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What strategies are used to select patients for direct admission under acute medicine services? A protocol paper for a systematic review of the literature

Samuel Evans [1,2] Catherine Atkin [1,3] Austin Hunt,[4] Georgina Ball,[4] Charlotte Cassidy,[4] Alexander Costley-White,[4] Louise Toy,[4] Rebecca Wilding,[4] Elizabeth Sapey [1,3]

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[1]Institute of Inflammation and Ageing, University of Birmingham College of Medical and Dental Sciences, Birmingham, UK
[2]Acute Medicine, University Hospitals Plymouth NHS Trust, Plymouth, UK
[3]Society for Acute Medicine, Eastleigh, UK
[4]University Hospitals Plymouth NHS Trust, Plymouth, UK

Correspondence to
Samuel Evans;
sxe375@student.bham.ac.uk

ABSTRACT

Introduction Despite unprecedented pressures on urgent and emergency care services, there is no clear consensus on how to provide acute medical care delivery in the UK. These pressures can lead to significant delays in care for patients presenting with emergencies when admitted via traditional routes through the emergency department. Historically, a separate pathway has existed where patients are directly admitted to acute medicine services without attending the emergency department. It is suspected that there is a significant variation in how these patients are selected, triaged and managed in the UK. This systematic review will assess the methods and evidence base used for direct patient admissions to acute medicine services compared with traditional admission pathways through the emergency department.

Methods and analysis A systematic review of the literature will be conducted and a total of six databases will be searched: MEDLINE (Ovid), The Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE in process, Web of Science, CINAHL and Embase. This will include studies from the period 01 January 1975 to 24 January 2024. Covidence software will be the platform for the extraction of data and paper screening with the selection process reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram. Both title and abstract screening and full-text screening will be done by two reviewers independently. The risk of bias of included studies will be assessed using the methods introduced in the Cochrane Handbook for Systematic Reviews of Interventions and the tool used will be dependent on the type of study. Where possible, outcomes will be dealt with as continuous variables. Change percentage will be assessed between any pathway characteristic or outcome. The χ^2 test and I^2 test will be used to evaluate the heterogeneity of included studies. Where appropriate, relevant meta-analysis techniques will be used to compare studies and forest plot produced.

Ethics and dissemination This systematic review does not require ethical approval. Findings will be disseminated widely in peer-reviewed publication and media, including conferences.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ There is a lack of comprehensive reviews synthesising the existing literature on direct admission pathways to acute medicine. We aim to create a comprehensive systematic review on this topic.
⇒ The search algorithm will include international and broad nomenclature to increase the ability to find significant research, with no language restrictions applied.
⇒ Six databases will be searched within a broad timeframe (from 1975 to 2024).
⇒ The systematic review will be developed with experienced researchers in the field of acute medicine.
⇒ While the search algorithm will attempt to account for the variability in the international use of the term acute medicine, this remains a limitation of the study.

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INTRODUCTION

In the UK, there are over 500 000 unplanned, urgent admissions to hospitals each month, which places significant demand on healthcare services.[1] Medical emergencies are the most common reason for attendance to emergency departments and are predominantly referred to acute medical services.[2] Early assessment of patients by acute medical services improves patient outcomes.[3] The Society for Acute Medicine has published guidelines on best practices stating that a review by a senior acute medicine clinician should occur within 6–14 hours from referral to acute medicine depending on time, with a 6 hour target during the day and a 14-hour target out of hours. At present, only 41% of

patients referred to acute medicine are reviewed within this timeframe.[4]

The acuity of patients who are referred to acute medicine can vary significantly with an estimated 30% being discharged within 24 hours of arrival to the hospital.[5] Many factors, such as the time of day of presentation, the clinician undertaking the review and the number and complexity of patients in emergency departments, impact the likelihood of review and discharge in a timely manner.[6] To improve the operational efficiencies of acute medical services and improve outcomes for patients, several different care models have been developed and implemented across the UK. These models aim to reduce the time for a patient to see a clinical decision maker (as defined by Society for Acute Medicine Benchmarking Assessment (SAMBA) 2023[7] as an ACP (Advanced Clinical Practitioner), PA (Physician Associate) or any grade of doctor, ensure medical reviews are undertaken in the most appropriate setting based on the acuity of presentation and improve the flow into the acute medicine services out of the emergency department.[7]

One such model is the use of a medical triage. Here, suitable patients are referred directly to acute medicine services at presentation, effectively bypassing assessments by emergency department clinicians. This model assumes that having the initial review of these patients by acute medicine clinicians, repetition is avoided, there are less delays in reaching an acute medical clinical decision maker and patients can be more effectively signposted for optimal care, for example, through a same-day emergency care (SDEC) unit. This model may be an effective way to provide acute care to patients; however, the evidence base for this direct admission pathway to acute medicine is not yet established.

