Clinical Review

Quality: What does it mean in Acute Medicine and how do we measure it?

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ABSTRACT

Acute Medicine is a specialty that is not defined by a single organ system and sits at the interface between primary and secondary care. In order to document improvements in the quality of care delivered a system of metrics is required. A number of frameworks for measurements exist to quantify quality of care at the level of patients, teams and organisations, such as measures of population health, patient satisfaction and cost per patient. Measures can capture whether care is safe, effective, patient-centred, timely, efficient and equitable. Measurement in Acute Medicine is challenged by the often-transient nature of the contact between Acute Medicine clinicians and patients, the lack of diagnostic labels, a low degree of standardisation and difficulties in capturing the patient experience in the context. In a time of increasing ecological and financial constraints, reflecting about the most appropriate metrics to document the impact of Acute Medicine is required.

Keywords

Acute Medicine, Quality Improvement, Metrics, Value based Healthcare, Sustainable health

Key Points

1. Acute Medicine faces specific challenges to measuring quality due to the short interaction with acutely unwell patients
2. Application of frameworks for disease specific measurement of quality might be limited
3. There is a need to develop relevant metrics for Patient Reported Experience and Outcome Measures.

Introduction

Clinical care focuses on understanding the effects of diseases on our patients, diagnosing underlying causes for their ill health, administering effective treatments and monitoring their progress.

Quality Improvement focuses on understanding the context in which our organisations deliver this clinical care for our patients, diagnosing causes for our poor performance, administering effective interventions to improve system performance and monitoring of standards. Quality Improvement applies the insight that good care for individual patients is much easier to deliver in systems that function consistently well.

Quality of care and efforts to improve it can be measured and assessed. Measuring quality is incorporated in many aspects of healthcare such as guidelines by The National Institute for Health and Care Excellence, reviews by the Care Quality Commission, professional standards, training curricula and health care policy. Relating quality outputs to the required inputs results in measures of value.

Challenges to measuring quality in Acute Medicine

Acute Medicine differs from other medical specialties as it is not defined by a diagnostic category of patients it is caring for or by a body organ, such as cardiology or nephrology; instead, its practitioners have clinical expertise in assessment, diagnosis and treatment of acute syndromes, as well as knowledge and skills in the development and implementation of acute healthcare systems at the hospital front door including those for optimisation of triage, escalation, flow and safety.

While episodes of care under Acute Medicine teams might often be of short duration performance is evidenced by a high rate of strategic decision making around escalation and de-escalation, sign-posting, coordination and communication.

Acute Medicine faces specific challenges in defining and measuring the quality of the care it delivers, specific to both the specialty and emergency care more generally:

1. **Transience:** For many patients their experience of Acute Medicine is transient, sitting as it does between primary care and other hospital specialties. For many patients seen in an Acute Medical Unit and discharged by the Acute Medical team, Acute Medicine is only a small part of their care, and their experience of the quality of their care is heavily impacted by the surrounding good or bad systems residing in Primary Care, Emergency Medicine, Specialist Medicine, and importantly Social Care and Community Services. This fragmentation should serve as an incentive for Acute Medicine to take ownership for the quality of these patients' care

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episodes rather than an excuse for not driving improvement. Quality metrics might fall into two groups: Metrics for care of patients who are exclusively care for, and discharged by Acute Medicine, and metrics for those where key clinical decisions are made in Acute Medicine but responsibility for care is shared when transferred from and to other specialties including Emergency Medicine and Critical Care.

