SHMI: guidance for trusts

Purpose of this guidance

This guidance has been produced for analysts and clinicians in trusts when using the Summary Hospital-level Mortality Indicator (SHMI) and the associated resources. Its purpose is to help users in trusts to understand the SHMI and make full use of the information to accurately and confidently investigate their SHMI.

NHS Digital hopes that this guidance will be of assistance to existing users and those who are using the SHMI for the first time.

We welcome any queries that trusts may have regarding their SHMI so please do contact us with any questions using the contact details at the bottom of this guidance. We would also welcome any information you could share about your experiences interpreting the SHMI.

What is the Summary Hospital-level Mortality Indicator (SHMI)?

The SHMI compares the actual number of patients who die following hospitalisation at a trust with the number that would be expected to die on the basis of average England figures, given the characteristics of the patients treated there.

For any given number of expected deaths, a range of observed deaths is considered to be 'as expected'. If the observed number of deaths falls outside of this range, the trust in question is considered to have a higher or lower SHMI than expected.

The SHMI includes deaths which occurred in hospital or within 30 days of discharge and is calculated using Hospital Episode Statistics (HES) data linked to Office for National Statistics (ONS) death registrations data.

The SHMI is published by NHS Digital as a National Statistic on a quarterly basis, with each publication reporting on a 12-month period. The first publication was in October 2011 and this reported on discharges in the period April 2010 – March 2011. SHMI data for earlier reporting periods is not available.

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Interpretation of the SHMI

- **The SHMI can be used by trusts to compare their mortality outcomes to the national baseline, with some caveats.**

  Where a trust has an 'as expected' SHMI, it is inappropriate to conclude that their SHMI is lower or higher than the national baseline, even if the number of observed deaths is smaller or larger than the number of expected deaths. This is because the trust has been placed in the 'as expected' range because any variation from the number of expected deaths is not statistically significant.

- **The difference between the number of observed deaths and the number of expected deaths cannot be interpreted as the number of avoidable deaths for the trust.**

  Whether or not a death could have been prevented can only be investigated by a detailed case-note review. The SHMI is not a direct measure of quality of care.

  The expected number of deaths for each trust is not an actual count of patients, but is a statistical construct which estimates the number of deaths that may be expected at the trust on the basis of average England figures and the characteristics of the patients treated there.

- **A 'higher than expected' SHMI should not immediately be interpreted as indicating bad performance.**

  Instead, it should be viewed as a 'smoke alarm' which requires further investigation by the trust. Similarly, an 'as expected' or 'lower than expected' SHMI should not immediately be interpreted as indicating satisfactory or good performance.

  The methodology used to calculate the expected number of deaths for a particular trust takes into account the number of patients treated and their characteristics (including the condition the patient is in hospital for, other underlying conditions the patient suffers from, age, gender and method of admission to hospital) and so these factors should not influence a trust's SHMI. There are many other factors which have the potential to affect a trust's SHMI including (but not limited to) the quality of the data upon which the SHMI is based, other patient characteristics not listed above, the organisation of services and availability of resources e.g. staff, and quality of care.

  The SHMI includes admitted patients for all clinical areas within a trust and it is possible that mortality rates differ across these areas. For this reason, we advise all trusts to investigate their SHMI data in detail using the data broken down by diagnosis group, regardless of whether their SHMI is categorised as 'higher than expected', 'as expected' or 'lower than expected.

  The SHMI requires careful interpretation and should be used in conjunction with other indicators and information from other sources (e.g. patient feedback, staff surveys and other similar material) that together form a holistic view of trust outcomes.

- **The SHMI cannot be used to directly compare mortality outcomes between trusts and, in particular, *it is inappropriate to rank trusts according to their SHMI.***

  Instead, the SHMI banding can be used to compare mortality outcomes to the national baseline. If two trusts have the same SHMI banding, it cannot be concluded that the trust with the lower SHMI value has better mortality outcomes.

