

Mortality reporting

Information sheet for SSNAP users

Why does SSNAP report mortality data?

Mortality data can be used as a signal that there may be issues with a particular healthcare service. It is often presented as a statistic measuring the number of actual deaths against the number of deaths expected. It is important for all hospitals (teams), particularly for teams with higher than expected mortality to review this important data, combined with other SSNAP reports, and investigate whether changes to the service may be required. Mortality is reported annually as to report it more frequently does not yield high quality data. SSNAP mortality data is only reported for England and Wales. It is a privilege for teams to have access to this linked data and it should be treated with a great degree of sensitivity in accordance with information governance rules.

Why are casemix and case ascertainment so important?

Stroke teams enter data onto SSNAP about the patients they treat, including casemix variables: age, stroke type, whether the patient was in atrial fibrillation before stroke, and NIHSS. These variables have been reviewed and concluded to be the most important factors in mortality prediction ([Bray BD, Campbell J, Cloud GC, Hoffman A, James M, Tyrrell PJ, Wolfe CD, Rudd AG. Derivation and External Validation of a Case Mix Model for the Standardized Reporting of 30-Day Stroke Mortality Rates. Stroke. 2014; 45: 3374-3380](#)).

It is incredibly important that this **casemix** information is entered onto SSNAP, as it gives a more robust representation of the range of patients that are seen by a team, and casemix adjustment allows valid comparison of outcomes across teams. Factors such as age, whether a patient is in atrial fibrillation (AF) before stroke, stroke type, and stroke severity (NIHSS) all impact predicted mortality. The more accurate this information is, the more accurate the interpretations from this information are. NIHSS is an important factor in the mortality models (more info below) and there are two models, one for full NIHSS on admission and the other for the level of consciousness component of NIHSS, for settings where the ability to record the full NIHSS on admission is limited. Teams can view a detailed breakdown of their casemix in the four-monthly **Full Results Portfolio** available for all teams under the "Casemix" tab contained within it. A DIY analysis of the team's casemix can be performed by using the **DIY casemix analysis tool** available for logged-in users at the following link: <https://www.strokeaudit.org/Resources/DIY-Analysis-Tools.aspx>

Case ascertainment, or the number of stroke patients that a team enters onto SSNAP, is another important component for robust interpretation of the information. Teams should aim to enter all of their stroke cases onto SSNAP. If not all of a team's patients are entered onto SSNAP this would result in a misrepresentative mortality rate. SSNAP uses information from Hospital Episode Statistics (HES), and the equivalent in Wales (PEDW), to compare an estimate based on the number of patients that were coded in hospital as having a stroke to the number of patients that a team entered onto SSNAP.

How is mortality data collected?

From the information entered onto SSNAP by stroke teams, SSNAP patient records are linked using the NHS number with data from NHS Digital in order to determine mortality for the directly admitted patients with known stroke type. This data is linked for **quality improvement** purposes only and is fully compliant with current legislation and Section 251 of the NHS Act 2006, and the utmost care is taken when working with these data. The SSNAP team do not see any of the personal identifiers for these data. Further information on SSNAP information governance can be found for logged-in users at the following link: <https://www.strokeaudit.org/SSNAP-Governance.aspx>

The **number of deaths from any cause** (not just stroke related deaths) within 30 days of admission (or onset in the case of an inpatient stroke) are counted. This number is referred to as **all-cause mortality**. These deaths can either be recorded in ONS or SSNAP. The number of deaths from any cause within 30 days is used to calculate the team's crude mortality percentage.

How can mortality results be accessed?

Mortality results are only granted for teams to use in relation to SSNAP and **quality improvement**.

You can choose to view mortality data **nationally**, for **your team** as a whole, and also for **individual patients**.

Only logged-in users can see **individual** patient data.

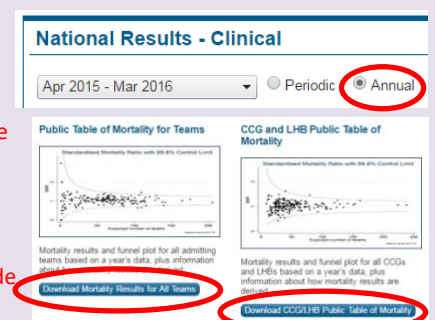
Go to www.strokeaudit.org.