2. **Lack of diagnostic labels:** Patients often present to Acute Medicine without a clear diagnostic label. Traditionally many standards are defined by organisations specialising in the care of the chronically ill, based on clear diagnostic categories and where many quality metrics are based on clinical diagnoses, as opposed to presenting symptom or clinical syndrome.
3. **Low degree of structural standardisation:** There is a wide variation in the setup of Acute Medicine services. This includes geographical lay-out of units, staffing levels and skill mix, ownership of patients and pathways and interactions with other specialists. AMUs have different inclusion and exclusion criteria based on resource, skillset and infrastructure leading to difference in case-mix. Many of these phenomena do not fall into patterns that can be easily standardized.[1] Services are commonly shaped by gaps in provision and adapted to a very local environment. For these reasons, common, standardised and nationally agreed patient-centred process and outcome measures might be all the more important in highlighting areas of unmet need in the service to drive improvement and further commissioning of resources for acute medicine.
4. **Capturing the patient experience:** A further barrier to the assessment of the patient experience exists in Acute Medicine: Objective assessments by patients are affected by primary and recency effects including the emotional impact of an experience being different during the immediate acute presentation from that two weeks or more following the care event.[2] Memories from the experience of acute care might be altered by subsequent experiences and contacts. Follow-up questionnaires of patients after discharge from hospital are notoriously more difficult and costly than surveys undertaken at the time of discharge from hospital. The Adult In Patient Survey[3] reviews the experiences of adults that have been admitted to an NHS hospital in England. Despite the importance of the survey the majority of organisations send out surveys to only 850 patients per trust per year, i.e. a small proportion of the patients seen in a given hospital.
5. **Case-mix adjustment:** By definition Acute Medicine cares for a diverse patient population. Acute Medicine caters for patients admitted with medical conditions presenting or being referred as emergencies with three overlapping needs: (a) expertise to assess the risk of a potentially life-threatening condition / diagnosis that can be ruled in or out (b) frequent monitoring for acute physiological instability and possible intervention and (c) increased requirements for nursing care.[4] When measurements of quality are used to compare local performance with other centres, case-mix adjustment is needed.

Heterogeneity in the groups of patients that units care for in different geographic locations means that any system of measurement needs to adjust for case-mix, comparing the care of the more unwell patients, the frailer patients and those presenting with the most common syndromes. The metrics for this have been tested to a degree in the Society for Acute Medicine's Benchmarking Audit (SAMBA):[5,6] Age, gender, severity of illness as measured by the National Early Warning Score, frailty prior to the episode of acute illness and the character of existing support networks (living alone / living with someone / care home resident) all affect outcomes of care. Adjustment of case- mix might be complex. The absence of validated case-mix adjustment systems might preclude the use of outcome measures for inter-unit comparison[7] and limit analysis to trends in individual units. Consequently, process measures with well-designed patient inclusion criteria may be more robust and accurate.

The Getting it Right First Time (GIRFT) National Quality Improvement Programme aims to improve medical care by reducing unnecessary variation. The Acute and General Medicine workstream tracks 11 sentinel conditions based on frequency, illness severity and potential for ambulatory care: Pulmonary embolism, Non-ST-Elevation Myocardial Infarction, Sepsis, Acute Kidney Injury, Atrial Fibrillation, Pneumonia, Chest Pain, Headache, Chronic Obstructive Pulmonary Disease, Urinary Tract Infections and falls.[8]

This paper aims to list frameworks for the measurement of quality and explore how they might relate to the specific challenges of measuring quality in Acute Medicine while attempting to identify gaps that require further debate and research in the Acute Medicine community.

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Frameworks for measuring quality

A number of frameworks are being used to describe how care and its quality can be measured and compared. The presented synopsis is not comprehensive but covers commonly used systems.

Types of Metrics (Institute for Healthcare Improvement)

One way to describe metrics is by outcome, process and balancing measures. This framework allows monitoring of unwanted or unintended side-effects of interventions. For example, survival for patients with sepsis (outcome) is improved if a high proportion of patients receives early antibiotics (process). If too many patients receive antibiotics, then the rates of patients who suffer nosocomial infections like diarrhoea caused by clostridium difficile will increase (balancing measure).

Domains of quality (Institute of Medicine)

In 2001 the American Institute of Medicine published a report under the title "Crossing the Quality Chasm: A New Health System for the 21st Century".[9] The document outlines domains of quality as a system to define how 'good' can be described (Table 1).

Applying this framework to Acute Medicine could result in a number of metrics.

Safe care should assure prevention of adverse events, monitoring for deterioration and may include the avoidance for the need for re-admission to hospital in the days after discharge. The latter measure of quality is controversial. Whilst there are preventable re-admissions others are not related to the severity of illness but to patient and care preferences and the social network of patients.[10,11] Preventable deaths[12,13] in hospital or death after discharge are further safety measure: they can only be meaningfully applied to patients who were not expected to die due to underlying illnesses or care preferences.

