

Streaming patients in emergency departments to primary care services – what is the evidence for effectiveness and safety?

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Word Count 1258

What you need to know

- There is a current evidence gap for the effectiveness and safety of streaming emergency department patients to primary care services.
- Commissioners and service providers should clarify whether general practitioners are encouraged to function more as primary care or emergency medicine clinicians in the emergency department – to suit the local patient demographic profile, demand patterns and staff recruitment needs.
- Quality and safety can be maintained by clear roles and governance and sharing learning about how systems have been adapted to ensure effective, safe care.

How patients were involved in the creation of this article

Patient representatives were involved as public collaborators and co-applicants on the NIHR funded GPs in EDs study. They have given feedback on findings from the realist review, taxonomy and patient safety incident report analysis.

What patients need to know

Research is ongoing to evaluate the effectiveness and safety of new healthcare models designed to improve overall patient care in emergency departments.

Education into practice

Does your emergency department primary care service meet the needs of the local population and local context? What data do you already have to support this assessment, and what data do you need to identify how to improve the service?

Recommendation for further research

How can individual primary care services at emergency departments be most effective for local needs?
Are there patient safety implications for primary care services co-located with emergency departments and if so, how can they be mitigated?

Introduction

Increasing demands on emergency healthcare systems have led to the development of different healthcare models, including the streaming of patients presenting with primary care type problems to primary care services.(1) Strategies like this seek to improve patient care and safety by reducing crowding in the emergency department and improving patient flow.

Consequently, a £100 million investment (US\$130million) was made by NHS England in October 2017 (with ongoing annual staffing costs estimated to be £350 million (US\$450million)) for all emergency departments to have a co-located primary care facility, to be “free to care for the sickest patients”.(2,3)

Box 1: Definitions(4)

Triage: A clinical activity to sort patients by acuity so that those with the greatest need are seen first.

Streaming: An operational activity to sort low acuity patients by clinician availability and suitability.

What is the evidence of uncertainty?

Estimates for the proportion of patients with primary care type problems who present to emergency departments vary from 10-43%,(5–9) relating partly to methodological differences such as retrospective versus prospective identification, and also local population demographics and help-seeking behaviour. Different service models (including urgent care centres, walk-in centres or more integrated services) are described in different contexts, using ambiguous terminology.(4,10) The term ‘co-located’ primary care service may describe patient care in a separate unit to the emergency department without access to acute diagnostics, thus similar to normal general practice settings. Alternatively, for the same label, general practitioners may work within the emergency department, largely integrated with emergency service provision, with responsibilities beyond usual primary care.(4) Various primary

healthcare professionals also work in these models, including nurses and advanced care practitioners. Training requirements, professional qualifications or governance arrangements to guide best practice are unclear.(11)

**** Insert Table 1 about here ****

Evidence for this initiative is weak (Table 1).(12–16) Research studies have heterogeneous designs and there are few large scale evaluations. The 2018 Cochrane review included: three single-site non-randomised studies, all conducted before 1999, with supernumerary general practitioners seeing non-urgent patients (identified by different methods) in emergency departments; and one Australian randomised trial assessing the effectiveness of an emergency nurse practitioner service model. Results were inconsistent and highlighted the paucity of evidence for effectiveness outcomes, with no data available on mortality or safety events.(12) The UK National Institute for Health & Clinical Excellence (NICE) also assessed the available evidence and included two non-randomised UK studies conducted before 1996.(14) Measures of process such as ‘use of diagnostic tests’ and patient-reported experience surveys have been used to draw conclusions about the effectiveness of services, but these are inadequate proxies for value-based outcomes which reflect the safety of the system.(18) No evidence was found for safety indicators and no economic evaluations were identified. Given the limited, outdated clinical and cost-effectiveness evidence and concerns about the feasibility of staffing the workforce to support this initiative, NICE did not make a recommendation for general practitioners to work within or on the same site as emergency departments.(14)

Table 1: Summary of evidence for effectiveness and safety of primary care services co-located with emergency departments

