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Factors influencing streaming to general practitioners in emergency departments: A qualitative study

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ABSTRACT

Background: Emergency Department attendance is increasing internationally, of which a significant proportion could be managed in general practice. In England, policies backed by substantial capital funding require such patients attending Emergency Departments be directed or 'streamed' to general practitioners working in or parallel to Emergency Departments. However, evidence for streaming is limited and the processes of streaming patients attending Emergency Departments to general practitioners lacks exploration.

Objectives: This paper explores streaming to general practitioners in and alongside Emergency Departments at ten sites across England. It highlights positive streaming practice, as well as issues that may contribute to poor streaming practice, in order to inform future service improvement.

Methods: A longitudinal qualitative study was conducted with data collected between October 2017 and December 2019 across 10 case study sites throughout England as part of a broader mixed methods study. 186 non-participant observations and 226 semi-structured interviews with 191 health professionals working in Emergency Departments or related General Practitioner Services were thematically analysed in relation to streaming processes and experiences.

Results: Six interconnected themes influencing streaming were identified: implementing and maintaining structural support; developing and supporting streaming personnel; implementing workable and responsive streaming protocols; negotiating primary/secondary care boundaries; developing and maintaining interprofessional relationships and concerns for patient safety. Streaming was considered central to the success of general practitioners in/parallel to Emergency Departments. The importance of the skills of streaming nurses in delivering an optimal and safety critical service was highlighted, as was the skillset of general practitioners and interprofessional relationships between streamers and general practitioners. There was no distinct streaming model or method associated with good streaming practice to general practitioners in/alongside Emergency Departments, instead factors for success were identified and key recommendations suggested. 'Inappropriate' streaming was identified as a problem, where patients streamed to general practitioners in or parallel to Emergency Departments required Emergency Department management, or patients suitable for general practitioner care were kept in the Emergency Department.

Conclusion: Despite adopting differing methods, commonalities across case sites in the delivery of good streaming practice were identified, leading to identification of key recommendations which may inform development of streaming services.

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Tweetable Abstract: Workplace culture and the skillset of streamers and General Practitioners is crucial to streaming of patients to General Practitioners in Emergency Departments
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What is already known

- Emergency Department attendance is increasing internationally and a significant proportion of those who attend Emergency Departments could be managed in general practice.
- In England, and more broadly, policies require such patients attending Emergency Departments be streamed to General Practitioners in or near Emergency Departments
- Evidence for streaming is limited and the processes of streaming patients attending Emergency Departments to general practitioners lacks exploration.

What this paper adds

- Our paper highlights potentially positive streaming practice as well as issues that may negatively affect streaming.
- There was no distinct streaming method associated with positive streaming practice to General Practitioners in Emergency Departments, instead factors for success were identified, and key recommendations drawn, which may be used to inform development of future streaming services.

1. Introduction

Attendance of patients to Emergency Departments continues to increase internationally and this has been identified as putting significant pressure on emergency healthcare systems in countries including the USA, Canada, Australia and the UK (Cooper et al., 2019; Cowling et al., 2014; Yarmohammadian et al., 2017). It is estimated 15-40% of patients who attend Emergency Departments could be managed in general practice (Murphy and Mann, 2015; NHS England, 2013; Thompson et al., 2013) Consequently, initiatives such as various forms of streaming and redirection have been introduced in different countries in order to better manage patient flow and reduce Emergency Department crowding (Yarmohammadian et al., 2017). Similarly, a review of National Health Service (NHS) Urgent and Emergency Care in England (NHS England, 2015) suggested patients be directed to alternative appropriate healthcare providers and the 'Next Steps on the NHS Five Year Forward View' (NHS England, 2017) required hospital Emergency Departments to provide "comprehensive front door streaming by October 2017" (p. 15). Several models of streaming to General Practitioners in or alongside Emergency Departments were developed in response, and a taxonomy of General Practitioner services in or alongside Emergency Departments was described by Cooper et al. (2019). The Royal College of Emergency Medicine (2017) has set out a range of processes which may be involved in initial streaming of patients who attend Emergency Departments (supplementary material: Box 1). Patients suitable for general practice services can be streamed (identification and redirection of low acuity patients according to clinician availability/suitability), triaged (identification of high acuity patients in order for their care to be prioritised), or a combination of both streaming and triage (Cooper et al., 2019). Streaming should be carried out by a trained clinician (NHS England and NHS Improvement, 2017) and is commonly conducted by experienced nurses working in Emergency Departments (NHS Improvement, 2017). It was anticipated that directing patients to general practitioners via Emergency Departments would significantly improve patient flow, reduce Emergency Department crowding and free capacity for the sickest patients (Cooper et al., 2020). NHS England has provided substantial capital funding to develop streaming to General Practitioner services in or alongside Emergency Departments (Gov.UK 2017). However, evidence for streaming is limited (Cooper et al., 2020) and there has been little exploration of the processes involved in streaming patients attending Emergency Departments to general practitioners.

In this paper we explore how streaming to General Practitioners in or alongside Emergency Departments was carried out at ten case study sites across England. Through interviews with health professionals and non-participant observations of streaming, we highlight positive and negative aspects of streaming practice that may be useful in informing evaluation and implementation of future service improvement.

2. Methods

2.1. Design

A longitudinal qualitative study was carried out across 10 case study sites throughout England as part of a broader mixed methods study: General Practitioners and Emergency Departments– Efficient Models of Care (Morton et al., 2018). Ethics approvals were gained from East Midlands – Leicester South Research Ethics Committee (ref:17/EM/0312), the University of Newcastle Ethics Committee (Ref: 14348/2016) and HRA Approval was received (IRAS: 230848 and 218038). Trial registration: ISRCTN51780222. Data consisted of 186 direct non-participant observations and 226 semi-structured interviews with 191 health professionals working in Emergency Departments and/or in General Practitioner services in or alongside Emergency Departments in the 10 study sites (Pseudonyms: Birch, Chestnut, Hawthorn, Juniper, Linden, Nutmeg, Poplar, Redwood, Rowan, Teak). Data were collected across a total of three timepoints (supplementary material 2: Box 2). 124 health care professionals were interviewed at timepoint 1, 20 at timepoint 2 (13 of which also participated at timepoint 1) and 82 at timepoint 3 (24 of which also participated at timepoints 1 and 2). Four case sites participated across all three timepoints, five case sites at timepoint 1 and 3 only, while one case site (Birch) was visited only once due to difficulties accessing follow-up visits.