Effective care should aim to reduce length of inpatient stay to a necessary minimum and maintain patients' ability to live independently at home. Measurement might require extensive risk adjustment for the level of severity of illness (National Early Warning Score or similar), frailty (Clinical Frailty Scale or similar) and the availability of home support and social networks.

Patient-centeredness means that care is guided by patients' needs and values and becomes relevant when gauging the 'relative risk' of a discharge or treatment decision. Preferences of care have to be seen in the current context of an individual. How can we demonstrate this in Acute Medicine? How can risk-management of decisions be evaluated for quality?

Table 1. Domains of quality: A health system should be

1. Safe: Avoiding harm to patient – from disease and from care.
2. Effective: Achieve clinical outcome in the right patient population avoiding under and over usage.
3. Patient-centred: Responsive to patient preferences and guided by their needs, and values.
4. Timely: Avoiding delays where not clinically indicated.
5. Efficient: Providing the most care with the least possible means.
6. Equitable: Care that is available independent of patient characteristics like age, gender, etc.

Timely care is often measured across pathways as the time from presenting symptom to initiation of care or completion of care bundles.[14,15] Complex behavioural drivers make change in this area challenging.[16] In Acute Medicine there are agreed operational standards of what 'timely' means albeit with some debate:[17,18] Patients should have a set of vital signs taken within 30 minutes of admission, be seen by a doctor within four hours (or earlier if seriously ill) and be seen by a consultant within 8 hours during extensive office hours and 14 hours if presenting out-of-hours. There are significant challenges to identify time zero – the time when the clock starts. Is this the first symptom, the first contact with the healthcare system (GP/111/ED), the first point of entry to hospital or the first contact with Acute Medicine as a specialty or service?

Efficient care could be applied to the duration of care provided by clinicians per patient compared with alternative models of care. The last iterations of the Society for Acute Medicine's Benchmarking Audit (SAMBA) collected data on double handling of admissions presenting through the Emergency Department by doctors from Emergency and General Medicine.[19] Appropriate usage of Same Day Emergency Care (SDEC)[20] might be another example of efficient care but requires careful calibration for case-mix.

Equitable can be evidenced by demonstrating that patients from all patient groups including elderly patients and patients in remote geographic locations receive the same standard of care.[6] This is often a difficult argument given the broad range of patients' needs in Acute Care.[21]

The Triple Aim (Institute for Health Improvement)

In 2007 the Institute for Healthcare Improvements (IHI) has published a framework for measurement of outcomes called 'The Triple Aim'[22] which detailed that good healthcare provision should balance three things: population health (mortality or suffering), patient experience, and per capita cost of healthcare. Clinical training, especially for those dealing predominantly with emergency presentations is

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Table 2. Examples for application of quality and value metrics to patients care for by Acute Medicine

Framework	Metric	Example
Balanced set of metrics (IHI)	Outcome measure	Mortality from sepsis
	Process measure	Time to administration of antibiotics
	Balancing measure	Rate of Clostridium C. difficile
Domains of Quality (IoM)	Safe	Rate of Cardiac arrests
	Effective	Rate of anticoagulation for pulmonary emboli
	Patient-centred	Evidence for shared decision making for discharge decisions
	Timely	Time to administration of Stroke-thrombolysis
	Efficient	Proportion of ambulatory management of Pulmonary Emboli
	Equitable	Independent of age
Quadruple aim (IHI)	Population health	Recovery after pneumonia
	Experience of care	Treated with respect
	Per capita cost	Median length of stay for a given condition
	Meaning in work	Rate of sick-days in a team
Patient related experience and outcome measures	Relief of symptoms	I perceive my symptoms got better after treatment by my healthcare team
Donabedian model	Structural metrics	Has the unit got a lead for audit?

often geared towards a reduction in mortality and this is what large drug-trials are usually powered against. For the treatment of ischemic heart disease aspirin, statins and beta-blockers have all shown mortality benefits. But patients might suffer significant side-effects and their priorities need to be balanced with our recommendations for 'life-saving' interventions. At the same time the monetary cost of interventions needs to be taken into account. Quality-Adjusted Life Years[23] are one way to synthesise these three aspects of care: what is the price of an intervention to result in one year of perfect quality of life.