- **A correlation between the SHMI and other variables of interest does not imply causation.**

  Even if a correlation suggests that there is a relationship between the SHMI and another variable, it does not necessarily imply that one is causing the other. For example, other factors may be influencing both the SHMI and other variables, suggesting a direct relationship where there is none.

- To support the interpretation of the SHMI, various contextual indicators are published alongside it. Contextual indicators on the following topics are currently available: palliative care coding, admission method, in and outside hospital deaths, deprivation, primary diagnosis coding and depth of coding**.**

SHMI resources

A number of different SHMI resources are available to users. On the NHS Digital corporate website there is a SHMI homepage providing supporting information on the SHMI including interpretation guidance, frequently asked questions (FAQs), a publication timetable, a users and uses statement and this guidance document. There is also a SHMI research and development webpage which brings together reports and ad-hoc analyses related to the SHMI methodology.

There is a webpage for each quarterly release including a one page summary of the publication (available from the July 2015 publication onwards), which aims to provide a user-friendly introduction to the topic, and detailed information on data quality. In addition, a more detailed report is produced annually as part of the September release, including analysis for trusts identified as repeat outliers and analysis of the SHMI contextual indicators.

The Excel and csv data files containing SHMI data at trust and diagnosis group level and contextual indicator data at trust level are also available to download, along with methodology specification documents, files containing data definitions and files containing data on the statistical models upon which the SHMI is based. An interactive data visualisation is also provided (from the June 2017 publication onwards).

The one page summary, data quality report, data files and an interactive funnel plot which provides a visualisation of the SHMI data at trust level can also be accessed from the NHS Digital Indicator Portal. The SHMI diagnosis breakdown data is a useful starting point for trusts wishing to investigate which diagnosis groups have the greatest influence on their SHMI**.**

A SHMI Extract Service is available to trusts that complete an application process and have obtained the relevant approvals. Trusts who have registered for this service receive an extract of the record-level data which have been used to calculate their SHMI and accompanying contextual indicators following the quarterly publication of the SHMI. This record-level data allows trusts to carry out further quality assurance and investigations into their SHMI. Trusts are only provided with access to their own SHMI data. As part of this service, NHS Digital also provides trusts with Variable Life-Adjusted Display (VLAD) charts for some of the individual diagnosis groups which make up the SHMI. VLAD charts are a type of statistical process control chart which make a visual comparison between an expected outcome and its associated observed outcome. They allow the monitoring of trends in outcomes over time and can highlight the specific clinical areas which have the most impact on a trust's SHMI. Further information is available in the SHMI Extract Service Information Pack which can be requested using the contact details provided below.

Trusts are provided with the opportunity to review their SHMI data prior to its publication for the purpose of quality assurance via NHS Digital's Clinical Indicator Preview tool. Each preview period allows five working days for trusts to carry out this quality assurance and to raise any issues or questions with NHS Digital. As part of this process, medical directors (or other senior clinicians) are asked to sign-off the SHMI for their trust. If trusts raise data quality concerns during the preview period, the impact of the issue is investigated and this is then documented in this background quality report where necessary. Access to the Clinical Indicator Previewer can be requested using the contact details provided below.

How should a trust investigate their SHMI?

A 'higher than expected' SHMI should not immediately be interpreted as indicating bad performance and instead should be viewed as a 'smoke alarm' which requires further investigation by the trust. It is recommended that such follow-ups use a structure such as the pyramid of investigation for special cause variation[1] to further investigate the SHMI (see diagram below).

