



Acute care toolkit 11

Using data to improve care

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Working as a physician involves not only providing the best possible care for the patients of today, but also working to improve care for the patients of tomorrow. Collecting and understanding data is central to both of these aims, as without information and data, a clinician has little to draw on to answer two fundamental questions: How am I and my team doing? What can we do to improve?

The complexity of modern healthcare means that answering these questions requires data from multiple sources. Data from one source (such as patient experience data) may be best understood in the context of other data (staffing ratios or infection rates). For individual teams and clinicians, the most powerful data for improvement is often not numerical or quantitative, but rather qualitative information that provides insight into the reasons for the care that patients received and how it might be improved.

The aim of this toolkit is to help clinicians to draw together the information that is necessary to understand the quality of care that they and their team provide. This includes a description of the main types of data, considerations of how it should (or should not) be interpreted, and how data can be used to help improve healthcare quality. It is not a comprehensive guide to clinical audit or quality improvement, and sources of more detailed information have been referenced.

Introduction

Most quantitative data about patient outcomes cannot meaningfully be interpreted at the level of the individual clinician. Small samples of data make comparisons difficult or impossible – the smaller the sample, the greater the chance that any difference or change is due to random variation or other factors, such as differences in patient characteristics, rather than being a true indicator of performance.

For individual clinicians and teams, the most meaningful information is qualitative (non-numerical) information about the outcomes of care and quantitative information about the process of care (see Table 1 on the fold-out). For example, while differences in the rate of safety incidents between clinicians are likely to be meaningful only under exceptional circumstances, all teams can improve their care by understanding the nature of and reasons for the safety incidents, and by measuring the care processes that are necessary to ensure patient safety.

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Box 1 Suggested approach to mortality case-note review

- 1 Using a standard methodology (eg the UK modification of the Institute for Healthcare Improvement (IHI) Global Trigger Tool)⁸ will help to identify common themes.
- 2 If it is not practical to review the case notes of all patients who have died, then consider:
 - > a two-stage process, with initial screening out of straightforward cases
 - > a representative sample of case notes.
- 3 Use teams of reviewers, from different clinical backgrounds and specialties, who have had training in the methodology and understand the clinical issues involved in a particular patient's care.
- 4 Reviewers can review case notes alone, or in pairs so that difficult cases can be discussed.
- 5 Have a policy for dealing with the occasional case where the actions of an individual clinician could be an issue (which usually involves escalation to the medical director).
- 6 Collate outputs into common themes, to support quality improvement activity.

Box 2 Types of healthcare quality data

Organisational measures. These describe how services are structured and planned, such as the number of beds, the availability of equipment and staffing numbers. They may also be less tangible aspects of how care is planned – for example, the presence of care pathways and protocols.

Process measures. These describe the healthcare that is provided: the assessments, investigations and treatments that patients receive. For example, in a patient with acute myocardial infarction, process measures might include door-to-needle time of primary angioplasty or the prescription of antiplatelet therapy.

Outcome measures. These are direct measures of the outcomes of care. For example, in a patient with pneumonia, outcome measures might include mortality, length of stay or the amount of time it took before they could return to work. Some outcomes can be objectively measured but some are subjective, for example quality of life and pain after a hip replacement (an example of a patient-reported outcome measure – PROM), or a patient's own opinion about whether they were treated with care and dignity (an example of a patient-reported experience measure – PREM).

There are many potential sources of data to help physicians to measure, learn from and improve on what they do (Appendix – available online at www.rcplondon.ac.uk/resources/acute-care-toolkits). The types of data needed depend on the purpose for which they are used and the level of measurement. All data sources have strengths and weaknesses – such as potential for error and bias, effort of collection and ease of interpretation. Data collection can be time consuming and labour intensive, so existing data sources are usually preferable to additional data collection exercises.

In addition to collecting and using data for improving care quality, data may also be collected for research (to test hypotheses about treatments and processes) and for judgement (for accountability to regulators, payers, policymakers and the public). Data should be shared and used as fully as possible, while the ethical and information governance issues that may be involved in sharing data should be fully considered.