Review	Published	Included studies	Intervention	Quality of evidence	Evidence of effectiveness	Evidence of safety
Goncalves et al.(12) (Updated Khangura 2012 (13)) Cochrane review	2018	1 Non-randomised UK study (4641 patients) 2 Non-randomised Irish studies (1878 + 4684 patients)	GPs providing care for non-urgent patients in the ED	Very-low certainty evidence. High heterogeneity across studies precluded pooling data.	Uncertain if GPs reduce time to clinical assessment and ED length of stay, admission to hospital or referral to hospital-based specialists, use of diagnostic tests or costs.	No data were reported on adverse events (such as ED returns and mortality).
		1 Randomised Australian trial (258 patients)	Standard ED medical care vs emergency NP care			
NICE assessment (14)	2017	2 Non-randomised UK studies (4641 + 1996 patients)	GPs providing care for non-urgent patients in the ED	Very low quality due to risk of bias	GPs may provide benefit in reduced number of diagnostic investigations, with no effect on patient satisfaction. No relevant economic evaluations identified.	No evidence found for mortality, quality of life, time to admission/ discharge, avoidable adverse events, readmission.
Ramlakhan et al.(15) Narrative review	2016	20 primary studies from The Netherlands (n=8), England (n=4), others were from Australia, Ireland, Spain, Sweden and Switzerland.	Primary care professionals managing non-urgent ED patients	All evidence included to search for explanations loosely based on a realist approach. No formal individual study quality assessment	A paradoxical increase in attendances described, likely to be attributable to provider-induced demand. The evidence for improved throughput is poor. Marginal savings may be realised per patient, but this is likely to be overshadowed by the overall cost of introducing a new service.	No increase in patient reattendance described in two studies.
Cooper et al.(16) Rapid Realist Review	2019	96 articles, largely primary research studies, most from the UK (n=44), Netherlands (n=17), others were from Ireland, Belgium, Switzerland, Sweden, Italy, Finland, Australia, USA, Canada, Singapore and New Zealand.	Mostly GPs seeing non-urgent patients in the emergency department	Extracts included that offered explanatory power why and how the services worked. No formal individual study quality assessment.	The effectiveness of emergency department streaming to primary care services may be influenced by how staff interpret the streaming system and the roles GPs adopt. Little evidence that GPs directly or indirectly affected the care and throughput of the sickest patients.	Minimal data on the safety implications of GPs working in EDs. 5 studies showed no increase in reattendance rates and a Dutch study showed no increase in mortality rates.

Key: NICE, UK National Institute for Health & Clinical Excellence; GP, General Practitioner; NP, Nurse Practitioner; ED, Emergency Department

Ramlakhan et al. undertook a narrative review of 20 studies in 2016 to search for explanations of why models worked or not. They described a paradoxical increase in attendances when primary care services are located at emergency departments, termed “provider-induced demand”. There was poor evidence about emergency department throughput and minimal economic impact.(15)

Our rapid realist review aimed to describe the mechanisms by which general practitioner services were linked to outcomes. We used papers referenced in the recent systematic reviews as a starting point,(13,15,17) then combined search terms used previously, to update database searches (Medline via OVID, Embase, CINAHL, Cochrane DSR & CRCT, DARE, HTA Database, Business Source Complete, PsycINFO and SCOPUS) to develop our theories from 96 articles.(16) Multiple factors influenced the effectiveness of different services, including how staff interpret the streaming system and the roles adopted by general practitioners (traditional, extended, gatekeeper or emergency clinician). There was little evidence that streaming patients with primary care type problems to general practitioners frees up emergency department staff to improve care and safety for the sickest patients.(16)

Significantly, NHS England data show increasing numbers of hospital admissions from emergency departments rather than general practices (Figure 1).(19) With an average acute hospital admission cost of about £900, should interventions in emergency departments (which may include the expertise of general practitioners focusing on a specific patient groups) prioritise preventing these admissions rather than treating patients with primary care problems?

Figure 1: UK National Health Service Hospital Episode Statistics showing emergency admissions from emergency departments (yellow) and general practice (red)

**** Insert Figure 1 about here ****

Is ongoing research likely to provide relevant evidence?