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[1] Lilford R., Mohammed M. A., Spiegelhalter D., Thomson R. Use and misuse of process and outcome data in managing performance of acute medical care: avoiding institutional stigma. Lancet 2004; 363: 1147-54.
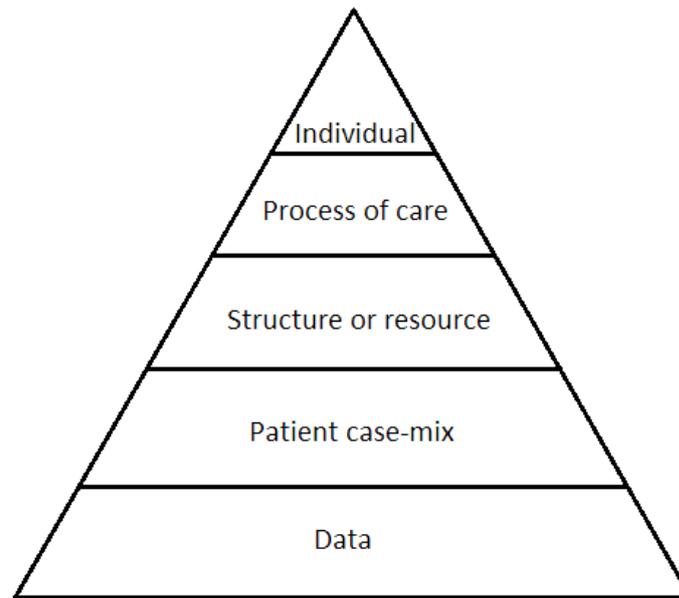
More likely explanations are listed towards the bottom of the pyramid, and so it is suggested that these are investigated first. Examples of the types of questions that trusts should ask at each stage are provided below:

Data: has the data been coded accurately, have all comorbidities been recorded and coded, have there been any changes in coding practice, is the data complete? The SHMI contextual indicators on primary diagnosis coding and depth of coding may be helpful here.

Patient case-mix: are there factors that particularly affect patients at the trust which are not taken into account by the national risk-adjustment e.g. patients admitted for end of life care? The SHMI contextual indicators on palliative care coding may be helpful here.

Structure or resource: were there any changes to the structure and availability of resources e.g. availability of beds, equipment and staff?

Process of care: have new treatment guidelines been introduced, have the appropriate care pathways been consistently followed, have there been any changes to admission or discharge practices?

Individual: have there been staff changes during the period under investigation, has a staff member gained additional skills which has led to improved outcomes, are the cases with adverse outcomes mostly associated with one clinician or team?

Similarly, an 'as expected' or 'lower than expected' SHMI should not immediately be interpreted as indicating satisfactory or good performance. The SHMI requires careful interpretation and should be used in conjunction with other indicators and information from other sources (patient feedback, staff surveys and other such material) that together form a holistic view of trust outcomes.

More information

A one page summary (containing details of trusts with higher and lower than expected SHMIs) and detailed information on data quality are available to download from NHS Digital's SHMI publication page. The data files and an interactive data visualisation are also provided. In addition, a more detailed report is produced annually as part of the September release (including analysis for trusts identified as repeat outliers and analysis of the SHMI contextual indicators).

➢   SHMI publication page

SHMI data are also available to download from NHS Digital's Indicator Portal.

➢   NHS Digital Indicator Portal

Further information on the SHMI, including details of the methodology used in its calculation, is available on the SHMI support and guidance page.

➢   SHMI support and guidance page

For access to the SHMI Extract Service please email enquiries@nhsdigital.nhs.uk including "SHMI Extract Service" in the subject line.

For access to the Clinical Indicator Preview tool please email enquiries@nhsdigital.nhs.uk including "SHMI Preview tool" in the subject line.

Feedback

We welcome user feedback on all aspects of the SHMI and we are particularly keen to understand more about how trusts make use of their SHMI data and we would like to further develop this guidance document based on any feedback you could provide. If you have any examples of how you have investigated your SHMI we would be keen to discuss developing a case study about your analysis that may help other trusts. Please contact us at enquiries@nhsdigital.nhs.uk, including "SHMI" in the subject line.

Contact details

For all SHMI queries please contact enquiries@nhsdigital.nhs.uk or phone 0300 303 5678.