1 Learning from clinical incidents and complaints

Complaints and clinical incident reports can be a rich source of learning for clinicians about the quality and safety of their service. Only a minority of clinical incidents are reported, so even where a mandatory requirement to report exists, data about rates or numbers of incidents (which many organisations and national bodies collect) do not give meaningful information about safety. They may even be misleading; high reporting rates can either arise because more incidents occur or because there is a strong safety culture that encourages reporting.

Clinical leaders and trusts should support a culture where reporting and learning from incidents is encouraged. The main aim of incident reporting should not be to identify individuals to blame, but to understand the root causes of incidents as part of a process of quality improvement. Consultants and trainees should routinely be involved in reporting and reviewing clinical incidents. Trainees have a unique perspective in understanding issues relating to day-to-day clinical care and should be supported in taking part in incident reviews by their educational supervisors.

When reviewing incidents or complaints, clinical teams should specifically look for:

- > common themes where systems of care have broken down, eg problems with handovers or systems for reviewing investigation results
- > warning signals of potential safety hazards, eg with faulty equipment or devices
- > high-risk situations, eg in specific clinical areas or in the treatment of specific conditions such as sepsis or dehydration.

Most safety incidents occur as a result of a sequence of system errors rather than individual action or failure, so a punitive, blame-seeking approach is usually unhelpful and should be avoided. An understanding of the conditions that can lead to errors and human factors science is helpful in this.¹ All humans make mistakes, and patient safety can be improved by understanding the reasons why these occur, and designing systems to reduce the risk of harm from error.

In managing complaints, while it is essential for organisations to be responsive in communicating with complainants, opportunities for learning can be missed if a systematic approach that looks for common themes across complaints is not taken. Complainants often highlight issues (eg a lack of recognition of, or response to, clinical deterioration) that have not been apparent from other sources. Learning from complaints is also central to improving the experience of healthcare services by patients, families and carers.

Taking the opportunity to learn from and reflect on complaints is an important part of continuing professional development. Complaints often concern multiple aspects of care (eg nursing, therapy, investigations, waiting times), and clinicians should contribute to and support improvements in the overall care of patients, not only those directly relating to the care provided by physicians.

Complaints should receive a prompt response. While some complaints require written reports, there will be instances where an early meeting to discuss a complaint may lead to a more satisfactory resolution. Most complainants do not seek recompense, but they instead seek reassurance of change and improvement. Proactive clinical engagement helps to facilitate learning and change, as well as improving patients' and carers' experience of care and their perception that their complaint has been responded to appropriately.

2 Using feedback from staff and colleagues

For individual clinicians, multi-source (or 360-degree) feedback from colleagues is an important component of the appraisal and revalidation process, and can help to highlight areas for personal and professional development.² Multi-source feedback needs to be sought from a broad range of individuals and not just from those who are anticipated to only provide favourable feedback. The list of potential individuals from whom feedback is to be sought may need to be approved beforehand by a supervisor or employer.

When providing feedback about colleagues, it is important that clinicians give an honest and balanced account, providing positive feedback about good practice but also constructive criticism where issues need to be addressed. Written comments or face-to-face feedback is usually more useful than rating scores in helping colleagues to identify areas where practice can be improved.

Formal and informal feedback from staff can give useful insight into issues at unit or hospital level, and there is evidence of an association between staff satisfaction and patient experience.³ The NHS staff survey is rarely accessed by clinicians, but it is freely available and has been shown to have validity at speciality as well as hospital level.⁴

The General Medical Council's (GMC's) national training survey⁵ receives responses from almost all doctors in training, and results are available to every trust. While the main focus is on the quality of training, there are also important questions about patient safety and trainees' perceptions of being supported to raise concerns.

