Indicator 1.20
Mortality from breast cancer in females

Domain 1
Preventing people from dying prematurely

Indicator specification

Version: 1.3
Date: September 2016
Author: Clinical Indicators Team
Document Management
Revision History

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<td>1.0</td>
<td>September 2014</td>
<td>Initial Release</td>
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<tr>
<td>1.1</td>
<td>February 2015</td>
<td>Clarification of confidence interval methodology</td>
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<tr>
<td>1.3</td>
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<td>Rebranding to NHS Digital and source links</td>
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Indicator assurance

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Overview

Indicator title
Mortality from breast cancer in females

Indicator family name
CCG Outcomes Indicator Set (OIS) Domain 1 - Preventing people from dying prematurely

Condition / Topic area
Breast Cancer

NHS Digital Indicator Portal code
P01819

Detailed Descriptor

Plain English description
CCG OIS 1.20 measures the number of female deaths from breast cancer.

Technical description
Deaths from breast cancer in females registered in the calendar year, directly standardised by age group, given as a rate per 100,000 registered female patients.
Data Sources

Denominator
Unconstrained GP registered female patient counts by single year of age from the NHAIS (Exeter) Systems; extracted annually on 1 April for the forthcoming financial year.

http://systems.digital.nhs.uk/ssd/prodserv/vaprodopenexe

Numerator
Female death registrations, due to breast cancer, in the calendar year for all England deaths based on GP of registration from the Primary Care Mortality Database (PCMD).

http://digital.nhs.uk/pcmdatabase

Standard population
Office for National Statistics (ONS) mid-year England population estimates for the respective calendar years. If estimates are not available for a specific calendar year, the most recent available estimates are used.

https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates

Data from 2012-14 onwards is released without the Area Team breakdown. Prior years Area Team breakdown has been archived, see indicator portal.

Construction

Calculation Methodology

Introduction
This indicator gives the number of deaths from breast cancer in females, registered in the calendar year; it is directly standardised by age group and given as a rate per 100,000 registered female patients.
Data Fields
For this indicator data are derived from PCMD and registered patient counts from NHAIS which are supplied annually on 1 April.

The data fields and filters used within PCMD (numerator) are as follows:

- CALCULATED_AGE_UNIT
- CALCULATED_AGE
- SEX
- DATE_OF_REGISTRATION
- CCG_OF_REGISTRATION
- UNDERLYING_CAUSE_OF_DEATH

Data Filter
1. Field Name: CALCULATED_AGE_UNIT
   Conditions: When CALCULATED_AGE_UNIT equals 2, 3 or 4, then re-code age to zero years
   Rationale: The calculated age unit is used to specify whether the CALCUALTED_AGE field refers to years (1), months (2), weeks (3) or days (4) of life. Those recoded to zero years are added back into the CALCULATED_AGE field.

2. Field Name: CALCULATED_AGE
   Conditions: Is valid number
   Rationale: Combined with the recoded zero ages from CALCULATED_AGE_UNIT selects only those with a valid age.

3. Field Name: DATE_OF_REGISTRATION
   Conditions: Between 1 January and 31 December inclusive
   Rationale: Selects only those deaths registered during the relevant calendar year.

4. Field Name: SEX
   Conditions: Is equal to 2
   Rationale: Selects females only.
5. **Field Name**: CCG_OF_REGISTRATION  
   **Conditions**: Is valid English CCG  
   **Rationale**: Selects people registered with a CCG in England.

6. **Field Name**: UNDERLYING_CAUSE_OF_DEATH  
   **Conditions**: Is equal to ICD-10 code ‘C50’  
   **Rationale**: Selects those whose underlying cause of death was coded on the death certificate as breast cancer.

**Calculation**

This indicator is calculated as a rate directly standardised by age and sex. Calculated per 100,000 registered female patients. A list of the age groups used in the standardisation can be seen in appendix 1.

**Denominator**

CCG level count of females registered with the constituent GP Practices, provided by NHAIS (Exeter) Systems.

**Numerator**

The number of female deaths from breast cancer (ICD-10: C50), classified by the underlying cause of death registered in the respective calendar years.

