How can quality and performance be measured within a physician-led Community Emergency Medical service? A scoping review protocol

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Research Article

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Abstract

Background

Quality and performance measurement as part of quality improvement in healthcare is integral for service delivery and development. This is particularly pertinent for health services that deliver care in ways that differ from traditional practice. Community Emergency Medicine (CEM) is a novel and evolving concept of care delivered by services in parts of the UK and Ireland. This scoping review aims to provide a broad overview of how quality and performance may be measured within services delivering CEM.

Methods and Analysis

Methodology follows the Preferred Reporting Items for Systematic review and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) and is guided by recognised work of Arksey and O'Malley and the guidelines developed by the Joanna Briggs Institute. Several databases will be searched: Medline, Embase, Emcare, CINAHL, Scopus, the Cochrane library and grey literature. Search terms have been developed by representatives within Community Emergency Medicine services. Two reviewers will independently screen eligible studies for final study selection. Results will be collected and analysed in descriptive and tabular form to illustrate the breadth of measurement that may be applicable to CEM services. This scoping review protocol has been registered with the Open Science Framework platform (osf.io/e7qxg).

Discussion

This is the first stage of a larger research study aimed at developing national quality indicators for CEM. The purpose of this scoping review is provide a comprehensive review of quality measures that could be used within CEM. The results will be mapped using a framework and identify gaps in the literature to help guide future focused research.

Background

Community Emergency Medicine (CEM) is a novel model of emergency care that has evolved from Pre-Hospital Emergency Medicine (PHEM) [1]. Within the United Kingdom (UK), pre-hospital care (healthcare provided outside of a hospital or fixed healthcare centre) is predominantly delivered by National Health Service (NHS) ambulance service trusts. In 1966, a revolutionary mobile coronary care unit, staffed by a hospital physician, a coronary care trained nurse and an ambulance driver, was developed in Belfast. A combination of cardiopulmonary resuscitation (CPR) with a portable defibrillator was delivered to patients suspected of suffering out-of-hospital cardiac arrest secondary to myocardial infarction. This is one of the first examples of a specialist medical team working in partnership with an ambulance service to optimise care for patients in the community. In modern healthcare a variety of teams now collaborate with the ambulance service to deliver advanced specialist care to targeted cohorts of patients.[2] PHEM is an established speciality which primarily focuses on delivering critical care and safe hospital transfer for the most seriously ill and injured patients [3]. CEM evolved from PHEM after it was recognised that that there are emergency needs beyond critical illness that could benefit from specialist care in the community. It is the

clinical or situational complexity of the patient, rather than the acuity of illness, that defines this cohort of emergency patients. The complexity of these cases may challenge the scope of practice of traditional prehospital care models, where physician-led intervention may result in care that is beneficial for both the patient and the health system.

A universally shared CEM model of care has yet to be formally defined. Hanks, Ramage and Leech (2021) described and evaluated the practices of five services that are delivering CEM across the UK and Ireland.[1]. These services deliver a definitive assessment of patients with emergency care needs by clinicians empowered by knowledge, training, equipment and integrated care structures, independent of the patient's clinical environment [1,3]. An experienced emergency clinician and an ambulance practitioner 'take the Emergency Department to the patient' in an equipped response car [1, 2]. With the use of advanced diagnostics, therapeutics and community services the patient is often managed within the community, admitted to hospital only when specific needs cannot be safely or optimally met by other services [1, 2]. The range of clinical presentations is broad, reflecting the wide range of urgent and emergency presentations that would be assessed and managed within a typical emergency department. [2]

CEM provides an important paradigm shift in how patients with emergency care needs are considered and managed within the health system. Positioning an experienced hospital emergency clinician earlier in the patients episode of care allows a senior decision maker to consider the patient and their needs within the wider health system before they are referred to hospital [2]. Prehospital management supported by alternative community care pathways reduces emergency department attendances by encouraging definitive care within the community complimented with elective hospital services. This model is believed to strengthen existing relationships between primary and secondary care by encouraging co-operative management and providing an opportunity to develop novel clinical pathways. As a consequence, this develops greater perspective of emergency healthcare for trainees and other staff involved in the patient's care [1, 2] thereby benefitting other patients in the future.

