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**A QUALITATIVE STUDY OF SYSTEMIC INFLUENCES ON
PARAMEDIC DECISION MAKING: CARE TRANSITIONS AND PATIENT SAFETY**

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ABSTRACT

Objectives: Paramedics routinely make critical decisions about the most appropriate care to deliver in a complex system characterised by significant variation in patient case-mix, care pathways and linked service providers. There has been little research carried out in the ambulance service setting to identify areas of risk associated with decisions about patient care. The aim of this study was to explore system influences on decision making by paramedics around care transitions to identify potential risk factors.

Methods: An exploratory multi-method qualitative study was conducted in three Ambulance Service Trusts, focusing on decision making by paramedic and specialist paramedic staff. Researchers observed 57 staff across 34 shifts, 10 staff completed digital diaries and three focus groups were conducted with 21 staff.

Results: Nine types of decision were identified, ranging from ED conveyance and specialist emergency pathways to non-conveyance. Seven overarching system influences and risk factors potentially influencing decision making were identified: demand; performance priorities; access to care options; risk tolerance; training and development; communication and feedback; and resources.

Conclusions: Use of multiple methods provided a consistent picture of key system influences and potential risk factors. The study highlights the increased complexity of paramedic decisions and multi-level system influences that may exacerbate risk. The findings have implications at the level of individual Ambulance Service Trusts (e.g. ensuring an appropriately skilled workforce to manage diverse patient needs and

reduce ED conveyance) and at the wider prehospital emergency care system level (e.g. ensuring access to appropriate patient care options as alternatives to ED).

Keywords: Paramedic, decision making, patient safety, system risk factors

INTRODUCTION

The delivery of prehospital emergency care within the UK National Health Service (NHS) embodies challenges for risk management and patient safety. Reviews of relevant patient safety research have identified a limited range of studies in the prehospital emergency care setting^{1,2} and recommend further research to develop our understanding of threats to patient safety¹. The need to understand what influences decisions about patient care and areas of potential risk has been identified as a priority for future research in prehospital urgent and emergency care³. A Canadian study exploring emergency medical and health providers' perceptions of key issues in prehospital patient safety raised concerns about system influences on decision making' including the increased complexity of clinical decisions encountered and constraints on staff skills⁴. Both of these are pertinent in the UK context.

Paramedics routinely make critical decisions about patient care in a complex environment characterised by significant variation in patient case-mix, care pathways and linked service providers. Decisions at key transition entail considering a range of options, including conveyance to hospital, either the Emergency Department (ED) or specialist centres (stroke, cardiac and trauma), referral to other services or discharge at scene. Where patients have critical or life-threatening conditions, transport to hospital is the most appropriate decision⁵. However, it is estimated that only around

10% of 999 patients have a life-threatening condition, prompting greater efforts in recent years to provide alternative care options appropriate to the majority of patients⁶. Not transporting patients to the ED requires paramedics to make clinical decisions in a system where ED has traditionally been the default option. Safety related concerns have been raised about non-conveyance decisions, for example, one study found high rates of subsequent emergency healthcare contacts and an increased risk of death and hospitalisation for older people left at home following a fall⁷.

Although ambulance services have policies and protocols to guide staff in making appropriate decisions, in reality decisions not to convey patients to ED are often more complex than the scope of protocols and paramedics are reliant on their own professional judgment to interpret ambiguous situations⁸. Non-conveyance decisions often involve negotiation between paramedics and patients, highlighting non-clinical considerations and the issue of patient choice⁸. A study examining the complexity of decision making for assessment and referral of older people who have fallen identified a predominance of informal decision-making⁹. The authors concluded that further research is needed to look at how new care pathways offering an alternative to the ED may influence decisions.

