

Version 1

Announcement of methodological change to CCG Outcomes Indicator Set potential years of life lost indicator

From June 2015, both the directly standardised rate (DSR) calculation for pooled years (2009-2011, 2010-2012 and 2011-2013) and the confidence intervals methodology for all breakdowns have been updated.

We have updated the way in which we calculate the DSR for pooled years to both improve the accuracy by maintaining granularity and to facilitate a change in the calculation of confidence intervals.

1. Change in methodology for pooled years for CCG OIS indicator 1.1: Potential Years of Life Lost (PYLL) from causes considered amenable to healthcare

Current method

The current method takes the average life expectancy by age and gender group for the specific year and multiplies it by the observed number of deaths for the same age and gender group in that year to create a total years of life lost figure for a single year. These single year totals for years of life lost are then divided by the **sum of the subject population for each individual year by age and gender group**. These figures are then multiplied by the standard population for each individual year by age and gender group.

This figure is then summed to create a figure for pooled years before continuing the calculation by dividing by the pooled sum of the standard population.

Previous method

The previous method took the average life expectancy by age and gender group for a specific year and multiplied it by the observed number of deaths in that year by the same age and gender group to create a total years of life lost figure for a single year. These single year totals for years of life lost were then summed to form a total for pooled years, before being divided by the **sum of the subject population at pooled years** and then multiplied by the standard population at pooled years by age and gender group. Finally, this figure was divided by the sum of the standard population at pooled years to derive the DSR.

The directly standardised rate (DSR) for pooled years has changed due to the additional information within single years being captured. DSRs for single years are unaffected.

2. Change in methodology for confidence intervals for CCG OIS indicator 1.1: Potential Years of Life Lost (PYLL) from causes considered amenable to healthcare

Current method

95% confidence intervals are calculated using an adaptation of Dobson's and Byar's methods. Byar's method is recommended for larger counts and the exact method based on the Poisson distribution for small counts; where Byar's method is not quite as accurate. As follows:

$$DSR_{lower} = DSR + \sqrt{\frac{Var(DSR)}{Var(O)}} \left(O \left(1 - \frac{1}{9O} - \frac{1.96}{3\sqrt{O}} \right)^3 - O \right)$$

$$DSR_{upper} = DSR + \sqrt{\frac{Var(DSR)}{Var(O)}} \left((O + 1) \left(1 - \frac{1}{9(O + 1)} - \frac{1.96}{3\sqrt{O + 1}} \right)^3 - O \right)$$

where:

O is the total number of observed deaths in the subject population

$$Var(DSR) = \frac{\sum_i \frac{a_i^2 w_i^2 O_i}{n_i^2}}{(\sum_i w_i)^2}$$

$$Var(O) = \sum_i O_i$$

where:

a_i is the life expectancy for age group i

w_i is the reference (standard) population for age group i

O_i is the observed number of deaths in age group i

n_i is the denominator population for age group i

The current method is based on the counts of deaths (as these are the events we are observing) by changing the weighting parameter for the DSR. The weighting given to each age group is derived from the Standard Population used (ONS mid-year England population estimates). PYLL is still a weighted average of death rates, but the weighting reflects the years of life lost as well as the standard population. This means that $a_i w_i$ is used instead of w_i , rather than O_i being replaced with $a_i O_i$ as was done previously.

Previously the formula used for $Var(DSR)$ was:

$$Var(DSR) = \frac{\sum_i \frac{w_i^2 a_i O_i}{n_i^2}}{(\sum_i w_i)^2}$$

where:

a_i is the life expectancy for age group i

w_i , O_i and n_i are as stated in the specification document

This resulted in confidence intervals that were too narrow.

Advice was sought from members of the Methodology Review Group (MRG) panel, who reviewed and had no objections to the change (28.05.2015).

For information regarding the MRG, please follow this link:

<http://www.hscic.gov.uk/article/5173/Appraisal-end-to-end-process#mrg>