2.2. Sampling and recruitment

Case study sites were purposively selected for maximum variation according to: duration of General Practitioner services in or alongside Emergency Departments; model of General Practitioner services in or alongside Emergency Departments; deprivation index, Emergency Department volume and geographical location. Health professionals were approached opportunistically by the research team to take part in an interview and/or to have their practice observed during on-site data collection at case study sites. However, the research team regularly reviewed and discussed recruitment whilst conducting data collection to ensure that interviews and observation periods captured a broad range of perspectives from key informants in a mixture of professional roles. For observations, care was also taken to ensure that different parts of

Box 3
Key informant interviews – healthcare professionals.

Role	Number of health care professionals interviewed
Nursing	
Streaming/Triage Nurse (Band 5-8*)	27
Matron	6
Emergency Department /General Practitioner Service Nurse Band 5-8*	16
Emergency Nurse Practitioner	13
Paediatric nurse/practitioner	2
Minor Injuries nurse/practitioner	2
Advanced Nurse Practitioner/Advanced clinical practitioner	5
Nurse Consultant/Nurse manager	3
Primary care nurse specialist/ General Practitioner Service lead nurse	4
Research nurse	5
Health care assistant	2
Medical/Management	
General Practitioner clinical Lead	4
General Practitioner (including locum)	38
Emergency Department clinical Lead/Deputy clinical lead	4
General Practitioner Service Lead consultant	2
Emergency Department consultant	21
Emergency Department junior/middle grade doctor	5
Medical director/associate medical director/ clinical director/ Emergency Department director of operations/ General Practitioner Service Director/Director of operations /Clinical operations manager	6
General Practitioner Service chief executive / General Practitioner Service manager/Operations manager/service manager/flow co-ordinator	12
Administration and Support	
General Practitioner Service receptionist/ Emergency Department receptionist/ward clerk/ porter	9
Other	
Clinical Commissioning group representative/ Paramedic working in General Practitioner Service / Clinical specialist – physiotherapy/Other	5

* In England, NHS Agenda for Change terms and conditions are expressed as 'Bands' with registered nurses starting at Band 5 on qualification. Banding increases with seniority, experience, post graduate qualifications and leadership up to Band 9. Band 6 and above is considered a senior nursing role (Global Nurse Force, 2020)Data Collection

the day/evening and activities (triage, streaming, clinical consultations) were observed. Box 3 lists key informants interviewed. 31 streaming/triage nurses were also observed carrying out streaming/triage processes.

Data collection took place between October 2017 and December 2019). Interviews with healthcare professionals were mainly conducted face-to-face at the hospital case sites, with a small number of interviews (≈10%) conducted by telephone at the request of the participant. Interviews were semi-structured and followed a topic guide, which was developed by the research team and was based on the current literature and specific research aims and objectives of the wider 'General Practitioners and Emergency Departments – Efficient Models of Care' study. Participant information leaflets were provided to all participants and the study rationale was explained. Written consent was obtained from all participants and interviews were audio-recorded. Interviews on average lasted between 20-60 minutes.

Non-participant observation of clinical practice involving healthcare professionals and patients/carers was carried out by the research team at each hospital case site to gain insight into how streaming worked. Observational data were documented in field notes, with observations taking place in up to 2-hour blocks covering different times of the day and evening. However, there was some variation in observation length as it was important to consider issues such as: willingness of clinicians to have their practice observed for extended time periods; what was being observed (as some parts of the streaming process may require more or less observation) and what data were required or had already been collected at each case site. Activities observed included streaming processes, non-clinical and clinical work including clinical consultations, informal interactions and patient flow processes. Researchers spent time shadowing different members of the clinical, managerial and administration team to observe their interactions with patients and colleagues, observing streaming practices and general practitioner actions, informally discussing streaming processes and experiences with participants and seeking clarifications.

2.3. Analysis

Interview data were audio-recorded and then transcribed. These and observational fieldnotes were managed using NVivo Version 12. A broad coding framework (supplementary material 3: Box 4) was developed following familiarisation of the research team with the data. Data were then summarised into case site pen portraits (Sheard and Marsh, 2019) at each time point and compared/contrasted across sites and timepoints. The development of the coding framework was an iterative process that underwent constant refinement by the research team throughout the study's three-year data collection and analysis period. On a practical level, this involved theme development and refinement that comprised both independent thematic analysis by each member of the research team and group discussion at monthly project meetings. One of the broad themes generated by the data was the centrality of streaming to the entire General Practitioner in or alongside Emergency Department process. As a consequence a further, more nuanced, thematic analysis (Braun and Clarke, 2006) was then conducted on these data by HA to draw out themes related to streaming processes and experiences and the relationship between themes. This analysis was discussed, and refinements made, by the qualitative team as part of the monthly project meetings. Anonymity and confidentiality were protected by allocating pseudonyms to case sites and unique identifying numbers to individual participants.

AS, HA, HL, JA and members of the wider research team undertook data collection and/or analysis. As this was a longitudinal study across multiple case sites, while some members of the research team were constant (JA, AS), data collection and analysis involved a variety of researchers at different case sites at different time points. All members of the research team involved in data collection and analysis are experienced qualitative health services researchers. HA is also a registered nurse with experience of working in primary care.

2.4. Patient and public involvement

Ten public contributors with experience of Emergency Department services contributed to design, development and interpretation of the wider study. They supported development of the original application for research funding and contributed to key study materials (e.g. information sheets). As well as attending external steering group meetings, our public contributors participated in workshops where anonymised interview transcripts and pen portraits from two study sites where discussed. Contributors' interpretations of the data were compared to the research team's framework. Their interpretations were in broad agreement with those of the research team and, consequently, achieving consensus was not problematic. Contributors considered streaming to be an important aspect of service delivery. They identified the central role of streaming nurses and raised this as an area to explore in sub-

Table 1
Streaming methods identified at case sites.