Trainees and other staff may not feel able to formally report concerns about safety, but they may raise these informally with consultants or educational supervisors. Such concerns should always be taken seriously; the GMC has useful guidance for clinicians who face such concerns.⁶

3 Understanding mortality

Around 5% of patients who are admitted to hospital will die. Most deaths are in frail, elderly patients with multiple medical problems who have been admitted as emergencies and in whom death is unfortunately inevitable. While most deaths are inevitable, some are not; studies suggest that around 5% of hospital deaths might have been avoidable with higher-quality care.⁷ These estimates suggest that approximately 1 in 400 patients admitted to hospital suffer an avoidable death.

Clinicians should understand the factors that lead to hospital deaths. They can do this by:

- > case review of the notes of all, or a sample of, patients who have died or have suffered a 'near miss' such as a cardiac arrest, using a standard methodology (see Box 1 – left): this can provide valuable information for clinicians and teams on opportunities for improvement
- > understanding data on mortality rates provided at hospital or service level.

The primary purpose of reviewing the case notes of patients who have died is to detect patterns where processes might have broken down and to learn where care might be improved, even if the death was unavoidable. This could be with a specific clinical issue (eg recognition of, and response to, sepsis) or in a particular area of the hospital (eg patients on general wards within a few days of transfer from the acute medical unit – AMU).

Common themes that are reported in mortality case-note review in medical patients are:

- > the recognition of, and response to, clinical deterioration
- > fluid balance and acute kidney injury
- > the recognition and management of sepsis
- > medication safety issues
- > frequency of senior clinical review
- > inadequate end-of-life care planning.

Mortality rates are rarely meaningfully interpretable at the level of a clinical team or individual physician. They may, however, provide information on the safety and effectiveness at the hospital or service level by acting as a 'smoke signal' for potential problems in quality, and to track progress over time.

Crude mortality rates are not a good measure of quality, as they are affected by numerous factors, including patient characteristics (hospitals that admit older or sicker patients have higher death rates) and the provision of local services such as hospice and community care. Standardised mortality measures were developed to correct for these factors and are now in widespread use throughout most of the NHS (see Table 2 – above right). Clinicians need to understand the strengths and weaknesses of standardised mortality measures, to gain the most value from them.

4 Making measurement meaningful

Neither data collection without improvement activity nor quality improvement without appropriate measurement are effective ways of improving care.

Measurement can occur at different levels. Local audits can be valuable for addressing specific local issues, although isolated projects often lack follow through; the Royal College of Physicians' (RCP's) 'Learning to make a difference' project¹³ coaches trainees in quality improvement skills to address this gap. There are many other resources available to help teams to apply quality improvement methods and to learn more about using data for quality improvement.^{14,15}

National clinical audits and registries are the gold-standard source of data for many conditions. They benefit from rigorous methodological and statistical design, have high clinical credibility, provide benchmarking against peers, and are supported by national guidelines and recognised approaches to quality improvement.

Table 2 Standardised mortality measures

Standardised mortality measures, such as the hospital standardised mortality ratio (HSMR) or the summary hospital mortality indicator (SHMI), are presented as a ratio of actual to expected mortality. An expected mortality rate is calculated for each hospital using data derived from discharge coding: using a statistical model to forecast the number of deaths that a hospital would be expected to have, based on the characteristics of the admitted patients. Because expected mortality rates are based on discharge coding, it is important for clinicians to support accurate coding (for example, by avoiding the use of symptom diagnoses such as 'chest pain'). The SHMI and HSMR have a number of important differences:

	SHMI	HSMR
Data source	Discharge codes	Discharge codes
Methodology	Statistical model to forecast expected number of deaths	Statistical model to forecast expected number of deaths
Mortality measure	Inpatient deaths or death within 30 days of discharge	Inpatient deaths
Included patients	All deaths	Exclusions for certain diagnoses

These measures are controversial, especially when they are used to compare hospitals.^{9,10,11,12} Much of the controversy arises from the standardisation method, as it is based on coding of variable quality. Hospitals with more detailed coding tend to have higher expected mortality (because there is more information on which to predict this) and hence a lower standardised mortality.