Recognising this evidence gap, the UK NIHR (National Institute for Health Research) Health Services and Delivery Research programme commissioned evaluations of the effectiveness, safety, patient experience and system implications of the different models of general practitioners working in or alongside emergency departments. Two observational, mixed-methods studies are ongoing, utilising Hospital Episode Statistics data for interrupted time series quantitative analyses and hospital site visits for in-depth qualitative data analyses (HS&DR Projects: 15/145/04 and 15/145/06).(20,21) The studies will address the challenges of defining the target population and which service models may be better suited, depending on local demographics and contexts. Effectiveness will be evaluated by: waiting times; admission rates and (re)attendances; patient satisfaction; and cost-consequence analysis. We will analyse patient safety incident reports, referring to World Health Organization definitions of adverse events and near-misses, for patient safety outcomes.(22) Another ongoing Belgian study,(23) has also been identified from clinical trial registers (EU Clinical Trials Register, ISRCTN Registry, ClinicalTrials.gov, ICTRP).

Figure 2: The form of primary care service models in or alongside emergency departments

****Insert Figure 2 about here****

Early work from the UK studies includes an updated taxonomy to describe the form of primary care service models: INSIDE the emergency department - either an *integrated* or a separate *parallel* service; and OUTSIDE the emergency department - either *on* or *off site* (Figure 2). There is a spectrum of constructs that influence the function of these services, from usual primary care approaches to more integrated with the emergency medicine service.(4) Analysis of 217 National Reporting and Learning System patient safety incident reports and 9 Coroners'

reports with learning relevant to these services highlight: difficulty identifying appropriate patients and delayed initial assessment for patients referred to a separate primary care service; under-investigation, misinterpretation of diagnostic tests and underuse of safeguarding protocols for services integrated with the emergency department; and inadequate communication and referral pathways between services.(24)

What should we do in the light of the uncertainty?

Clinicians, service directors, managers and commissioners should acknowledge the current evidence gap for effectiveness and safety in this area. Historically, emergency department and primary care patients have been well demarcated, but boundaries may be blurring. While perceived availability of primary care is likely to be a factor, so are wider social factors such as increased expectations and democratisation of medical knowledge.

The Bayesian implications of patients seeking urgent and emergency care however should be acknowledged and understood. Patients may have a higher pre-test probability of serious disease when they deem their complaint to be an emergency and choose to present to an emergency department rather than to their usual primary care provider. General practitioners and other primary healthcare staff should incorporate this into their already complex clinical management decisions.(25) Patient safety incident reporting systems should be used to learn from incidents, their underlying causes, and support plans to mitigate risk to patients. Learning about how systems have been adapted to ensure effective, safe care should be shared.

Commissioners and service providers should clarify whether they encourage general practitioners to function more as primary care or emergency medicine clinicians in the

emergency department, to suit their local patient demographic profile, demand patterns and staff recruitment needs. Emergency department and primary care clinical leads should jointly consider which patients are appropriate for their local primary care service model and how best to identify these patients. Clarification of governance implications is particularly important for the primary care role(s) and potential learning needs that must be addressed for those primary care staff in emergency medicine roles.

This case illustrates the cost of policy-making in the context of the lack of evidence and affords opportunity to consider how to address such issues in the future.

Word count 1258

Contributory Statement

All authors were involved in the conception and design of the funded study. AC developed the first draft of this article and TH contributed Hospital Episode Statistics emergency admission data. All authors agree to be accountable and have approved the final version of this article.

Acknowledgements

The authors would like to thank Prof Matthew Cooke for his contributions towards this article.

Competing Interests

AC, ACS, TH and AE are all co-applicants on the NIHR HS&DR study Project: 15/145/04 – A realist evaluation of effectiveness, safety, patient experience and system implications of different models of using GPs in or alongside Emergency Departments.