Streaming Method	Description	Quotation
'Front door'	Streaming nurse is initial contact with patient. Brief assessment. Often does not involve measuring vital signs or other objective physiological measurement.	*"we have a streaming nurse at the front door who kind of assesses the patient very briefly and decides either UCC [Urgent Care Centre] or ED [Emergency Department]. (Emergency Department Consultant. Chestnut. 024.Interview.T1)*
Navigator	Streaming nurse intercepts suitable patients either before or after triage and redirects to General Practitioner services in or alongside Emergency Departments. May include additional work-up e.g. measuring vital signs, initiating tests, administering analgesia, carrying out preliminary treatment or managing whole episodes of care.	*"So, they've got a broad role which basically allows them the freedom to go and hunt out cases that might be appropriate for that stream. What they also do is they see patients in that stream, as well. So, not only are they acting as a co-ordinator and seeking out patients or even sitting at triage, they will, at other times, actually see those patients within the queue that they have generated" (Emergency Department Consultant.Rowan.014.Interview.T1)* *"the triage nurse has got a sheet and takes observations…*
Triage	Fuller assessment than streaming. Includes vital signs and prioritising of patients dependant on acuity/severity of presentation. Used instead of, or in conjunction with, streaming.	*And they're supposed to check them with a little list they have in the triage room, which says, "These things are suitable for GPs." And then they bring the patient round….So the triage nurse is supposed to check with the GP available." (General Practitioner.Hawthorn.001.Interview.T1)*
'See and treat'	General Practitioner clinicians identify suitable patients either at reception desk or via patient records and manage whole episode of care.	*"the department tried a 'see and treat' model where the GP [General Practitioner] sat in triage" (General Practitioner.Redwood.001.ObservationT1)*

theme analysis. Three of our public contributors participated in the wider study's dissemination event.

3. Results

There was general agreement across case sites that streaming was central to the success of General Practitioner services in or alongside Emergency Departments, *"So it's getting the streaming right at the front door is the most important thing I think." (Emergency Department Consultant.Poplar.008.Interview.T1)*. Six interconnected themes which were considered by staff to support or detract from the success of streaming were identified: implementing and maintaining structural support; developing and supporting streaming personnel; implementing workable and responsive streaming protocols; negotiating primary/secondary care boundaries; developing and maintaining interprofessional relationships and concerns for patient safety. However, case sites used a variety of different streaming methods, or parts/combinations of streaming methods, depending on the requirements of their service/population and staff availability (Table 1) which led to inconsistency between sites. Indeed, at some sites staff were themselves unclear whether they were carrying out streaming or triage, *"Streaming, they call it, but it's triage, because they do a full set of obs and a history" (Primary Care EmergencyDepartment Lead.Nutmeg.003.Interview.T1).* Similarly, models of General Practitioner services in or alongside Emergency Departments more broadly were widely variable between case sites (Table 2). They varied in the service options open to streamers and the times these options were available. All sites streamed to Emergency Department/General Practitioner services in or alongside Emergency Departments, while two could also access wider specialities such as obstetrics and gynaecology or ophthalmology, as well as redirection to community pharmacies or the patient's own general practitioner. A minority (n=3) also streamed to off-site General Practitioner Hubs.

All case sites identified inappropriate streaming as a problem to a greater or lesser extent. Inappropriate streaming was perceived by health professionals to be:

- sending patients with more serious or acute presentations to General Practitioner services when they actually required Emergency Department management, or
- streaming patients suitable for General Practitioner services to the Emergency Department, leaving General Practitioner services underused and the Emergency Department overburdened.

Consequently, 'positive streaming practice' was perceived to be when staff judged patients were appropriately and safely directed to services, when services were utilised efficiently and correctly, and staff felt their workload was manageable. The key themes that we identified as influencing perceived positive streaming practice will be explored in turn.

3.1. Implementing and maintaining structural support

The impact of streaming was variable and dependent on the structure and organisation at case sites. Buy-in from streaming staff, and at a wider organisational level, was considered an essential part of the success of General Practitioner services in or alongside Emergency Departments. Sometimes managers thought there was staff buy-in, but staff 'on the ground' felt differently. Case sites that considered themselves to implement good streaming practice had planned carefully, involved professional groups in the development and implementation of streaming and provided training, ongoing support and regular supervision. A minority of sites had formal audit procedures specifically related to streaming. Audit and support for streamers in general was linked with improved patient experience and ensuring safety.

> *We discussed the streaming criteria, and she highlighted that these are discussed and revised on a monthly basis, and that inappropriate referral cases are evaluated in depth at monthly clinical governance meetings. This was seen as a way to manage the risks associated with streaming and to maintain high levels of patient care and safety.* (Observation of Band 6 Streaming Nurse.Linden.001.Observation.T1)

In contrast, at case sites where there was less planning and formal organisation, for example where there was a perceived lack of formal service preparation, absent or inconsistent streaming protocol development, lack of training or education around streaming or lack of formal supervision and support, staff felt the streaming process did not work well. *"I think it doesn't flow as well - there wasn't much research or due diligence behind it, I thought" (Emergency Nurse Practitioner.Rowan.020. Interview.T1)* Assuming that nurses

Table 2
General practitioner in/alongside emergency department model by case site.