In 2015 a fourth dimension was added to form the quadruple aim:[24] meaning at work for staff. Purpose and meaning in work for staff is something that has been raised as an important topic in the face of increasing signs of burn-out, experienced especially by those working in acute and emergency care. Interventions aimed at meaning at work need to be aware not to lose sight of the other three dimensions of the Triple Aim with the patient being ultimately at the centre of all quality.

Patient related experience and outcome measures

Patient related experience measures and patient related outcomes measures are commonly used to capture the impact of care on patients. There are national datasets for common surgical procedures.[25] Indicative examination of patient satisfaction suggested that those who are seen with more acute conditions might be more satisfied with care.[26] An exploratory search for usage of Patient Reported Experience Measures (PREMs) and Patient Reported Outcome Measures (PROMs) in Acute Medicine using PubMed resulted in no citations. A search for PREMs and PROMs in Emergency Medicine identified a single review of PREMs[27] evaluating four tools from eight studies with 'uncertain validity, reliability and responsiveness' of tools. The bulk of papers reporting PREMs in emergency care focused on patients with trauma. A group in the Netherlands has identified five domains relevant to Patient Reported Outcomes for acute care in medicine: relief of symptoms, understanding of diagnosis and symptoms, presence and understanding of diagnostics and therapeutic plan, reassurance and experiences.[28]

Donabedian Model

The Donabedian's model[29] is a conceptual model for grouping metrics into three interrelated categories: structures, processes and outcomes. In order to achieve any outcome (like those listed in the domains of quality or the Triple Aim) processes are needed to achieve them. In order to enable those processes structures are required to enable them, i.e. in order to achieve survival after an acute myocardial infarction (outcome) hospitals need to diagnose ischemia as early as possible at the front door (process) and have the ability to undertake a timely transfer (process) to the patient to a coronary angiography suite (structure). Structural and process metrics are often much easier to collect than outcome measures – especially if the intended outcome is patient-centred such as change in health status or patient experience.

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Value Based Healthcare (International Consortium for Health Outcomes Measurement)

There are an increasing number of diverse interventions in healthcare. Value describes the relationship between the output (in quality) to the input (in cost). The International Consortium for Health Outcomes Measurement (ICHOM) (30) is trying to define the comparative value of health-care interventions, based on the observation that many of the thousands of metrics that health services collect are based on simple process and structural measures that seem to have little relation to what matters to patients.[31,32] ICHOM publishes standardised datasets based on consensus of expert panels for a large number of chronic conditions but including older age. ICHOM recommends a combination of metrics for 1. health status achieved or retained, 2. process of recovery and 3. sustainability of health including effects on carers (!). At current ICHOM does not provide metrics for any of the syndromes of acute care.

Sustainable healthcare

Sustainability[33,34] of care is likely to become an increasingly relevant metric of acute and chronic care with the climate emergency and the decimation of resources by the recent COVID-19 pandemic requiring a change in thinking about how we care and how we allocate resources. Reducing of waste in usage of resources has been part of management techniques aimed at optimising processes and increasing value under the heading of Lean Thinking in Emergency Care[35,36] but this tends to focus on waste for the organisation rather than the ecological context. Much of emergency care is delivered face-to-face in the United Kingdom and this is true even for care of chronic conditions. COVID-19 has demonstrated that more robust methods are required to deliver and evaluate tele-medicine and remote monitoring.[37]

Conclusions

Our review identified challenges and potential gaps in the way that existing frameworks for quality of care that might be applied to acute and emergency care. We did not identify suitable metrics to capture patient experience.

The short time of exposure of patients to acute medical care impacts on the ability to measure but the nature of Acute Medicine as the engine room of the modern hospital means also that many quality improvement activities initiated from teams outside of Acute Medicine will impact on the outcomes and experience of care, thus presenting a formidable challenge to measurement of potentially additive or subtractive overlapping effects.

Nevertheless, Acute Medicine has an important role to play in the provision of high-quality medical care even though it is part of a bigger system. The challenge for the specialty is to demonstrate measurable value across the patient journey, while many others are involved. It would be desirable for those working and training in Acute Medicine to take up the challenge and demonstrate impact on what really matters to patients, teams and organisations.

Conflict of interests

None in relation to this manuscript.

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