Ambulance services are making increasing use of specialist paramedic roles, including, emergency care practitioner (ECP), paramedic practitioner (PP), community paramedic (CP), and critical care paramedic (CCP), equipped with the enhanced knowledge and skills needed to make more complex decisions about patient care. The available evidence indicates that specialist roles have reduced conveyance to ED and increased discharge at scene, thus reducing the costs associated with ambulance journeys, ED

attendances and hospital admissions^{10,11}. However, one of these reviews also concluded that there is a lack of rigorous evidence on the appropriateness of decisions and the safety of patients¹¹. The need for a better understanding of influences on the safety of paramedic decision making and potential risk factors (threats) is particularly important in the context of plans to develop emergency ambulances into mobile urgent treatment services capable of dealing with more people at scene⁵, to ensure that such developments do not increase the risk for patients. The aim of our study was to explore system-wide influences on decision making by paramedics, focussing on care transitions and potential risk factors. This encompasses multi-level system influences at the macro-level (prehospital emergency care system); meso-level (Ambulance Service Trust) and the micro-level (local areas/stations).

METHOD

A multi-method qualitative study was conducted in three Ambulance Service Trusts in England, representing a variety of contextual factors in the prehospital emergency care system (e.g. care pathways, staff roles, service configuration). The geographical area covered by each Trust includes densely populated urban areas, sparsely populated rural areas, coastline and busy stretches of motorway (table 1). Phase one aimed to develop a preliminary understanding of each context, potential influences on transition decisions and relevant patient safety issues. Phase two examined decision making by paramedic and specialist paramedic staff across the three ambulance services using an ethnographic approach to study their actions and accounts in everyday context¹². The study methods included document review, interviews,

observation, digital diaries and focus groups to provide a more comprehensive examination of the issues than a single-method.

Data collection

Phase one entailed reviewing relevant national and local documents (e.g. annual reports, policies, protocols) and conducting semi-structured interviews with 16 key informants across the three Trusts (table 1). Mirroring approaches adopted in ethnographic studies of hospital based staff¹³⁻¹⁵, phase two involved non-participant observation of paramedics over 10-12 hour shifts by a university researcher or ambulance service researchers seconded to the study, bringing both 'outsider' and 'insider' perspectives. A total of 34 shifts were observed, involving 57 crew members attending 155 calls (table 1). Alongside each observation, informal interviews explored paramedics accounts of the rationale for their decisions and actions. The approach to data collection was relatively unstructured within the scope of the research aim. Ten paramedics (table 1) maintained digital diaries (audio-recorders), recording their rationale for decisions and any concerns, and providing 141 diary entries. In order to explore shared experiences, perspectives and decision criteria, a focus group was conducted with paramedics in each Trust (total n=21, table 1). Audio-recordings and written notes from all methods were transcribed for analysis.

Table 1 shows the participants roles in the phase 1 interviews (Ints), and phase 2 observations (Obs), digital diaries (DD) and focus groups (FG). On dual crew ambulances, the second crew member was often a less highly skilled member of staff (e.g. emergency care assistant or technician). Phase 2 participants had ambulance

service experience ranging from less than one year to 20 years. Staff observed included solo rapid response (n=11), dual crew members (n=23) and specialist paramedics (ECP, PP, CCP, CP).

Table 1: Details of study sites and participants

| | Site 1 | | | | Site 2 | | | | Site 3 | | | |
|---|--------------------|------------|-----------|-----------|--------------------|------------|-----------|-----------|--------------------|------------|-----------|-----------|
| Site details | | | | | | | | | | | | |
| Population | 4.8 million | | | | 5 million | | | | 4.3 million | | | |
| Geographical area | 6,425 square miles | | | | 6,000 square miles | | | | 3,600 square miles | | | |
| Annual emergency calls | 616,000 | | | | 796,000 | | | | 862,000 | | | |
| Staff | 2,700 | | | | 4,500 | | | | 3,661 | | | |
| | <i>Ints</i> | <i>Obs</i> | <i>DD</i> | <i>FG</i> | <i>Ints</i> | <i>Obs</i> | <i>DD</i> | <i>FG</i> | <i>Ints</i> | <i>Obs</i> | <i>DD</i> | <i>FG</i> |
| Phase 1 participants | | | | | | | | | | | | |
| Directors: medical, clinical operations | 1 | | | | 1 | | | | 1 | | | |
| Managers: governance, quality, education, safety, locality, control | 4 | | | | 4 | | | | 3 | | | |
| Front line: specialist paramedics | 1 | | | | | | | | 1 | | | |
| Phase 2 participants | | | | | | | | | | | | |
| Paramedic | 13 | 3 | 6 | | 13 | 2 | 7 | | 7 | 2 | 4 | |
| Specialist paramedic (ECP, CCP, PP, CP) | 2 | - | 2 | | 1 | 1 | 1 | | 3 | 2 | 1 | |
| Emergency care assistant/technician/support worker | 6 | - | - | | 6 | - | - | | 6 | - | - | |