Site	General practitioner services in or alongside emergency department model	Streaming model	Routine vital signs	General practitioner role
Birch	*Inside Emergency Department: Parallel*	*Triage*	*Yes (at triage)*	*Additional Role (investigations)*
Chestnut	*Inside Emergency Department: Parallel + Outside Emergency Department: Offsite Hub*	*'front door'*	*Yes*	*Usual Primary Care Role*
Hawthorn	*Inside Emergency Department: Parallel (Out of Hours only)*	*Triage*	*Yes (at triage)*	*Usual Primary Care Role*
Juniper	*Outside Emergency Department: General Practitioner services on hospital site (out of hours only) Inside Emergency Department: Hybrid* General Practitioner/ Emergency Department clinician role* **At this site General Practitioners can either work in usual primary care role or can adapt a dual role where they become involved in managing patients with major health issues or requiring intermediate/ambulatory care*	*'front door' (limited)*	*No (children only)*	*Dual Model:* • *Usual Primary Care Role* • *Emergency Department Additional Role/Emergency Department duties (Hybrid General Practitioner/Emergency Department clinician role in Emergency Department)*
Linden	*Outside Emergency Department: hospital site + off-site hub*	*'front door'*	*No*	*Usual Primary Care Role*
Nutmeg	*Inside Emergency Department: Parallel*	*'front door'*	*Yes*	*Usual Primary Care Role*
Poplar	*Outside Emergency Department: hospital site*	*Navigator/interceptor*	*No*	*Additional Role (investigations)*
Redwood	*Inside Emergency Department: Parallel*	• *Previous: 'see & treat'* • *Current: Triage* • *In development: Navigator*	*No*	*Additional Role (investigations)*
Rowan	*Inside Emergency Department: Parallel*	*Triage + navigator*	*No*	*Usual Primary Care Role*
Teak	*Inside Emergency Department: Parallel + Outside Emergency Department: Off-site hub*	*'front door'*	*Yes*	*Additional Role (investigations, increased acuity)*

trained in triage should have skills transferrable to streaming also appeared to hinder the utility of General Practitioner services in or alongside Emergency Departments.

> *there's a few issues as to why streaming's not happening. I think the main one being really that the streaming nurses have had no training or education and so they don't really know what to send to us.* (General Practitioner.Poplar.009.Interview.T2)

Consequently, implementing and maintaining structural support, for example, by involving streaming clinicians and wider team members in service design, identifying their educational needs and enabling ongoing support, directly impacts on the development and support available to streaming personnel in performing their role. This was considered by team members to play an active role in influencing good streaming practice.

3.2. Developing and supporting streaming personnel

With the exception of one case site (Juniper) where General Practitioners were involved in streaming patients, streamers across case sites were registered nurses. The calibre, experience and knowledge of streamers was considered vital to ensuring appropriate and safe streaming. Of the case sites with streaming, the majority (n=6/8) used nurses of Band 6 or above to stream, with experienced Band 7 nurses considered the most competent and confident. As well as clinical knowledge, good streaming practices were also considered to be related to characteristics of individual streamers and it was a common theme that streamers varied in their tolerance to risk and ambiguity which affected their streaming decisions.

> *Different streaming nurses have different thresholds of risk and will stream patients differently despite standardised protocols. More senior staff seem confident streaming patients who might be more ambiguous in terms of diagnosis or pushing the boundaries of the streaming protocol.* (Linden.S.001.Observation.T1)

Consequently, streaming was not attractive to some senior nurses and some sites lacked appropriately experienced nurses. Several nurses expressed their dislike for streaming, describing it as relentless, stressful and a waste of experienced nurses' skills by diverting them from 'proper' Emergency Department work. It was clear that streaming was seen as a highly responsible position which was physically and mentally exacting due to the volume of patients and the need to make accurate, safe decisions quickly. Some staff displayed signs of stress and burnout, which manifested as negative behaviour towards patients. Some case sites attempted to mitigate this by rotating streaming staff regularly, but this was limited by the number of suitably experienced streaming staff.

> *Nurses-wise, yes. Not many people apply for the jobs because I think a lot of people think it's just triage. You're just working as a triage nurse. So, nobody in their right mind would want to do triage for 12 hours of a day, and, potentially, you wouldn't necessarily be able to rotate with anyone because there's only one of you that's doing it.* (Emergency/Primary Care Nurse Practitioner.Rowan.008.Interview.T1)

Streaming nurses were often expected to take on extra responsibilities as senior nurses and faced competing demands on their time. Because they were often based at the 'front door' of the Emergency Department, for example at reception, they were expected to 'keep the waiting room safe' by observing patients for signs of deterioration or administering pain relief. They were also often expected to carry out additional co-ordination and administrative duties, as well as answering general queries from patients, which limited their ability to focus on streaming. While the wider Emergency Department/General Practitioner team valued this con-

tribution and saw it as a safety critical part of the role, streaming nurses sometimes felt that that it reduced streaming effectiveness.

> *The streaming nurse tells me that she feels she fails at streaming all the time under the current circumstances because she is being drawn in all directions.* (Poplar.S.001.Observation.T1)

Ultimately, while some nurses enjoyed or were happy to undertake streaming and were confident in their abilities, it remained that streaming was considered to be a demanding and often stressful role which was sometimes considered unsustainable in the longer term without additional support. In order to support streamers in their decision-making, at some case sites streaming protocols had been put in place. However, like much of the structural implementation of streaming across case sites, this was inconsistent. Furthermore, utilisation of streaming protocols varied between individual streamers.

3.3. Implementing workable and responsive streaming protocols

Five case sites had streaming protocols in place. Protocols ranged from detailed instructions/criteria for streamers to a *"list of things the [general practitioner] won't see"* (Emergency Department General Practitioner Lead.Rowan.003.Observation.T1). Staff were sometimes unclear whether protocols were in place. Sites without protocols left streaming decisions to the streamer's clinical experience. However, lack of protocols was thought to limit the consistency of streaming.

> *There isn't [a protocol] and that's something that needs working on and needs constructing because then that just allows a bit more efficient targeting of who can and can't go there. It makes it a bit less ad hoc in terms of who goes there* (Band 7 Emergency Department Nurse.Birch.008.Interview.T1)

Adherence to protocols varied across sites and between streamers, with some considering that strict adherence improved the appropriateness and safety of streaming. Conversely, others felt streaming worked more successfully when streamers used critical thinking and clinical judgement to inform their decisions. This was potentially why senior nurses were considered the most appropriate streamers, *"it's rarely is a black and white issue, so the clinically informed assessment is needed." (Navigator/Streaming Nurse.Redwood.004.Observation.T1).* Therefore, while streaming protocols provided assurance in terms of clinical governance, it was also necessary to allow room for discretion in streamer's clinical decision-making.