Quality

The benefits of CEM have been demonstrated on a local basis with observational data [2], but critics have questioned the validity of the proposed benefits based on the data presented [3]. Scepticism towards novel healthcare models that manage patients in a manner that deviates from traditional practice should be respected and can facilitate service growth.

New services should be developed with the ability to observe their outcomes from data in a robust and transparent manner to allow key stakeholders to integrate quality improvement methodology that can drive meaningful change.

Quality and performance measurement is widely recognised as an integral component of healthcare service improvement [4-6] and should be used to inform key stakeholders such as clinicians, executives and commissioning bodies, enabling the services to develop and mature in a purposeful direction. Its importance

is recognised within pre-hospital care, and has clearly been identified within literature as an area of high research priority [7].

Quality measurement relies on the use of Quality Indicators (QI), concise elements of a service that can be objectively measured [8]. The performance of pre-hospital emergency services has historically been measured by crude, non-clinical, surrogate markers of success such as response times, time to assessment and length of stay. These became popular as they are easily measured and can be understood by a variety of stakeholders including the lay-person [9]. However, prehospital and emergency care is increasingly complex and so such measures, when considered alone, are thought to offer limited insight into the quality of the care that is delivered [4]. In recent decades there has been significant progress within prehospital care to develop more comprehensive, evidence-based quality measures that are thought to align more closely with the quality and performance of modern healthcare models [10-15]. Many frameworks and guides now exist to help define and map this more comprehensive approach to quality measurement [5, 10, 16].

Donabedian [16] considers three broad domains of a healthcare service within which quality can be measured: structure, processes and outcomes. Structure refers to the infrastructure within which the healthcare is delivered; processes describe the ways in which care is delivered; and outcomes refers to any change in the patients' status. This simple conceptual approach remains widely used within initiatives that approach modern healthcare improvement [4, 8, 17, 18].

The Institute of Medicine (IOM) further developed the concept of quality within healthcare; they defined a set of six discrete dimensions of quality that could be measured: timeliness, safety, efficiency, equity, effectiveness and patient-centredness [5].

Combining these two concepts of quality measurement creates a framework that can help define and map quality measurements to help consider all domains of a service and each dimension of quality. (Table 1) [8, 10, 19].

Table 1. Quality measures

	Institute of Medicine Dimensions					
Donabedian `domains	Timeliness	Safety	Efficiency	Equity	Effectiveness	Patient Centredness
Structure						
Process						
Outcome						

If we were to consider an example of 'time to assessment by clinician' – this would be measuring a process of a system and would measure the dimension of timeliness.

In order to provide a comprehensive picture of quality measurement, this scoping review aims to identify and present a broad overview of how quality and performance could be measured within a service that

delivers CEM.

The results of this review will be used to inform a wider piece of research aimed at developing national QI.

Methods

This scoping review protocol has been registered with the Open Science Framework platform (osf.io/e7qxg). It follows the guidance provided in the Preferred Reporting Items for Systematic review and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) [20]. (See appendix 3 for PRISMA-ScR checklist). It is also guided by the work of Arksey and O'Malley [21] and the subsequent guidelines developed by the Joanna Briggs Institute [22].

Protocol stages:

1. Develop a research question.
2. Define eligibility criteria.
3. Describe the search strategy and define information sources.
4. Describe the method for data extraction.
5. Explain how the results will be synthesised and reported.

Research question and framework

To help define the research question and search strategy, we have framed the question from four index elements: the target population; the type of care delivered; the process of care; and the concept of quality measurement. The more commonly applied 'population, care, concept' was not felt to be comprehensive enough to capture the desired output. The index headings that follow are felt conceptualise each distinct element of the research question with more accuracy.