Previous systematic reviews demonstrated that there is a lack of evidence to support how best to deliver acute medical care in the UK, and the Society for Acute Medicine annual benchmarking audit has identified significant heterogeneity in how services are run.[7 8]

The systematic review specifically aims to answer the question of how patients are directly admitted to acute medicine services and how any pathway being used performs compared with the traditional pathway through the emergency department.

METHODS AND ANALYSIS

This systematic review will be conducted using standard methodology.

Objectives

The systematic review has two main objectives:

1. To identify the approaches used to identify and select patients directly admitted to acute medicine services from the emergency department.
2. To compare the safety and operational efficiencies of such models compared with usual care (which is where patients are reviewed by emergency department clinicians and then referred to onwards to acute medical teams).

PICO

Population

- Adult patients requiring hospital acute medical services, attending the emergency department, via self-referral, ambulance conveyance or primary care referral.

Intervention

- Direct medical triage to acute medical services

Comparison

- Adult patients who have been reviewed by emergency department teams and require acute medical services

Outcomes

Primary outcomes

- Time until review by senior clinical decision maker.

Secondary outcomes

- Mortality (in hospital and 30 days).
- Length of stay.
- Readmission rates in 7 and 30 days.
- Time until review by an acute medicine specialist.
- Time to review by a tier 1 clinical decision maker.
- Utilisation of SDEC pathways.
- Comparison of any inclusion or exclusion criteria used for direct admission pathways.

Study Design

Systematic review

Databases which will be used are as follows

MEDLINE (Ovid), The Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE in process, Web of Science, CINAHL, Embase. An example of the search strategy to be used can be found in the appendix.

Search dates

All reported studies from 1975 onwards with an end date of 24 January 2024.

Participants/population

Adult patients requiring hospital acute medical services, attending the emergency departments.

Participant and study inclusion and exclusion criteria

Inclusion criteria:

- Adult patients (over 16 years of age) presenting to the emergency departments who require acute medical assessment.
- Acute medical services will include those delivered within hospital settings such as acute medical units, medical assessment units, medical SDEC, ambulatory care units, and acute frailty units.
- Studies that describe the triage/ identification of patients with acute medical problems that are selected for direct admission to acute medicine services.

- Randomised control studies or observational studies
- Within an acute hospital setting
- Unplanned presentations to emergency services
- Studies dating from 1975 to 2024.

Exclusion criteria:

- Studies focusing on patients aged 16 or under
- Patients not referred to or selected to acute internal medicine services. Patients who are under the care of acute medicine services for ongoing care such as the virtual ward or returning patients to medical SDEC services.
- Acute internal medicine services are delivered outside of a hospital setting such as hospitals at home and virtual wards.
- Planned or return admissions to acute medicine services.
- Case studies or case series with less than 10 patients.
- Narrative reviews
- Systematic reviews, although studies in these reviews will be screened for inclusion.
- No description of the triage method used to identify the need for acute medicine service referral.
- Case studies or case series of less than 10 patients.

Intervention

The use of direct medical triage as a patient selection tool or pathway, which enables the clinician to select patients for direct admission to acute internal medicine services. There may be some variation of this pathway and how it is implemented, and even the term used. For example, this pathway could exist as a role a clinician undertakes using clinical judgement, as a physical ward or as a screening selection tool being used.

To account for this suspected variation, the intervention will need to determine the pathway selected for patients referred for direct admission to acute medicine services.

Comparator/control

Pathways in which the patient is seen by emergency medicine teams for initial assessment and treatment and referred to acute medicine services or equivalent services after this initial assessment and treatment.

Context

Studies focusing on in-hospital emergency, acute medicine or SDEC departments will be used. No limitation will be given to referral pathways to prevent the exclusion of primary care or alternative referral pathways. Studies where initial triage has occurred outside of a hospital setting will not be included, as although integrated care services are planned for development, optimising patient flow at presentation to the emergency department is a current and critical healthcare challenge.

Data extraction

Using Covidence software, two authors will independently screen each paper. The title and abstract will be screened and reviewed by two independent reviewers to assess eligibility for inclusion in the study according to prespecified inclusion and exclusion criteria. Any disagreement will be resolved through discussion and an independent third review will mediate where appropriate. Full text will be screened and reviewed by two independent reviewers using the prespecified inclusion and exclusion criteria. Any disagreement will be resolved through discussion and an independent third review will mediate where appropriate. The reason for exclusion will be recorded. The selection process will be reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram. For each included study, data will be extracted on study design, patient characteristics, interventions, comparators and outcomes using a customised electronic data extraction form. The data extraction form will be assessed by three reviewers before the data extraction phase. Data extraction will be done by one reviewer and checked for accuracy by a second reviewer with disagreement being checked by a third member of the team. The study's author will be contacted directly if data are ambiguous or missing.