However, it was not only streamers, but general practitioners, who were seen to variably adhere to protocols, or in some instances general practitioners followed a separate set of protocols which did not match those of streamers, resulting in patients being returned to the Emergency Department.

> *We do still have issues. Because the GPs [general practitioners] will bounce them back, and you have to try and explain that you followed the protocols that are set out by the lead in the urgent care centre.* (Band 6 ED Streaming Nurse.Chestnut.021.Interview.T1)

To counter this, individual streamers would sometimes circumvent streaming protocols, for example by providing limited information to General Practitioners when it was thought General Practitioners might reject the patients streamed to them, *"more information would mean that the GP* [*General Practitioner] manager is less likely to accept the patient" (Band 6 Emergency Department Streaming Nurse.Linden.006.Observation.T1).* This has implications for patient safety as General Practitioners relied on this information to help them determine patient suitability. Such disparate views were also a potential source of tension between primary and secondary care practitioners. This exposed inconsistencies between individual clinicians, which protocols in themselves did not appear to fully rectify, as well as a lack of shared understanding of primary and secondary care boundaries.

3.4. Negotiating primary/secondary care boundaries

Notwithstanding the availability of protocols, a common theme across case sites was variability between streamers.

> *streaming is definitely variable between different individuals. I mean I sort of make a point of seeing who's streaming in the morning*
> (Band 7 Emergency Nurse Practitioner.Poplar.007.Interview.T1)

Similarly, all case sites reported a variation between individual General Practitioners in terms of the sort of patients they were prepared to see. This limited the usefulness of streaming, and of streaming protocols, as some General Practitioners returned patients back to the Emergency Department, while others were happy to accept a broader range. This caused streamers to be unsure which patients to refer to General Practitioner services in or alongside Emergency Departments: *"the number of patients sent back to the Emergency Department varies depending on which General Practitioners are working in the Urgent Care Centre" (Emergency Department Senior Nurse.Chestnut.019.Observation.T1).*

The experience and quality of general practitioners was considered central to the streaming process. Streaming was considered to work best when general practitioners were comfortable seeing a wide range of presentations and were perceived to work hard in terms of taking on a significant workload. General practitioners who were flexible in their approach and actively sought out suitable patients were viewed as a positive asset.

> *We've got one GP [general practitioner] that we work with who's amazing. He will pull, he will filter, he will be like, "Just come to me, just come to me." But then others tend to be quite sedentary, sort of, working alone and we don't even know if there's a GP [general practitioner] on or not.*
> (Emergency Nurse Practitioner.Birch.003.Interview.T1)

For their part, streamers were often unaware of the scope of general practice and the range of knowledge of general practitioners. This led to fewer patients being streamed to General Practitioner services in or alongside Emergency Departments as streamers did not feel confident general practitioners could deal with more complex issues. There were also conflicting views on what presentations were considered appropriate for general practitioners. For example, streamers felt that general practitioners should be willing to carry out 'minors' procedures such as removing sutures, which general practitioners felt were inappropriate for their role and experience. General practitioners at some case sites had little understanding of how streaming/triage worked and how decisions were made about which patients they were expected to see, *'I don't actually know how it works at the moment' (General Practitioner.Hawthorn.018.Interview.T1).* Negotiating these interconnected tensions at the edges of primary/secondary care boundaries appeared to impact on inter-professional relationships.

3.5. Developing and maintaining inter-professional relationships

Collaborative working was central to good streaming processes, but this was sometimes difficult to achieve. Streamers and general practitioner colleagues worked together with varying levels of integration. Even at case sites which purported to be integrated, there appeared to be differences between the workplace cultures of the Emergency Department and general practitioners which meant

that despite physical integration, streamers often viewed general practitioners as lacking collegiality.

> *The GP [general practitioner] will, sort of, arrive, go straight into their room and then stay in the room unless you call them out for huddle or something like that, whereas A&E nurses and all of our doctors are all quite social, we're a team, we're really visible to each other … We need to just try and find a way to integrate them more into our team, which we're trying to do with huddles. But then if it's not the same person every time, it's really difficult.* (Band 6 Emergency Department Nurse.Nutmeg.015.Interview.T1)

Accurate streaming was dependent to a large extent on communication and the trust and confidence streamers had in General Practitioners. Streamers were comfortable streaming to General Practitioners they knew and trusted but were less trusting of locum General Practitioners and those with whom they had not developed a good working relationship. However, most case sites (n=8) reported gaps in General Practitioner rotas which meant that shifts were unfilled or covered by locum General Practitioners. Equally, it was important that General Practitioners trusted and had confidence in streamers' abilities to stream patients appropriately and safely.

> *I certainly notice a huge difference when she's on, because she's keeping an eye on what's actually being sent to us. Because she's worked quite closely with us over the last few years, she has quite a good idea about what we'd see* (General Practitioner.Rowan.Interview.003.T1)

However, there were clear tensions between General Practice clinicians and streamers, and this was referred to by respondents at all sites. This mainly centred on a perception of General Practitioners 'picking and choosing' which patients they saw and nurses streaming patients inappropriately or behaving in a way that General Practitioners felt was antagonistic.

> *We're not their handmaidens. You know?.... I just know that some nights you go round and….You get a 'no'…. that then basically sets up processing your own head about 'well, I'm going to have to be more selective today about who can go and who can't. Because I've got an awkward GP [General Practitioner]'.* (Band 5 Triage Nurse. Hawthorn.018.Interview.T1)

> *Sometimes they're just bloody minded……I think it was one of the going-off nurses asked me about one of the patients that was in the list. I said, 'Actually, I think that patient needs to go to [assessment unit].' I took a set of notes and then realised that this patient was still- she had done nothing. She'd just left the patient.* (General Practitioner.Teak.S.026.Interview.T1)

Inter-professional tensions appeared to increase when either or both departments were busy. Emergency Department crowding was considered to influence streaming in two ways. When the Emergency Department was busy, there was perceived to be a greater risk of patients with Emergency Department-type presentations being streamed to the General Practitioner service to ease Emergency Department workload. When General Practitioner services in or alongside Emergency Departments were busy, the service would send patients that streamers had considered appropriate back to the Emergency Department or would close early, resulting in the Emergency Department seeing patients suitable for general practitioner care, *"but now we're getting more and more and more exclusions. We're getting busier and busier and busier and we're getting more and more exclusions (Band 7 Emergency Nurse Practitioner/ Streamer.Linden.002.Interview.T1).* Often both departments were busy at the same time which increased tensions further. In response, some sites had developed plans to manage patient flow across both departments when one part was excessively busy.

