESPONSIBILITY
   Conditions: Valid value i.e. a known CCG code for the reporting year, i.e. excludes unknowns. Note: legacy organisations are mapped to new organisation codes when known.

7. Field Name: EPITYPE (episode type)
   Conditions: Equals 1. General episode types only.
8. Field Name: CLASSPAT (patient classification)  
   Conditions: Equals 1. Ordinary Admissions only.

9. Field Name: STARTAGE (age at start of episode)  
   Conditions: Value between 0 and 120 and 7001 and 7007 only. Value between 7001 and 7007 are converted to 0.

10. Field Name: DOB (patient date of birth)  
    Conditions: Not 01/01/1900 or 01/01/1901 representing unknown.

11. Field Name: SEX (sex of patient)  
    Conditions: Equals 1 or 2.

AND the LAST episode in the CIP spell has:

12. Field Name: EPITYPE (episode type)  
    Conditions: Equals 1. General episode types only.

AND exclude the whole CIP spell where ANY episode in the spell has:

13. Field Name: DIAG_01 - DIAG_20 (any diagnosis)  
    Conditions: C00*-C97*, D37*-D48* (any mention of a diagnosis of cancer) OR Z51.1* (any mention of chemotherapy for cancer). Applies both within the reporting year or anywhere in the 365 days prior to admission for the patient.

OR

14. Field Name: MAINSPEF (specialty under which the consultant is contracted)  
    Conditions: Not 501, 560, 610.

15. Field Name: DIAG_01 (primary diagnosis)  
    Conditions: Does not begin with ‘O’ (Obstetrics).

There is an additional 3 step piece of logic which is designed to ensure that the spells are allocated to the most appropriate diagnosis/procedure group for standardisation:

**Step A**

Searching all episodes from first to last, identify spells where there is a valid procedure\(^2\) and surgical specialty (taken from the episode where the procedure was found). These spells are standardised by procedure subgroup (procedures beginning with ‘Y’ or ‘Z’ are standardised in the ‘no procedure’ basket).

**Step B**

Excluding spells selected in step A, select spells where main specialty in the first episode is surgical, these spells are standardised under the ‘no procedures’ basket.

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\(^2\) Validity is defined in this case as not being either: (1) a null value, (2) ‘-’ meaning “no operation performed”, (3) ‘&’ meaning “not known”.

Step C

Excluding those spells selected in step A and step B, select spells where main specialty of the first episode is medical. These spells are standardised by diagnosis subgroup.

In all cases the first three characters of the respective diagnosis or procedure code is used.

Lists of specialties and sub-groups used above for filtering/standardisation are:


Numerator

The number of finished and unfinished CIP spells that are emergency admissions within 0-29 days (inclusive) of the last, previous discharge from hospital (see denominator), including those where the patient dies, but excluding the following: those with a main specialty and primary diagnosis upon readmission coded under obstetrics and those where the readmitting spell has a diagnosis of cancer (other than benign or in situ) or chemotherapy for cancer coded anywhere in the spell.

The date of the last, previous discharge from hospital, and the date and method of admission from the following CIP spell, are used to determine the interval between discharge and emergency readmission.

The numerator is based on a pair of spells, the discharge spell and the next subsequent readmission spell (this spell must meet the numerator criteria). The selection process thus carries over the characteristics of the denominator for the discharge spell and applies additional ones to the readmission spell.

The following fields and values are used for the numerator:

The CIP spell has:

1. Field Name ADMIDATE (date of admission)
   Conditions Between 1\textsuperscript{st} April of the financial year reporting on and 30\textsuperscript{th} April of the following year.
   Conditions Filters the whole period of the financial year being reported on, plus one month., e.g. between 01/04/2017 and 30/04/2018 inclusive
2. Field Name ADMIMETH (admission method)
   Conditions Contains: 21, 22, 23, 24, 25, 28, 2A, 2B, 2C, or 2D (emergency admissions).

The FIRST episode in the CIP spell has:

3. Field Name EPIORDER (episode order)
   Conditions Equals 1.
4. Field Name CCG\_RESPONSIBILITY
   Conditions Valid value \textit{i.e.} a known CCG code for the reporting year, \textit{i.e.} excludes unknowns. Note: legacy organisations are mapped to new organisation codes when known.
5. Field Name EPITYPE (episode type)
   Conditions Equals 1. General episode types only.
6. Field Name CLASSPAT (patient classification)
   Conditions Equals 1. Ordinary Admissions only.
7. Field Name STARTAGE (age at start of episode)
   Conditions Value between 0 and 120 and 7001 and 7007 only. Value between 7001 and 7007 are converted to 0.
8. Field Name DOB (patient date of birth)
   Conditions Not 01/01/1900 or 01/01/1901 representing unknown.
9. **Field Name**: SEX (sex of patient)
   **Conditions**: Equals 1 or 2.

AND ADMIDATE from the FIRST episode of the Readmission CIP spell minus DISDATE from the LAST episode in Discharge CIP spell ≤ 29 days.

Note: where there is more than one readmission within 30 days, each readmission is counted once, in relation to the previous discharge.

AND exclude where ANY episode in the CIP spell has:

10. **Field Name**: DIAG_01 - DIAG_20 (any diagnosis)
    **Conditions**: C00*-C97*, D37*-D48* (any mention of a diagnosis of cancer) OR Z51.1* (any mention of chemotherapy for cancer).

