



**CHKS**

Insight for better healthcare

# **Mortality measurement**

## **six factors to consider in interpreting a hospital indicator**



## **A CHKS Insight report**

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## Introduction

Mortality measurement is a complex issue and much has been written about the usefulness of mortality ratios. Academics have clashed and there has been wide debate amongst those who seek to measure and hospital trusts whose data is being analysed. In 2010 the Department of Health asked us to be part of a working group to look into mortality measurement and devise a new measure that could be used throughout the NHS. We now have the Summary Hospital-level Mortality Indicator (SHMI) which takes into account deaths within 30 days of discharge.

However, CHKS believes that hospital trusts need to take a step back before considering any mortality ratio (regardless of who has published it) and take into account six factors which can have a direct impact on it. These are:

- percentage of the population who die in hospital as opposed to outside;
- population demography;
- different pathways of care;
- zero length of stay emergencies;
- palliative care, and
- data quality.

No two hospital trusts are exactly the same and mortality measurement cannot fully take into account these factors.

Remember a mortality ratio can be affected by changes in the denominator and the numerator:

$$\frac{\text{Number of observed deaths}}{\text{Number of expected deaths}}$$

## 1. Percentage of the population who die in hospital as opposed to outside

**Reasoning:** For most mortality ratios, a higher proportion of people dying in hospital will increase the number of observed deaths and therefore increase the ratio.

The number of people dying in hospital as opposed to outside varies considerably. The English average is around 56 per cent of a given population dying in hospital but this varies between local authority boundaries from 44 to 78 per cent. Mortality indicators do not take this into account –because some of this effect might be due to quality of care. As they assume all have the average, a trust which has 78% of its resident population dying in hospital will have a 78/56 increase in its indicator (assuming it would have been an average 100 value, this increases it to 139).

Trusts therefore need to take into account what level of support there is in the local community for end of life care. In some areas there will be support by way of PCT-provided community services and in others far less. The 2011 report<sup>1</sup> from an inquiry into end of life care led by Thomas Hughes-Hallett, chief executive, Marie Curie Cancer Care, describes huge variations in the quality of end-of-life services. Citing figures from the Department of Health, it reports that in the last financial year one primary care trust spent approximately £186 per death while another spent £6,213. An interactive map showing the end of life care profiles (place of death) can be found here:

[http://www.endoflifecare-intelligence.org.uk/profiles/Place\\_of\\_Death/atlas.html](http://www.endoflifecare-intelligence.org.uk/profiles/Place_of_Death/atlas.html)

## 2. Demographics of life expectancy

**Reasoning:** For some mortality ratios, a higher ratio is a result of a higher proportion of deaths through lower life expectancy, increasing the number of observed deaths at a younger age.

In some areas of the country life expectancy is shorter than in others. For example men in London can live up to 14 years longer than men in Glasgow, according to ONS figures<sup>2</sup>. This means there are likely to be more 48 year-old men admitted to hospital following a heart attack in Glasgow than there are on London. It follows that there are likely to be more deaths at an earlier age as a result of shorter life expectancy. Again mortality models assume that life expectancy does not vary when modeling around age.

There are a number of factors that affect life expectancy including eating habits; housing and education. Data on life expectancy can be found here:

[http://www.apho.org.uk/addons/\\_105057/atlas.html?HPT=R&config](http://www.apho.org.uk/addons/_105057/atlas.html?HPT=R&config)

### 3. Differences in pathways

**Reasoning:** Not all hospitals have the same services and more importantly they do not all follow the same pathways of care.

In some parts of the country there are different pathways for treatment of certain conditions. For example in London there is a stroke pathway which sees patients being treated in specialist Hyper Acute Stroke Units (HASU) rather than being admitted straight to their local hospital. Patients are then transferred from the **HASU** to a **stroke unit** in a hospital close to where they live, within around 72 hours of having had the emergency treatment. Thus the HASUs and local hospitals are seeing two different populations although they are both likely to be coded for stroke and look identical to a mortality model. It follows that these different pathways will potentially change the number of observed and/or predicted deaths for certain treatment. Hospital trusts should consider what local factors are at play for certain pathways when examining mortality.