3.6. Concerns for patient safety

Patient safety was a theme which ran through much of the data and across case sites and was intertwined with, and impacted by, the previous themes. Most case sites identified problems with computer and information technology systems, mainly because they did not link up or communicate. General Practitioner services in or alongside Emergency Departments often did not have access to the Emergency Department records, did not have access to the general practice records or both, *"The [General Practitioner Service IT system] is the same as the hospital system - GPs cannot access patients' primary care record. She highlighted to me the stress of juggling patient demand and managing the two systems." (General Practitioner reception manager.Chestnut.004.Observations.T1).* This slowed the system and caused safety concerns as staff were required to ask patients information which would be readily available in other records.

At some case sites, the physical environment limited streaming in that patients were thought to be uncomfortable divulging personal information in the midst of a busy Emergency Department or at the reception desk. *"There's not very much you can ask at a front desk because of the nature and the confidentiality" (Advanced Nurse Practitioner.Redwood.002.Interview.T1).* The safety of patients in isolated streaming areas was also a concern given the distance between where streaming takes place in Emergency Departments and where some General Practitioner services were situated. Some streamers also felt physically and psychologically vulnerable due to the physical location of the streaming desk and perceived lack of managerial support.

Concerns about patient safety in relation to streaming played a significant role in the confidence of streamers to direct patients to General Practitioner services in or alongside Emergency Departments, and they saw this as a heavy responsibility; *'She highlighted the responsibility associated with streaming, stating, "it's my registration on the line".' (Band 6 Streaming Nurse.Linden.001.Observation.T1).* This was influenced by perceptions of whether they would be supported by the wider team, the organisation, and their profession more broadly. Streamers were concerned about patients' complaints and litigation if they made a mistake. This affected their clinical decision-making and willingness to stream to General Practitioner services in or alongside Emergency Departments.

> *at the end of the day, if we make that decision that the patient goes to a different facility, be it the GP [General Practitioner], or something else and something happens to the patient, you know, are we going to be supported as a nursing team?* (Band 6 Emergency Department Nurse.Juniper.008.Interview.T1)

It was considered important that there were clear clinical pathways to return deteriorating, or inappropriately streamed, patients back to the Emergency Department when necessary. While most case sites had such policies in place, the realities were sometimes more difficult.

> *we even had a case the other day where a patient was in our department with abdominal pain and her observations looked like she had some form of sepsis, from abdominal origin. So we said, 'Okay, sorry. You've been sent here. We need to take you back to [Emergency Department].' They were all set up to receive her, with drugs and IV fluids, but in the time it took the patient to walk back to [Emergency Department], because she was still able to mobilise independently, she decided to get in a car and go to a different hospital cos she was so annoyed about being switched from one*

department to another. (Paramedic working in Urgent Care Centre.Chestnut.022.Interview.T1)

Streaming was often a very quick process of 'eyeballing the patient' and coming to a speedy decision, with 5/10 case sites not measuring vital signs on initial assessment. This process concerned streamers as it left them little time to make an assessment, while lack of objective assessment made streaming more difficult, and in some cases was felt to be unsafe.

Inappropriate streaming was also sometimes blamed on the history given by the patient, *"Sometimes, when you get to them, the patients don't always tell you what you need to know…and that's when we end up referring them back to the Emergency department." (General Practitioner.Rowan.003.Interview.T1).* Streaming was considered more difficult if there was a language barrier between clinician and patient. Patients were sometimes thought to find streaming confusing or were frustrated at repeating information several times to different members of staff. *"[clerk] said patients can also get frustrated having to explain their symptoms multiple times to different members of staff. (Receptionist Chestnut.002.Observation.T1).* Both staff and patients were generally resistant to referral to offsite locations. For staff, safety was the biggest concern, with it considered more appropriate for patients to be seen 'in-house'. Consequently, the safety concerns outlined inhibited some clinicians from referring to General Practitioners in or alongside Emergency Departments.

The themes generated from the data indicate that streaming patients to General Practitioners in or alongside Emergency Departments in a way in which healthcare professionals consider to be safe and appropriate requires integration of a number of complex and interconnected factors. It is clear that while case sites had worked to model their streaming services to respond to local need and workforce issues, inconsistencies in streaming practices, both within and between sites, worked to inhibit streaming to General Practitioners in and alongside Emergency Departments.

4. Discussion

Streaming was seen as vital to the success of General Practitioner services in or alongside Emergency Departments. Key factors supporting streaming were identified across sites and are summarised in Table 3. Several factors are integral to any service design, for example, engaging staff in service planning and organisation, visible leadership, addressing training needs and regular audit and evaluation (Dixon-woods et al., 2012). Practical issues such as functioning, joined up IT systems were also considered important, both in this study and more widely (Scantlebury et al., 2017). However, at several case sites fundamental requirements had been overlooked, reflecting other health service delivery initiatives (Dixon-woods et al., 2012). Addressing these issues are central to the implementation of good streaming practice.

Despite flagship models of General Practitioner services in or alongside Emergency Departments and streaming being promoted at a national level, case sites found these problematic and instead developed streaming in response to the availability and skills of staff and centred on the perceived requirements of the local population. Streaming/triage processes were based on established working practices at each site, rather than reflecting national and professional definitions of streaming such as those identified by the Royal College of Emergency Medicine (2017). Both staff and researchers (who are experienced researchers in health service settings) were often unsure what form of streaming or triage was being used.

