Risk adjusted mortality indicators

A mortality index is a ratio of an observed number of deaths to an expected number of deaths in a particular population. The index is simply the number of observed events divided by the number of expected events.

RAMI – The Model

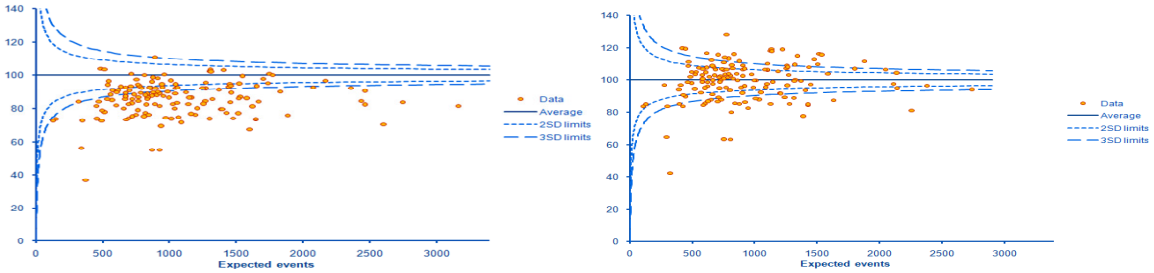
Using a large database containing more than 7 million annual episodes from England, Wales and Northern Ireland, (Scotland will be included in the 2014 model) a normative database of case-level hospital spell data including age, sex, length of stay, method of admission (emergency, transfer and other(including elective)), clinical grouping (Healthcare Resource Group -HRG), ICD10 primary and secondary diagnoses, OPCS primary and secondary procedures, hospital identification, and discharge method is constructed. The model includes patients from over 140 English Acute Trusts, 6 Welsh Local Health Boards and 5 Northern Irish Health and Social Care Trusts.

The RAMI model is rebased annually, by recalculating the norms based on a more up to date data period. In some instances we also adjust the model when we rebase and between RAMI 2012 and RAMI 2013 the following changes were made.

- Z515 – patients with a palliative care code were previously not included in the model derivation. In 2013 this was amended to include records coded with Z515 palliative care in the derivation of the coefficients, thereby ensuring condition based risk are as accurate as possible.
- Z518 – generalised palliative care or end of life care codes were previously assigned a high risk weight within the model but have been excluded from the calculation of the expected deaths in 2013 version.

Every year the model is rebased. This process is good practice for index-based indicators and ensures that the database norm returns to 100. After rebasing, the database norm will typically then fall again (from 100) from the moment it goes live until it is recalibrated once more.

The usual outcome of a rebase is that index scores rise by an average number of points (the number of which can depend upon changes to specific factors that influence the indicator as well as the length of time since the previous rebase) The distribution returns to norm of 100 as shown on the funnel plots below.



The differences between models come about for a variety of reasons. Shifts in index scores can relate to changes in coding, such as coding palliative care/end of life care patients, clinical practice, such as new techniques becoming better established with reduced mortality or changes in service provision, such as provision of ambulatory care services or moving intermediate, rehabilitation or ongoing care outside the acute hospital setting.

RAMI 2013 calibrated to Welsh mean

The RAMI index is recalibrated in the same way as above to ensure Welsh values are reported around 100. This increases the prediction scores for Wales. The Welsh Average, based on 18 major Welsh hospitals, for RAMI 13 was 116.89 at June 2012 so we have increased the predictions for RAMI 13 by 16.89%. The basic models remain unchanged but this negates the English dominance in the model as with over 140 acute trusts in the model the predictions are biased towards the English health service model rather than the integrated care model found in Wales and Ireland.

Note – although RAMI is not intended to compared to peers it is especially true with these recalibrated indexes – they definitely should not be compared with England.

In-Hospital SHMI

SHMI is the English hospital-level indicator used for reporting mortality across acute trust providers. The SHMI is a ratio of the observed number of deaths to the expected number of deaths for a provider. The observed number of deaths is the total number of patients who died in hospital plus those who died within 30 days of discharge from the hospital. The expected number of deaths is calculated from a risk adjusted model using patient age, gender, admission method, Charlson Comorbidity Index and diagnosis grouping.

More details about the SHMI Model can be obtained by accessing the SHMI information on the NHS Health and Social Care Information Centre website.

Note that, in this In-Hospital SHMI indicator observed deaths only include deaths in hospital. Any index value will increase when out-of-hospital deaths are included. An index below 100 for In-Hospital SHMI does not necessarily mean that deaths are lower than expected. Analysis of England-wide figures across all CCS groups suggests on average that approximately 25% of deaths reported in SHMI were out-of-hospital (within 30 days of discharge).

Interpreting risk adjusted mortality indicators

When reviewing any mortality indicator the advice is that they should be reviewed in conjunction with a range of other quality indicators and contextual information – this should include monitoring the actual number of deaths over time. Variation from the expected can be due to a range of issues and it is important that all are investigated and understood. These might include data quality issues, differences in service configuration or issues with the quality of care.