Standardised measures are presented using statistical process control (SPC) methodology with 100 as the reference value and upper and lower control limits calculated (analogous to confidence intervals). Control limits are usually set so that the probability of a value lying outside them by chance is less than 2 per 1,000. Rates are reported as abnormal if they are outside the control limits.

Although HSMR and SHMI are often presented as a single monthly or quarterly figure, this is unhelpful without knowledge of the control limits and the pattern over time. Observing changes in mortality data over time is generally a much more useful guide to quality than a one-off measurement.

Common pitfalls with standardised mortality measures:

- > reliance on a single figure without reference to data over time
- > the use of mortality measures on their own as an indicator of quality
- > dismissing high readings as being due to coding defects
- > taking reassurance from low readings without further understanding the data
- > use for ranking hospitals.

Clinical teams that contribute to the pathway of patients included in national audit (eg stroke and myocardial infarction) should use these data to plan and measure quality improvement activity.

The types of data that can be measured fall into three categories (see Box 2 – left). Often, a good assessment of the quality of care requires information about all three areas. For individual clinicians and teams, organisational and process data are the most meaningful and amenable to improvement.

5 Putting it all together: 'look back and learn' meetings

Most healthcare services have not developed a systematic approach to bringing together information about the quality and performance of care as a focus for quality improvement. For example, traditional mortality and morbidity meetings are typically separate from meetings that focus on audit results, quality improvement, operational performance (eg waiting times, bed occupancy), and education and training. Individual issues are therefore often addressed in isolation, without insight into the system issues that usually need to be addressed in order to improve care.

The RCP therefore supports a multidisciplinary, clinically led, integrated approach to presenting data through ward- or unit-level 'look back and learn' meetings, led by a senior clinician who can help others to understand and learn from the data.

Meetings should be:

- > multidisciplinary, including nurses and other clinicians, managers and administrative and support staff
- > aimed at integrating data at ward level to understand the 'big picture': operational data (eg bed occupancy and length of stay etc); quantitative data (eg clinical audits and safety measures); and qualitative data (eg complaints and informal feedback from staff and patients)
- > structured and focused, following a common format, with the aim of understanding common themes and developing approaches to address these
- > aimed at developing outputs that are used for quality improvement activity
- > documented, so that issues can be tracked (for example, in a risk register) and improvement can be monitored
- > a resource for trainees undertaking quality improvement work
- > a source of learning for both individuals and organisations
- > a source of data for clinicians to support individual appraisal and revalidation. ■

Table 1 Outcomes of care and quantitative information about the process of care

Team/clinician level	Service/hospital level
> Qualitative data on the outcomes of care is most useful.	> Quantitative data on the outcomes of care is most useful.
> Quantitative data on the process of care is most useful.	> Quantitative data on the process of care is most useful.
Examples:	Examples:
> nature and root cause analysis of safety incidents	> mortality rates
> complaints and compliments	> national clinical audit
> process audit, eg completion of national early warning scores (NEWS)	> outcomes audit, eg condition-specific clinical outcomes
> multi-source feedback.	> patient-reported outcomes.

Glossary of commonly used terminology in quality improvement

Term	Definition
Adverse event	Injury or harm caused by healthcare
Failure to rescue	Failure to respond appropriately to clinical deterioration or an urgent health problem
Global Trigger Tool	A standardised method for studying adverse events
Human factors	The study of human behaviour as it affects the design and implementation of equipment, environments and ways of working
Lean	A type of quality improvement methodology that is focused on identifying wasteful activity and increasing value
Never event	Serious, largely preventable patient safety incidents that should not occur if the available preventative measures have been implemented
PDSA	Plan Do Study Act: the cycle of activities involved in quality improvement
Root cause analysis	A systematic method to identify the underlying causes of problems or errors
Safety culture	The commitment to safety within an organisation
SBAR	Situation Background Assessment Recommendation: a structured approach to communication between members of a healthcare team
Six Sigma	A type of quality improvement methodology
Statistical process control	A method of quality control that uses statistical methods to monitor performance
Table-top exercise	A simulated interactive exercise to test an organisation's response to an emergency

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