Experience and seniority of the nurse was considered fundamental to safe and appropriate streaming and is consistent with previous research (Albard et al., 2017; Cooper et al., 2019; van Gils-van Rooij, 2018). Streaming is a safety-critical role which requires a high level of critical thinking and decision-making, clinical knowledge and skill, and tolerance of clinical risk and uncertainty. Alam et al. (2017) suggest that greatest clinical uncertainty occurs in managing primary care patients due to the range of undifferentiated symptoms. As a consequence, streamers are required to have a broad range of clinical knowledge and the ability to manage risk appropriately. Our study found a lack of experienced and suitably qualified nurses with streamers feeling stressed and unsupported. Clinical uncertainty can provoke stress and anxiety and hinder decision-making, which may negatively impact patients and the wider healthcare system (Alam et al., 2017). Tolerance of clinical uncertainty is generally conceptualised at an individual level and seen as a character trait. However, it is increasingly understood that individuals' responses to uncertainty may be context specific and greater focus on education and support around risk tolerance could have a positive effect on clinicians, patient care and the wider healthcare system (Hillen, 2017).

Linked to risk tolerance, differences between streaming decisions of Emergency Department nurses and their medical colleagues have been identified, with Emergency Department nurses streaming more patients to the Emergency Department, rather than to their General Practitioner colleagues. This is attributed to different training and experience of Emergency Department nurses, their reliance on competency frameworks and perceived lack of support for nurses to deviate from guidelines (Harris and McDonald, 2013). Our study highlights it is also good streaming practice to allow flexibility around streamers' clinical decision-making and it is important to develop strategies to support streaming clinicians in a consistent and sustainable way.

Variation between the skills, confidence and abilities of General Practitioners influences the success of streaming. The role and characteristics of General Practitioners differed not only between case sites, but between individual clinicians with General Practitioners differing in willingness to manage patients presenting with different conditions. These left streamers unclear which patients different General Practitioners would accept. This is consistent with a previous study of primary care services co-located in Emergency Departments which found variation between individual General Practitioners limited patients referred to General Practitioner services in or alongside Emergency Departments and the confidence streamers had in General Practitioners (Ablard et al., 2017). Consequently, in our study, streamers considered it important to standardise General Practitioner practice. However, to a certain extent, individual variation in both General Practitioners and streamers is expected, and our study found that General Practitioner services in or alongside Emergency Departments were reliant on locum and part time General Practitioners who differed in experience and scope of practice, so standardisation was problematic. This reflects challenges to healthcare implementation more broadly, where lack of sustained resource inhibits effectiveness (Dixon-Woods et al., 2012). Service design should prioritise attracting and retaining a stable General Practitioner workforce through a supportive working environment (Edwards et al., 2020).

The 'appropriateness' of patients streamed to General Practitioner services in or alongside Emergency Departments was a contested issue and there was little shared understanding of which patients were suitable to be directed there, with streamers often lacking understanding of general practice. There was also cultural dissonance between streamers who followed collaborative working practices of Emergency Departments and secondary care, which contrasted with General Practitioners who worked more autonomously. Consequently, Emergency Department staff expected General Practitioners to assimilate into established Emergency Department ways of working. This resulted in tensions between pri-

Table 3
Factors supporting streaming.

Themes					
Implementing and maintaining structural support	Developing and supporting streaming personnel	Implementing workable and responsive streaming protocols	Negotiating primary/secondary care boundaries	Developing and maintaining inter-professional relationships	Concerns for patient safety
Engagement/buy-in from staff.	Seniority of streaming Nurses (≥ Band 6, preferably experienced Band 7s or above).	Involvement of relevant clinicians in development and regular review of protocols.	Consistency in knowledge and skills of both streamers and General Practitioners.	Cultural integration: Different cultures/behaviours of primary care and Emergency Department colleagues mean that physical integration does not necessarily equate to cultural/deeper integration.	Easy to use and joined up computer and information technology systems between Emergency Departments, General Practitioner services in or alongside Emergency Departments and wider primary care
Organisation and planning of streaming processes.	High level of clinical experience, knowledge and skill of streaming nurses including streamer's wider knowledge of primary care.	Clear protocols effectively communicated to relevant clinicians, especially streamers and General Practitioners.	Shared understanding of protocols and awareness of primary care practitioners' /general practitioners' skills and level/scope of practice.	Shared understanding of goals mitigates tensions between streamers and General Practitioners working in or alongside Emergency Departments.	Impact of physical environment e.g. privacy at streaming desk, safety of both staff and patients in isolated or exposed streaming areas, and for General Practitioners located away from Emergency Department and off-site Hubs
Involvement of key stakeholder groups.	High level critical thinking and clinical decision-making.	Streaming requires a level of critical thinking and clinical decision-making which may include deviation from strict protocol adherence based on streaming nurses' clinical judgement.	Highly experienced and clinically knowledgeable General Practitioners who are willing to adapt and take on a broader view of General Practitioner work.	Trust in colleagues is paramount – Streamers' trust in General Practitioners' capabilities and their support of streamers, and General Practitioners' trust in streamers' competence and accuracy.	Clear pathways for managing deteriorating patients in place for returning inappropriately streamed patients back to the Emergency Department and ensuring they function in practice.
Visible clinical leadership in streaming roles.	Streamers' tolerance to risk and management of clinical uncertainty.				Address staff concerns about short clinical assessment (including vital signs) to support streaming staff in their decision-making.
Regular supervision and leaders working with streamers.	Requires adequate number of suitably experienced nurses available to provide streaming.				Consider ways of making the streaming process clearer/easier for patients to navigate, to reduce repetition in the process to reduce patient frustration.
Specific training in streaming.	Streaming is a challenging/stressful role and is not attractive to some nurses due to overloading streamers with additional responsibilities and nurses' dislike of streaming, leading to burnout.				
Regular audit and feedback to and from streamers and General Practitioners.	Visible organisational and professional support for streamers in making streaming decisions e.g., support from medical colleagues, management, nursing profession.				
	Streamers need to feel supported if they experience complaints, litigation or professional registration issues. Need to address streamers' concerns around these factors.				