    Applies both within the reporting year or anywhere in the 365 days prior to admission for the patient.

OR

11. **Field Name**: MAINSPEF (specialty under which the consultant is contracted)
    **Conditions**: Not 501, 560, 610.
12. **Field Name**: DIAG_01 (primary diagnosis)
    **Conditions**: Does not begin with ‘O’ (Obstetrics).
**Indirect Standardisation**

The first step is to calculate the casemix-specific rates for the standard population. The dataset described above is aggregated with counts of readmissions (numerator) and previous discharges (denominator) grouped by:

- Age based on STARTAGE using the following age bands: <1, 1-4, 5-9, 10-15, 16-64, 65-74, 75-84, 85+;
- Sex based on SEX as 1, 2 (male and female);
- Method of admission of discharge spell based on ADMIMETH as elective or non-elective;
- Medical or Surgical specialties based on MAINSPEF;

Then either:

- Diagnosis group (within medical specialties) based on DIAG_01 (primary diagnosis) and expressed to 3 characters OR;
- Procedure group (within surgical specialties) based on OPERTN_01 (primary procedure) expressed to 3 characters.

For each group in this casemix the casemix specific readmission rates are calculated and are then applied to the casemix structure of the subject population i.e. each CCG. This gives an expected number of events against which the observed number of events may be compared.

Indirect standardisation involves the calculation of the ratio of observed number of events (for the CCG) and the number of events that would be expected if it had experienced the same event rates as those of patients in England, given the casemix of age, sex, method of admission and diagnosis / procedure of its patients.

\[
IS_{Ratio} = \frac{O}{E} \times 100 = \frac{\sum_i O_i}{\sum_i E_i} \times 100 = \frac{\sum_i O_i}{\sum_i n_i \lambda_i} \times 100
\]

(expressed per 100 denominator population)

where:

- \(O_i\) is the observed number of events in the subject population in casemix group \(i\).
- \(E_i\) is the expected number of events in the subject population in casemix group \(i\).
- \(n_i\) is the number of individuals in the subject population in casemix group \(i\).
- \(\lambda_i\) is the crude age-specific rate in the standard population in casemix group \(i\).

This standardised ratio is then converted into a rate by multiplying it by the overall event rate of patients in England.

\[
IS_{Rate} = \frac{O}{E} \times \lambda \times 100 = \frac{\sum_i O_i}{\sum_i E_i} \times \lambda \times 100 = \frac{\sum_i O_i}{\sum_i n_i \lambda_i} \times \lambda \times 100
\]

(expressed per 100 denominator population)

where:

- \(O_i\) is the observed number of events in the subject population in casemix group \(i\).
- \(E_i\) is the expected number of events in the subject population in casemix group \(i\).
- \(n_i\) is the number of individuals in the subject population in casemix group \(i\).
\( \lambda_i \): is the crude age-specific rate in the standard population in casemix group \( i \).
\( \lambda \): is the overall crude rate in the standard population.

**Confidence Intervals**

The lower and upper limits of the 95% confidence interval for the indirectly standardised rate are calculated by finding the lower and upper limits of the standardised ratio and multiplying by the overall crude rate of the standard population. The Byar’s approximation is used as it is a sufficiently accurate approximation to the Poisson probabilities\(^3\).

The 95% limits are given by:

\[
IS_{Rate\ (LL)} = \frac{O}{E} \times \left( 1 - \frac{1}{9O} - \frac{1.96}{\sqrt[3]{O + 1}} \right)^3 \times \lambda \times 100
\]

\[
IS_{Rate\ (UL)} = \frac{(O + 1)}{E} \times \left( 1 - \frac{1}{9(O + 1)} + \frac{1.96}{\sqrt[3]{O + 1}} \right)^3 \times \lambda \times 100
\]

(expressed per 100 denominator population)

where:

- \( O \): is the total observed number of events in the subject population.
- \( E \): is the total expected number of events in the subject population.
- \( \lambda \): is the overall crude rate in the standard population.

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Presentation

Breakdowns

Time periods
Financial year data from 2013/14.

Demographic
None.

Geographic
CCG

Disclosure control
The indicator is calculated following HES guidance on suppression of small numbers:
## Excel and CSV output

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<tr>
<th>Column name</th>
<th>Output</th>
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<tbody>
<tr>
<td>Reporting period</td>
<td>Financial year</td>
</tr>
<tr>
<td>Period of coverage</td>
<td>Start and end dates of the reporting period</td>
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<tr>
<td>Breakdown</td>
<td>CCG and National</td>
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<td>ONS code</td>
<td>ONS code for the Breakdown</td>
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<td>CCG code and National</td>
</tr>
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<td>Level description</td>
<td>Name of CCG or National</td>
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<td>Indicator value</td>
<td>Indirectly standardised percentage rate (ISR)</td>
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<tr>
<td>CI Lower</td>
<td>ISR lower 95% confidence interval</td>
</tr>
<tr>
<td>CI Upper</td>
<td>ISR upper 95% confidence interval</td>
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<tr>
<td>Denominator</td>
<td>The number of discharges to end of financial year</td>
</tr>
<tr>
<td>Numerator</td>
<td>The number of readmissions within 30 days</td>
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<tr>
<td>Expected</td>
<td>The expected number of readmissions within 30 days</td>
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