The extraction tool will focus on:

- Study characteristics
- Publication year
- Multi/single centre
- Country
- Design
- Population
- Sample size
- The clinician undertaking medical triage
- Any criteria or tools used to identify medical patients for direct admission.
- Intervention
- Comparator (when applicable)
- Primary and secondary outcomes

Risk of bias assessment

The risk of bias of included studies will be assessed using the methods introduced in the Cochrane Handbook for Systematic Reviews of Interventions. The quality of Randomised Controlled Trials (RCTs) will be assessed with the Cochrane tool for assessing the risk of bias in RCT. Observational studies will be assessed using the risk of bias in non-randomised studies of interventions (ROBINS-E). Newcastle-Ottawa Scale will be used to assess the risk of bias in case/control and cohort studies. Joanna Briggs Institute (JBI) critical appraisal checklist for case series will be used to assess the quality of case series. The reviewers will independently check each selected article to minimise bias. Disagreement will be resolved using a third review. Information from the risk of bias assessments will be used when synthesising the data to explain differences in study results and to comment on the reliability of conclusions that arise from the analysis.

Strategy for data synthesis

Where possible, outcomes will be dealt with as continuous variables. Change percentage will be assessed between any pathway characteristic or outcome. Standardised mean

difference and 95% CIs will be used to assess the effect size of each included study. The χ^2 test and I^2 test will be used to evaluate if heterogeneity of included studies. Where appropriate relevant meta-analysis techniques will be used to compare studies and forest plot produced.

Analysis of subgroups or subsets

While analysis of subgroups or subsets is not planned, these will be considered and assessed for appropriateness and could include reported subgroups such as patient acuity. This will be explicitly stated in the report. If a subgroup analysis is required, we intend to use Progress Plus and PRISMA-E to explore equity issues.

Data management

Data will be published in the appendix of the systematic review. Any data that have not been included will be available on request.

ETHICS AND DISSEMINATION

This systematic review does not require ethical approval. Findings will be disseminated widely in peer-reviewed publication and media, including conferences.

Patient and public involvement

Patient and public involvement in the systematic review were included as part of previously published work, of the studies that met the inclusion criteria for the review.

Amendments

In the event of protocol amendments each amendment will be accompanied by a description of the change and the rationale.

X Catherine Atkin @catatkin

Contributors SE is the guarantor/lead author responsible for the design, the search and drafting of the manuscript. ES contributed to all areas of the manuscript providing supervisory expertise and provided conflict resolution of paper screening. CA and AH provided supervision and mentorship on the development of the manuscript. SE, GB, CC and LT screened papers, with SE and GB providing full-text reviews. RW and SE performed the data extraction. ES and ACW provided conflict resolution at each stage of the screening. All authors read, provided feedback and approved the final manuscript.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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ORCID iDs
Samuel Evans http://orcid.org/0009-0008-6559-8468
Catherine Atkin http://orcid.org/0000-0003-0596-8515
Elizabeth Sapey http://orcid.org/0000-0003-3454-5482

REFERENCES

1 NHS England. A&E attendances and emergency admission. 2023. Available: www.england.nhs.uk/statistics/statistical-work-areas/ae-waiting-times-and-activity/ [Accessed 1 Jan 2024].
2 Holland M, Subbe C, Atkin C, *et al*. Society for Acute Medicine Benchmarking Audit 2019 (SAMBA19): Trends in Acute Medical Care. *Acute Med* 2020;19:209–19.
3 Ward D, Potter J, Ingham J, *et al*. Acute medical care. The right person, in the right setting--first time: how does practice match the report recommendations? *Clin Med (Lond)* 2009;9:553–6.
4 Society for Acute Medicine Benchmarking Audit. SAMBA 2022. 2022. Available: https://www.acutemedicine.org.uk/wp-content/uploads/SAMBA-2022-report.pdf [Accessed 1 Jan 2024].
5 Atkin C, Riley B, Sapey E. How do we identify acute medical admissions that are suitable for same day emergency care? *Clin Med (Lond)* 2022;22:131–9.
6 Morley C, Unwin M, Peterson GM, *et al*. Emergency department crowding: A systematic review of causes, consequences and solutions. *PLoS One* 2018;13:e0203316.
7 Society for Acute Medicine Benchmarking Audit. SAMBA 2023. 2023. Available: https://www.acutemedicine.org.uk/wp-content/uploads/SAMBA23-national-report-.pdf [Accessed 13 Feb 2024].
8 Reid LEM, Crookshanks AJF, Jones MC, *et al*. How is it best to deliver care in acute medical units? A systematic review. *QJM* 2018;111:515–23.