To view national mortality results:

The national mortality results are in the form of a public table. To view this table:

- Select Results > Clinical Audit > National then select 'Annual'
- Click on the option 'Download Mortality Results for All Teams' or 'Download ICB/LHB Public Table of Mortality'*

The Public Table of Mortality for Teams contains team-level (Hospital) mortality results for all participating teams in England and Wales. **The ICB/LHB Public Table of Mortality* contains ICB/LHB results for England and Wales. This includes all the care received by patients who have a home postcode within the boundaries of the ICB/LHB. *Pre 2020 this was the CCG/LHB Public Table of Mortality**



Mortality Public Table - for SSNAP admissions April 2015 to March 2016

SCN	Trust	Team name	Team type	Total number of patients (with known stroke type)	Case ascertainment	Percentage of patients with fully complete NIHSS	SMR (Standardised Mortality Ratio)	Lower 99.8% control limit	Upper 99.8% control limit	Outlier at 99.8% control limit	Number of deaths (observed)	Number of expected deaths	Crude Mortality (Observed/Total)
-----	-------	-----------	-----------	---	--------------------	--	------------------------------------	---------------------------	---------------------------	--------------------------------	-----------------------------	---------------------------	----------------------------------

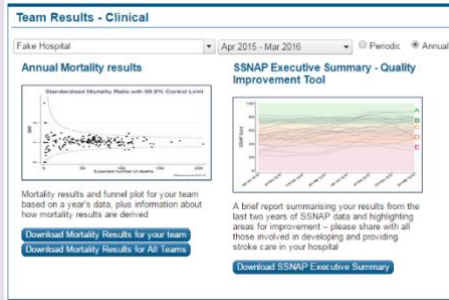
Mortality reporting

Information sheet for SSNAP users

Logged in users (results accessed via a password)

To view the mortality results for your team:

Select Results > Clinical Audit > Team then select 'Annual'



Available for:

2013 – 14
2014 – 15
2015 – 16
2016 – 17
2017 – 19**
2019 – 20
2020 – 2021*
2021 – 2023**
2023 – 2024
expected May 2025

The Annual Mortality Results contains the mortality results and funnel plot for a 12-month period along with information about how mortality results are derived.

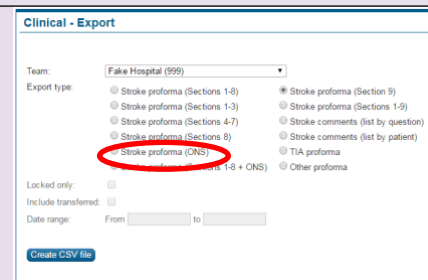
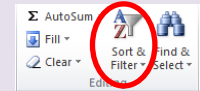
*Data for reference only

**Data reported over 24-month period

To download the mortality information for patients seen by your team

Select Clinical > Export then select your team and "Stroke proforma (ONS)"

When you open the file you can set a filter on the columns with ONS mortality data by selecting "Sort & Filter" and use them to find patients that have died.



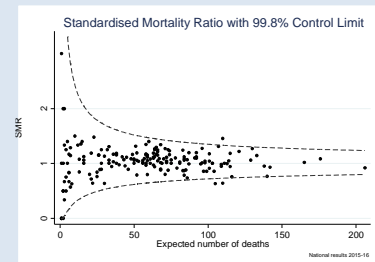
Understanding a funnel plot

The funnel plot is useful for identifying outliers by taking into account the number of patients per team. What is therefore important is whether the point representing your team lies outside the dotted lines (the funnel). Points inside the funnel represent teams where the number of observed deaths is not significantly different to the number of expected deaths.

The funnel area of the plot becomes narrower as the number of expected deaths increases because the more patients there are, the less likely that variations in the number of deaths are due to chance alone.

How is your team's expected number calculated?

- SSNAP's mortality model calculates the number of expected deaths and takes into account the differences between patients, including age, atrial fibrillation before stroke, stroke type and stroke severity (case mix). The model calculates the predicted probability of death for each patient in your team, and then these are added together to give your team's expected number of deaths.
- Your team's crude mortality percentage is the number of deaths (observed) out of the number of patients (with known stroke type).
- The SMR (Standardised Mortality Ratio) is the number of deaths (observed) divided by the number of expected deaths.



What if my team is an outlier?

There are a number of possible reasons why a team's results might show a higher than predicted mortality. It may be that it is a real observation, in which case SSNAP is happy to help review the service and get in place a plan to improve outcomes. It may be that there is a data quality issue which has not been picked up so far in periodic reports. Alternatively it could be that there is some case mix variable that has not been included in the model that is having a major impact in the local population that is not present elsewhere in the country. For example social deprivation has not been taken into account.

SSNAP will contact teams who are outliers in order for teams to discuss the findings with SSNAP, be supported to understand the data, conduct mortality reviews, and to investigate potential causes.

Further information on the mortality outlier process can be found for logged-in users at the following link:

<https://ssnap.zendesk.com/hc/en-us/articles/115004491389-Outlier-policy-SSNAP-stroke-mortality-reporting>

What next?

Actions that local public health teams and those involved in running a particular service, particularly the clinicians, could use the data for:

- Meet to review the mortality results
- Consider undertaking case note reviews of particular patients and identifying features of the stroke service that may have contributed to poor aspects of the mortality results.
- Use SSNAP reports to identify those aspects of the service that need improvement. The ten domains within the SSNAP scores provide a useful way of identifying these areas.

SSNAP clinical reports can be found at www.strokeaudit.org under the Results > Clinical Audit tab