

## Can we measure “failure to rescue”?

*‘Failure to rescue’ refers to a death after a treatable complication. The rate of failure to rescue in surgical patients derived from routine administrative data is recognized as an important indicator of patient safety by the United States Agency for Healthcare Research. It holds the promise of being more sensitive to the quality of care in a hospital than either conventional mortality or complication rates. [1]*

*In this Policy+ we draw on findings from a recent report from the National Nursing Research Unit (NNRU) to consider if it can be used in England. [2]*

### What do ‘failure to rescue’ rates indicate?

Some deaths in hospital are inevitable. Much of the difference in death rates between hospitals has little to do with differences in the quality of care that people receive. Instead it is related to the degree of illness and co-morbidity of patients receiving treatment and how vulnerable they are. Measures like the Hospital Standardised Mortality Rate (HSMR) try to account for this using statistical techniques, but no statistical adjustment can ever be perfect. The rate of avoidable death among surgical patients with treatable complications (another way of referring to failure to rescue) gives another way of exploring how a hospital performs, one which relates to a specific group of (patients) and may offer some advantages.

For people undergoing surgery, the chance of developing a complication, like bleeding or pneumonia, is strongly related to factors such as their age or an underlying condition. But while complications are often a result of patient characteristics, the ability of a hospital to successfully treat a complication once it occurs is strongly related to the quality of care provided. [1] The FTR indicator is intended to show how well hospitals perform once the complication occurs. The potential significance of failure to rescue is reflected in recent reports and research which emphasise the complexity of response to deteriorating patients and highlight potential points of failure including:

- not *taking* observations
- not *recording* observations
- not *recognising* early signs of deterioration
- not *communicating* observations [3]

For these reasons failure to rescue has often been considered particularly sensitive to the quality and quantity of nursing care that is available to patients. [4]

### How are ‘failure to rescue’ rates measured?

Failure to rescue rates used for both research purposes and as quality indicators are typically derived from hospital administrative databases. However, their validity can be compromised if the coding of secondary diagnoses (through which complications are identified) is poor, since the indicator relies on the identification of a group of patients who experience particular complications. Less detailed coding of diagnoses means less chance that complications have been recorded. Previously, it has been concluded that English hospital data were unsuitable for deriving failure to rescue measures, primarily because of low rates of coding. [5]

In our study we aimed to assess whether the conclusions made about deriving failure to rescue rates for surgical patients from English hospital data from 1996/7 still hold when using more recent data (up to March 2009) and whether there was evidence that the rates derived were indicative of quality.

As a response to concerns about low rates of coding secondary diagnoses, we used alternative approaches that have been proposed including:

- Assuming that *all* surgical deaths are 'failure to rescue' [1] and
- Using extended hospital stays which fall well outside the average range as an (indirect) indicator of failure to rescue. [6]

We used statistical techniques that allowed us to determine associations between FTR rates and a range of quality related organisational factors derived from routine NHS data; these included staffing variables such as the numbers of nurses and doctors per bed, teaching status of hospital and nursing staff stability.

### What do the English hospital data reveal?

Our findings suggest that failure to rescue indicators *can* be derived from English hospital data and that low levels of recording of secondary diagnoses are no longer a significant obstacle.

- Failure to rescue rates are not significantly correlated with the average number of secondary diagnoses coded, which suggests an absence of systematic bias caused by coding practices.
- We found strong year on year correlation for failure to rescue rates in recent years which suggests a degree of stability consistent with the rate reflecting an underlying characteristic of hospital performance.
- We found a number of associations between the failure to rescue indicators and presumed markers of quality, some of which have been demonstrated in previous US work. [2]

However, not all the relationships we observed are clearly or plausibly indicative of variations in quality. It seems likely that there are confounding variables that were not accounted for in our models. Any failure to rescue indicator would need to be adjusted for age and other patient level factors before coming to a final judgement. Non-risk adjusted failure to rescue rates cannot be used to make comparisons between providers.

### Conclusions and implications

It is notable that previous work, which showed that higher nurse staffing was associated with lower levels of failure to rescue, did not consider medical staffing. [1] Although we observed a similar association when considering nursing in isolation, the association disappeared when we controlled for other factors. Higher levels of clinically qualified staff (doctors plus nurses) were associated with lower levels of failure to rescue, but a higher nurse to doctor ratio was associated with higher rates of failure to rescue, suggesting that medical staffing levels might be more significant.

Although our extended stay 'failure to rescue' measure performed well in some respects, as there are no longer specific problems with secondary coding there is no clear advantage for using this over the mortality based measures. As an indicator of hospital performance, FTR is potentially linked to a number of factors beyond the control of the hospital, such as provision of community services. Also, the absence of any association with the mortality based indicators suggests that the length of stay based measure is not acting as a proxy of failure to rescue as originally conceived. Further work is required to develop and validate FTR as a quality indicator and develop and test

#### Key points for policy

- There is clear potential to derive mortality based failure to rescue indicators for surgical patients from routine administrative data in England.
- Our indicator, based on the AHRQ definition, is worthy of further exploration as a potentially valid safety measure.
- Failure to rescue indicators may offer some advantages over standardised mortality measures (such as HSMR) for surgical patients and can thus add to the range of indicators of hospital performance that are available.
- Unadjusted failure to rescue cannot be used to compare the quality of care between hospitals.
- Failure to rescue does not appear to be a specifically nurse sensitive indicator.

This Policy+ was produced in collaboration with Professor Peter Griffiths at the University of Southampton, formerly Director of the NNRU.

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