Disclaimer

This study is funded by the National Institute for Health Research (NIHR) HS&DR Project 15/145/04. The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

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References

1. Next steps on the NHS five year forward view 2017. <https://www.england.nhs.uk/wp-content/uploads/2017/03/NEXT-STEPS-ON-THE-NHS-FIVE-YEAR-FORWARD-VIEW.pdf>
2. A&E departments to get more funding - GOV.UK <https://www.gov.uk/government/news/ae-departments-to-get-more-funding>
3. Primary care streaming: Roll out to September 2017 www.england.nhs.uk
4. Cooper A, Edwards M, Brandling J et al. Taxonomy of the form and function of primary care services in or alongside emergency departments: concepts paper. *Emerg Med J*. 2019 doi: 10.1136/emered-2018-208305
5. Dale J, Reid F, Green J et al. Primary care in the accident and emergency department: I. Prospective identification of patients. *BMJ* 1995;311:423–6.
6. Ward P, Huddy J, Hargreaves S et al. Primary care in London: an evaluation of general practitioners working in an inner city accident and emergency department. *J Accid Emerg Med*. 1996;13:11–5.
7. Coleman P, Irons R, Nicholl J. Will alternative immediate care services reduce demands for non-urgent treatment at accident and emergency? *Emerg Med J*. 2001;18(6):482–7.
8. Nagree Y, Camarda V, Fatovich D et al. Quantifying the proportion of general practice and low-acuity patients in the emergency department. *MJA* 2013;198:612–5.
9. Thompson MIW, Lasserson D, Mccann L et al. Suitability of emergency department attenders to be assessed in primary care : survey of general practitioner agreement in a random sample of triage records analysed in a service evaluation project. *BMJ Open*. 2013;3(e003612).
10. Carson D, Clay H, Stern R, Primary Care Foundation. Primary care and emergency departments. 2010
11. Primary Care in Emergency Departments A guide to good practice. NHS Interim Mangement and Support. 2015
12. Goncalves-Bradley D, Khangura JK, Flodgren G et al. Primary care professionals providing non-urgent care in hospital emergency departments. *Cochrane Database Syst Rev* 2018;(2).
13. Khangura JK, Flodgren G, Perera R et al. Primary care professionals providing non-urgent care in hospital emergency departments. *Cochrane Libr*. 2012;53(11):1689–99.
14. NICE guideline GPs within or on the same site as emergency departments. 2017
15. Ramlakhan S, Mason S, O’Keeffe C et al. Primary care services located with EDs: a review of effectiveness. *Emerg Med J* 2016;33(7):495–503.
16. Cooper A, Davies F, Edwards M et al. The impact of general practitioners working in or alongside emergency departments: a rapid realist review. *BMJ Open* 2019;9(e024501).
17. Turner J, Coster J, Chambers D et al. What evidence is there on the effectiveness of different models of delivering urgent care? A rapid review. *Heal Serv Deliv Res* 2015;3(43):1–134.
18. Porter M. What is Value in Health Care? *NEJM*. 2010;363(26):2477–81.
19. Hospital Episode Statistics <https://digital.nhs.uk/data-and-information/data-tools-and-services/data-services/hospital-episode-statistics>
20. Morton K, Voss S, Adamson J et al. General practitioners and emergency departments (GPED) - Efficient models of care: A mixed-methods study protocol. *BMJ Open*. 2018;8(10).
21. Edwards A. Evaluating effectiveness, safety, patient experience and system implications of different models of using GPs in or alongside Emergency Departments. <https://www.journalslibrary.nihr.ac.uk/programmes/hsdr/1514504/#/>
22. Conceptual Framework for the International Classification for Patient Safety WHO. 2009 http://www.who.int/patientsafety/taxonomy/icps_full_report.pdf
23. Triageing and Referring in Adjacent General and Emergency Departments (TRIAGE) [Internet]. Universiteit Antwerpen, Belgium. <https://clinicaltrials.gov/ct2/show/NCT03793972?term=primary+care&cond=emergency+department&rank=4#contacts>
24. Cooper A, Carson-Stevens A, Siriwardena N et al. Learning from diagnostic error when primary care services are located in or alongside emergency departments: a theory generating mixed-methods study. *BJGP Res Conf* 2019;69(suppl 1): bjgp19X703277. https://bjgp.org/content/69/suppl_1/bjgp19X703277%0D
25. Croskerry P. Achieving quality in clinical decision making: cognitive strategies and detection of bias. *Acad Emerg Med*. 2002;9(11):1184–204.