Data analysis

Qualitative data analysis involved two researchers and regular review with the project team. The initial analysis was conducted by site, consistent with the sequential order of data collection. ATLAS.ti 7 qualitative data analysis software¹⁶ was used for the analysis. Data transcripts from the phase 1 interviews were thematically analysed using a constant comparison approach. The themes identified were subsequently explored in the focus groups. Documents identified as relevant during phase 1 were reviewed to develop an understanding of the context in which the paramedics operate. Documentation identified during phase 2 enhanced our understanding.

Analysis of data transcripts from phase 2 (observations, interviews, diaries) involved an iterative process of data coding and categorisation. This entailed checks of between-coder reliability and repeated comparison within and then across the Trusts, to identify similarities and differences. The initial analysis identified types of transition decisions, whereby each decision was assigned to only one category. This was followed by the coding of influences on decisions and patient safety. Focus group data transcripts were thematically analysed using a constant comparison approach.

Subsequent analysis combined the data for each method across the three sites to examine similarities and differences. Vincent et al's Human Factors framework¹⁷ was used to classify system influences across all phase 2 methods. A further synthesis of the data was conducted to generate a smaller number of overarching themes representing key influences on transition decisions and potential risk factors.

Ethics

The study received ethics approval from the University of Sheffield Research Ethics Committee (SchARR REC REF 0530/KW) on the basis that no patient identifying information would be collected and the researchers would not elicit any information from patients.

FINDINGS

The findings revealed the complexity of transition decisions and system influences potentially impacting on patient safety. Nine typologies of paramedic transition decisions were identified (box 1) and reflect the array of decision scenarios routinely encountered by paramedics.

Box 1: Types of transition decisions encountered by paramedics

- Emergency conveyance to specialist centre: Condition specific pathway (e.g. stroke; STEMI; major trauma)
- Emergency / urgent conveyance to ED (e.g. breathing difficulty; fracture)
- Conveyance to hospital for admission to maternity, oncology or other unit
- Decision to convey to hospital already made by another clinician (e.g. GP; other paramedic)
- Non-emergency conveyance or referral to ED (e.g. call for transport to convey to ED or patient advised to attend ED for further assessment)
- Conveyance of patient to ED as place of safety (e.g. psychosocial factors)
- Conveyance rather than referral to community practitioner due to lack of access (e.g. minor wound care, antibiotics, MH assessment)
- Decision based on preference of patient or family
- Non-conveyance: Treat and leave at scene. Discharge or refer to another service. (e.g. residential/ self-care, uncomplicated/long-standing condition; referral/support system, infectious condition or risk of infection)

Transition decisions range from relatively clear-cut emergencies, including protocol-driven decisions for conditions such as trauma or ST-elevation myocardial infarction (STEMI), to more complex cases where the patients' social circumstances and co-morbidities need consideration. The latter type of decision created most uncertainty and risk for both patients and paramedics (i.e. professional vulnerability), since certainty about handover of clinical responsibility for patients to an appropriate health or social care provider was perceived as critical to good and safe care. Although some decisions appeared less complex, for example, where conveyance to hospital was evidently appropriate, few decisions could be classed as completely unequivocal.