### 4. Percentage of zero length of stay emergency admissions

**Reasoning:** The inclusion of zero length of stay emergencies in the SHMI indicator will inflate the overall expected deaths and therefore lower the ratio

There is a wide variation between hospitals trusts in the number of people who are discharged on the same day following emergency admission. The inclusion of zero length of stay emergencies in the SHMI indicator will increase the overall denominator. These patients are potentially a different type of population to those with a longer stay.

Individually they will have a very low risk of death but they make up a very large proportion of total hospital activity. This type of activity has seen a very large growth in recent years. The impact on a trusts SHMI score will depend on whether they have a higher or lower proportion of this category of patient than average. As they are a low risk group overall the

impact may be relatively small but there is evidence that it can be quite significant if the rate of growth is very different to the rest of England.

## 5. Palliative care

**Reasoning:** Dying in hospital is a perfectly acceptable outcome - particularly if a person is admitted for end of life care. The difficulty is in identifying this cohort.

Some mortality indicators have made adjustments for palliative care because they found there was a distortion for those hospitals which ran their own hospice on site. For SHMI the decision was taken not to make any adjustment as the recording is still very variable and the report of the steering group recommended a full review of the coding of this area<sup>3</sup>. The coding of palliative care varies from one trust to another but overall there has been an increase in the use of the palliative care code Z51.5. We have written about the changes in the pattern of recording previously<sup>4</sup>. The data used to calculate the SHMI (financial year 2010/11) showed an average of 16.4 per cent with a range from 39 per cent to less than 2 per cent. Given the different manner in which trusts are using this code it is difficult to say what the “correct” level is likely to be. However, the wide variation can have a significant impact on mortality ratios.

Besides coding variation there are also good reasons why the number of palliative care cases admitted to hospital can vary. This will depend on what level of palliative care is provided for in their community. In some areas hospices are provided by the voluntary sector and therefore the number of palliative care in hospital deaths is likely to be lower.

## 6. Data quality

**Reasoning:** Data quality has been shown to have an impact on mortality ratios because it can affect the number of observed deaths

Previous analysis has shown that the rate of decrease in mortality indicators shows a strong correlation with increases in data quality<sup>4</sup>. There is now much firmer evidence to show the link between data quality and mortality ratios. Nine trusts focusing on improving their overall data quality showed the same pattern of reduction in their mortality indicator.

Over a nine month period they reduced the mortality indicator by an average of 10 points whilst demonstrating an increase in depth of coding. The relationships were very strong with a range of correlations from 0.849 to 0.998. This can be found on page 19 of the following report:

[http://www.advancingqualityalliance.nhs.uk/document\\_uploads/Rachel-documents/AQuA%20NW%20Reducing%20Mortality%20Report%20Phase%201%20output%20report%20June%202011\\_9b964.pdf](http://www.advancingqualityalliance.nhs.uk/document_uploads/Rachel-documents/AQuA%20NW%20Reducing%20Mortality%20Report%20Phase%201%20output%20report%20June%202011_9b964.pdf)

## **Conclusion**

Mortality indicators have a useful role to play in monitoring the performance of an organisation. In particular, they have greater value when used at a more granular level than the hospital (e.g. specialty or condition) – it would only have been at this level that the problems at the Bristol Royal Infirmary showed up. The other main use is in tracking changes over time and seeing if clinical pathway interventions (e.g. care bundles) have a beneficial impact.

## **References**

1. *The Palliative Care Funding Review*, 2011
2. *Life expectancy at birth and at age 65 by local areas in the United Kingdom, 2004-06 to 2008-10*, The Office for National Statistics
3. Report from the Steering Group for the National Review of the Hospital Standardised Mortality Ratio, 2010. The report can be found at:  
[http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh.digitalassets/@dh/@en/documents/digitalasset/dh\\_121328.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh.digitalassets/@dh/@en/documents/digitalasset/dh_121328.pdf)
4. Robinson, P., 2010, Hospital standardised mortality ratios and their use as a measure of quality (available at:  
[http://www.chks.co.uk/assets/files/Published%20articles/HSMRs\\_and\\_their\\_use\\_as\\_a\\_measure\\_of\\_quality\\_290310.pdf](http://www.chks.co.uk/assets/files/Published%20articles/HSMRs_and_their_use_as_a_measure_of_quality_290310.pdf)