Population

Patients in the 'prehospital' phase of management; this may also be described as 'community care' considering that a large proportion of patients are not transferred to hospital for definitive care. Care could be regarded as both 'community' and 'pre-hospital', the difference between these at times is nuanced and often dependent on historical categorisation. This difference may not be well described in the literature. Considering both 'community' and 'prehospital' patients in combination with the 'care' and 'process' concepts below should capture the most appropriate literature.

Care

The care required should be defined ‘in some measure’ as an ‘emergency’; a patient calling ‘999’ or a patient referred by a hospital team where the only alternative for these patients under the traditional emergency system is accessed via calling 999. We believe that the definition of ‘emergency care’ and the ‘emergency patient’ is more difficult to define as it may seem; the context of the patient’s presentation and the perspective of the provider can lead to conflicting statuses within our current system. Some ‘999’calls are determined ‘not an emergency’ once the patient has been assessed by an emergency provider however from the perspective of the patient and the system the needs were appropriately deemed an ‘emergency’.

Process

Care is delivered by senior emergency physician(s) (registrar grade or higher) or other clinician(s) with training similar to that of an emergency physician. An example would be an advanced nurse practitioner under the direction/supervision of a physician lead.

Quality measurement

Described or defined measures of quality or performance within services that deliver emergency care. The measures / indicators do not need to be in active use and may simply be conceptual. For example, it may have been hypothesised that measuring the rate of hospital admissions in the future for a CEM service is worth considering.

Research question: How can quality be measured within a physician-led Community Emergency Medicine service?

Eligibility criteria

Inclusion criteria:

All studies that consider quality measures for:

- prehospital or CEM.
- published literature from 1966 onwards.
- clinical and / or non-clinical quality measures
- adults and children.

Exclusion criteria:

- Trauma. This is a patient cohort is primarily managed by other services such as PHEM or the ambulance service.

- Specific diseases with an established pre-hospital protocol such as ST-segment Elevation Myocardial Infarction and Cerebrovascular Accidents. These exclude the involvement of CEM services in favour of immediate disposition to a specialist centre for definitive management.

Search Strategy and Information Sources

Four sets of search terms based on the index elements that helped formulate our question framework have been developed. This process has involved CEM representatives with terms subsequently reviewed with a librarian. Search terms will be modified to include standardised vocabulary within each individual database. Additional files describing this process in more detail and a draft search of MEDLINE are provided (Appendix 1).

A pilot search will be undertaken using MEDLINE. The pilot search will allow a subsequent revision of the search strategy to ensure all of the relevant literature has been captured and that the most appropriate headings have been used within the data extraction tables (table 1,2 and 3).

We will analyse the first 10 articles that meet the inclusion criteria including the referenced literature within them. This will allow for the introduction of new appropriate search terms not originally considered [21, 23, 24]. Any revision of the search strategy at this point will be documented and explained.

After this pilot is performed and the search strategy reviewed, a full search of MEDLINE will be carried out followed by searches of the online electronic databases: Embase, EMCare, CINAHL, Scopus and the Cochrane library.

A search of other grey literature will be completed including discussions with specialists who represent specific patient groups to hand-pick potentially relevant literature and searching Google Scholar.

Data screening process and extraction

Search results will be exported first into Endnote™ and then transferred into Covidence [1](Covidence systematic review software) where all publications will be screened to ensure they fulfil the eligibility criteria, first based on the title, second based on the abstract (JS).

The remaining articles will then be read by two reviewers, (JS and PMcC independently. In the case of uncertainty, the text will be re-evaluated by a third independent reviewer. Data will be stored and charted using Covidence.

A flow diagram in keeping with PRISMA [25] (appendix 2) will be used to report the searches and inclusion/exclusion pathway.

A data extraction table will be created and used to chart information from each publication (table 1). Refinement of this table will be allowed for, following the results of the pilot search.