Table 4
Key recommendations and implications for future practice.

Key recommendations and implications for future practice					
Implementing and maintaining structural support	Developing and supporting streaming personnel	Implementing workable and responsive streaming protocols	Negotiating primary/secondary care boundaries	Developing and maintaining inter-professional relationships	Concerns for patient safety
Streaming services planned and organised with involvement and buy-in from key stakeholders including streaming nurses and GPs.	Streaming carried out by senior nurses/clinicians (≥ Band 6)	Involvement of stakeholder clinicians (including streamers and GPs) in development and regular review of protocols.	Strategies to develop: • consistency in knowledge and skills of both streamers and GPs in order to stream patients appropriately. • shared understanding of streaming/GPED protocols, awareness of primary care practitioner's/general practitioners' skills and level/scope of practice	Awareness of different cultures/ behaviours of primary care and ED colleagues and acknowledgement that physical integration does not equate to cultural integration.	Development/procurement of joined up IT systems between departments and primary care.
Support for streamers including specific streaming training, regular supervision, audit and feedback.	Retention strategies to support streaming nurses and to futureproof streaming by training and retaining adequate numbers of suitably experienced nurses.	Communication of protocols to all relevant practitioners.	Recruitment of general practitioners should ideally focus on of highly experienced and clinically knowledgeable GPs who are willing to adapt their practice take on a broader view of 'general practice' work	Consider strategies to develop cohesion, trust, communication and shared understanding of goals to mitigate against tensions between streamers and GPED.	Consider impact of physical environment e.g. privacy/safety of both staff and patients when planning services
	Support from professional colleagues and management through: • strategies to mitigate against burnout • preventing overload from additional responsibilities • positively promote and support streaming roles to make them attractive to nurses. E.g. rotation of streamers to other areas, building streaming into wider ED roles, developing roles where streamers are involved in management of patients and enabling nurses to have ownership and influence over streaming roles.	Support for streamers to deviate from protocols based on clinical judgment while considering strategies to mitigate against inappropriate deviation		Consistency of general practitioner workforce e.g. less reliance on locum GPs and ensuring GPED shifts are covered consistently.	Develop and implement functioning pathways for managing deteriorating patients or returning inappropriately streamed patients back to the emergency department.
	Provision of guidance and support for streaming nurses experiencing complaints processes/litigation /professional registration issues.				Develop systems to address staff concerns about safety issues.
					Consider ways of making streaming process clearer/easier for patients to navigate.

mary/secondary care colleagues, who 'protected' their own working environment at the expense of other parts of the department. Poor working relationships have been identified as a barrier to streaming (Ablard et al., 2017; Edwards et al., 2020). However, while it has previously been suggested that co-location would enhance positive working relationships (Ablard et al., 2017)], we identified that co-location or integration of General Practitioner services within Emergency Departments per se does not address cultural issues nor enhance collaborative working. Conflicting organisational cultures and professional tribalism inhibit healthcare improvement initiatives (Dixon-Woods et al., 2012). Therefore, strategies to address these issues should be formally contemplated during service design and development, as well as training and education.

Safety concerns were shared across case sites, with patient safety seen as integral to the streaming process (Royal College of Emergency Medicine, 2017). However, the concerns identified here reflect a paucity of high-quality evidence relating to the safety of streaming to General Practitioner services in or alongside Emergency Departments (Cooper et al., 2020). For clinicians to be reassured, strategies are required to address the concerns of staff and further research is required to indicate whether, and in what ways, streaming can be safely implemented.

By identifying and drawing together interconnected themes and key factors associated with optimising streaming to General Practitioners in or alongside Emergency Departments, key recommendations and implications for future practice have been developed and are set out in Table 4.

4.1. Strengths and limitations

Findings were generated from a large qualitative data set consisting of interviews and observations with a range of clinicians that represented 10 case sites in England. This allowed a rich understanding of the complexity of streaming to General Practitioners in/alongside Emergency Departments in this context. While applicability across contexts is not claimed, findings are reflected in the growing literature relating to General Practitioner services in/alongside Emergency Departments and may resonate with other workplaces and clinicians. Key issues identified in this study are reflected in healthcare implementation initiatives more broadly (Dixon-Woods et al., 2012). Factors affecting streaming were largely self-reported in interviews. This may result in attitudinal fallacy, where reports of behaviours in interviews may be inconsistent with realities of practice (Jerolmack and Khan, 2014). However, this was countered by observations of streaming practices and interviewing and observing a range of clinicians which provided a more rounded analysis.

5. Conclusion

This study suggests that there is no clear typology of streaming method associated with safety of streaming and optimal streaming practice to General Practitioners in/alongside Emergency Departments. Instead, individual Trusts and Emergency Departments have developed localised responses to population needs, workforce availability and skillset. The complexity of streaming is highlighted. In particular the role of streamers in delivering good streaming practice and a safety critical service is clear, while the skillset of General Practitioners and the importance of inter-professional relationships between streamers and General Practitioners are evident. Key themes and factors influencing streaming practice have been identified across case sites which, while adopting differing methods, have commonalities which can be used as a foundation to build positive streaming practices.

Conflict of Interest

One author (JB) is seconded part-time to the post of interim Chief Medical Officer at NHS Digital. All other authors declare no conflict of interest.

CRediT authorship contribution statement

Helen Anderson: Writing - original draft, Resources, Data curation, Formal analysis, Investigation, Visualization. **Arabella Scantlebury:** Writing - review & editing, Investigation, Formal analysis, Resources. **Heather Leggett:** Writing - review & editing, Investigation, Formal analysis, Resources. **Heather Brant:** Writing - review & editing, Project administration. **Chris Salisbury:** Writing - review & editing, Conceptualization, Methodology, Supervision, Project administration, Funding acquisition. **Jonathan Benger:** Writing - review & editing, Conceptualization, Methodology, Supervision, Project administration, Funding acquisition. **Joy Adamson:** Writing - review & editing, Conceptualization, Methodology, Supervision, Project administration, Funding acquisition.

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Supplementary materials

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