The data used are based on the original cause of death recorded on the death certificate rather than any final amended causes. Data are aggregated by age group.
**Direct Standardisation**

The directly age and sex standardised rate (DSR) is the rate of events that would occur in a standard population if that population were to experience the age and sex specific rates of the subject population. The age and sex specific rates of the subject population are applied to the age and sex structure of the standard population.

\[
DSR = \frac{1}{\sum_{i} w_i} \times \sum_{i} \frac{w_i O_i}{n_i}
\]

where:

- \( O_i \) is the observed number of events in the local or subject population in age and sex group \( i \);
- \( N_i \) is the number of individuals in the local or subject denominator population in age and sex group \( i \);
- \( W_i \) is the number of individuals in the standard population in age and sex group \( i \).

The standard population used for the direct method is the England female population from ONS mid-year population estimates. The age groups used are: 0-4, 5-9, ..., 90+ (see appendix 1).

**Confidence Intervals**

95% confidence intervals are calculated using Dobson's\(^1\) and Byar's\(^2\) methods. Byar's method is recommended for larger counts whereas for smaller numerators (less than 389) a more exact method based on the Poisson distribution (Dobson's method) is used:

\[
DSR_{lower} = DSR + \sqrt{\frac{Var(DSR)}{Var(O)}} (O_{lower} - O)
\]

\[
DSR_{upper} = DSR + \sqrt{\frac{Var(DSR)}{Var(O)}} (O_{upper} - O)
\]

where:

- \( O \) is the total number of observed deaths in the subject population.

---


\[ Var(DSR) = \frac{\sum_i \frac{w_i^2}{n_i^2} O_i}{(\sum_i w_i)^2} \]

\[ Var(O) = \sum_i O_i \]

\( O_{lower} \) and \( O_{upper} \) are the lower and upper confidence limits for the observed number of events;

When \( O < 389 \) then,

\[ O_{lower} = \frac{\chi_{lower}^2}{2} \]

\[ O_{upper} = \frac{\chi_{upper}^2}{2} \]

Where:

\( \chi_{lower}^2 \) is the 97.5\(^{th}\) percentile value from the \( \chi^2 \) distribution with \( 2O \) degrees of freedom;

\( \chi_{upper}^2 \) is the 2.5\(^{th}\) percentile value from the \( \chi^2 \) distribution with \( 2O + 2 \) degrees of freedom.

When \( O \geq 389 \) then,

\[ O_{lower} = O \left( 1 - \frac{1}{9O} - \frac{z}{3\sqrt{O}} \right)^3 \]

\[ O_{upper} = (O + 1) \left( 1 - \frac{1}{9(O + 1)} + \frac{z}{3\sqrt{O + 1}} \right)^3 \]

Where:

\( z \) is the 97.5\(^{th}\) percentile value from the Standard Normal distribution.
Presentation

Breakdowns

Time periods
3 year, rolling calendar year data from 2009-2011 onwards.

Demographic
None

Geographic
All registered patients in England
CCG

Disclosure control

Where the indicator is calculated from a numerator of 0, 1 or 2 the value is suppressed to ensure an individual’s identity is not at risk of being disclosed. If there is only one value suppressed in this way, the rate based upon the next lowest numerator is also suppressed, reducing the risk of the first suppressed number being identifiable in isolation.

Rates are rounded to one decimal place before publication.
## Excel and CSV output

<table>
<thead>
<tr>
<th>Column name</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting period</td>
<td>Calendar year of death registration</td>
</tr>
<tr>
<td>Breakdown</td>
<td>Organisation type</td>
</tr>
<tr>
<td>ONS code</td>
<td>ONS organisation code</td>
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<td>Level</td>
<td>Organisation code</td>
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<td>Level description</td>
<td>Organisation name</td>
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<tr>
<td>Gender</td>
<td>Female</td>
</tr>
<tr>
<td>DSR</td>
<td>Directly standardised mortality rate per 100,000</td>
</tr>
<tr>
<td>CI lower</td>
<td>DSR lower 95% confidence interval</td>
</tr>
<tr>
<td>CI upper</td>
<td>DSR upper 95% confidence interval</td>
</tr>
<tr>
<td>Registered patients</td>
<td>The count of registered patients (denominator)</td>
</tr>
<tr>
<td>Observed</td>
<td>Number of deaths from breast cancer during the respective calendar years</td>
</tr>
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# Appendices

## Appendix 1 - England standard population age groups

|-----------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|

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