Information of interest will include the following:

1. Study Characteristics: Year of publication, study type, setting, population
2. Quality measurement classification: Donabedian and IOM classification.
3. Clinical Subtype if applicable: Mapping to clinical case types attended

Each of the included studies will be extracted by the two primary reviewers independently and any conflicts resolved through discussion. If there is any ongoing dispute, this will be resolved by the opinion of a third independent reviewer. Authors of publications will be contacted in the event that information is unclear.

Data synthesis and reporting of results

Results will be summarised descriptively and in tabular form.

Each quality measure will be listed as short descriptive sentences followed by its quality classification and, if clinical, the clinical sub type it represents (see table 1).

The quality measurement classification will be coded for ease of reference.

First by the Donabedian area: 1. a – Structure, 1. b – Process,1.c – outcome;

Secondly the IOM dimension of quality: 2. a – Safety, 2. b – Effective, 2. c - Patient-centred, 2.d. Timeliness, 2.e. Efficient, 2.f. Equity.

For example, an indicator that is measures an outcome relating to safety would be classified as 1.c 2. a.

Based on data available from local CEM services, clinical subtypes will be grouped into: 1. Critical Care and Anaesthesia 2. Elderly Care 3. Oncology 4. Palliative Care 5. Surgical Care 6.Urology 7.ENT 8. Infectious Diseases 9.Musculoskeletal 10. Paediatrics 11. General Emergency Care/Other.

Table 2. Data extraction table

Author	Year	Citation	Study design	Population	Proposed Quality Measure	Quality measure Classification	Clinical Sub-type grouping

Derived from the results in Table 2, we will tally the quantity of specific classifications of quality measures from each paper (tabulated in the matrix of Donabedian and IOM, table 2). This will be developed into a visual illustration, highlighting the breadth of measurements.

We will also display results as per the clinical subtype (table 3). As with table 1, a brief description of the measure will be included along with the quality measure classification. Tables 2 and 3 will display areas in which no measures exist, highlighting a gap in knowledge, which may prompt further research.

Table 3. Clinical sub-types

Clinical Sub-type	Quality Measure description	Quality Measure classification
Critical Care + Anaesthesia		
Elderly Care		
Oncology		
Palliative Care		
Surgical Care		
Urology		
ENT		
Infectious Disease		
Musculoskeletal		
Paediatrics		
General Emergency Medicine		

Discussion

This scoping review is the first phase of a larger piece of research designed to develop a set of accredited national QI for use within CEM services. While CEM shares similarities with Emergency Medicine and Prehospital Emergency Medicine it is distinct from both in its aims and delivery. Embedding quality measurement specific to its aims with a quality improvement structure is just one of many fundamental building blocks that will help CEM strategically mature into an established model of emergency healthcare.

The purpose of this scoping review is provide a comprehensive review of quality measures that could be used within CEM. The results will be mapped using a framework and identify gaps in the literature to help guide future focused research.

Abbreviations

CEM Community emergency medicine

PHEM Pre-hospital emergency medicine

UK United Kingdom

NHS National Health Service

CPR Cardiopulmonary resuscitation

QI Quality indicators

IOM Institute of Medicine

Declarations

Ethics approval and consent to participate

Ethical approval was not required as this is an approved NHS service development project.

Consent for publication

Not applicable

Availability of data and materials

As this is a protocol, there are no data available.

Competing interests

The authors declare that they have no competing interests

Funding

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Authors' contributions

The gensis of this project was conceived by JS who was supported by LS and TJ with regards direction and background literature. PMcC provided expertise in scoping review methodology. JS wrote each draft and the co-authors each provided critical feedback. All authors read and approved the final manuscript.

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Not applicable

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Footnotes

1. Covidence - an internet-based software program that facilitates independent collaboration among reviewers during the study selection process. This software will also identify and allow removal of duplicates and produce a schematic diagram of each of the selection stages.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Appendix1searchstrategy.docx
- Appendix2PRISMAflowdiagram.docx
- Appendix3PRISMAchecklist.docx