System influences on decisions

Seven overarching system influences on decision making, identified as potential risk factors, are outlined below. The first three system influences encompass both macro-level and meso-level issues (demand; performance regime; care options); the following three encompass both meso-level and micro-level issues (risk aversion; training; communication), and the final influence (resources), which has system-wide relevance, focusses predominantly on the meso-level and micro-level.

Increasing demand

Increased demand for ambulance service care has impacted on the scope of clinical decision making by paramedics as the profile of calls has shifted from primarily emergency care decisions to now dealing with a wider range of primary care and psychosocial decisions. Such decisions, where non-conveyance was an option, are

more complex and time consuming, and require a high level of skill and support to minimise the potential for inappropriate non-conveyance.

“They’ve [service users] given up accessing some other avenues, GPs, NHS Direct, and that makes the decision more complicated. If you don’t work in here, the hardest decisions are heart attacks and road traffic accidents and cardiac arrest when in actual fact if you’re a paramedic, en route you know that if someone’s crashed their car, having a heart attack, been shot or whatever. They probably are going to go to hospital, 90% of the decision is already made.” [Paramedic]

The increase in non-emergency cases was also perceived as diluting exposure to the less frequent life-threatening emergencies. This may contribute to skill degradation and increased risk for time-critical emergencies, including decisions that involve bypassing the nearest ED for conveyance to a specialist centre.

“The big jobs we used to deal with on a regular basis are now diluted and we’re receiving less training than we did two years ago.” [Paramedic]

Performance regime and priorities

Paramedics were conscious of organisational pressures to meet various performance indicators including the eight minute response time target, reduced on-scene time and reduced rates of conveyance. However, there was resistance to allowing these to unduly influence patient care.

“If they need to go to hospital they go, if they don’t, they don’t” [Paramedic practitioner]

The eight minute response target was regarded as a source of pressure for staff and resources, particularly when calls were not life-threatening. Solo responders in rapid response cars requiring a dual crew ambulance for transport to hospital were faced

with a dilemma regarding the time it would take for back-up to arrive; having to consider the risk to that patient if they left and the risk for other patients if they waited. In most instances the potential risk for conveyance by car was considered too great.

“Then you’ve got moralistic issue and decision-making of do I feel compelled to upgrade this to an immediate response because of time or am I happy to sit here for up to 2 hours and wait for a vehicle while I’m out of the system. So for patient safety, that is a decision where you say this patient is going to be safe to be left for two hours knowing that they can go into hospital and you may safety net with ‘if it gets worse phone 999’. And do you risk that. Do you make that decision and assume that responsibility or do you fear that if that if you leave them the ‘what if’ factor may kick in and then they could go into cardiac arrest.” [Emergency care practitioner]

A key issue in relation to performance indicators appeared to be how best to minimise risk for both individual patients and the wider patient population. The potential impact of increasing efforts to reduce ED conveyance and minimise on-scene time needs to be considered; as noted previously non-conveyance decisions are often more complex and time consuming.

Access to appropriate care options

Conveyance to ED was not considered the best option for some patients (e.g. those with mental health problems, people requiring end of life care, the elderly, or patients with chronic conditions). However, in a number of cases where conveyance was deemed unnecessary, lack of access to out-of-hours services or community resources

including ECPs resulted in conveyance to ED. This was particularly frustrating for specialist paramedics with a remit to reduce ED admissions.

“Trouble is I’ve also had times where by trying to keep the patient at home, I’ve just spent ages on scene and they’ve ended up going in anyway. ‘Cos I’ve exhausted so many avenues trying to keep them at home, like the lady that just needs someone to sit. Ringing the GP, ringing intermediate care, ringing social workers or mental health teams.” [Paramedic practitioner]

Similarly, where pathways were available, staff reported limited or no access during out-of-hours, weekends and bank holidays.

“I think the biggest risk in my decisions that I make for my patients today are that between midnight and 6am there aren’t as many options and often I would like to leave an old lady at home but the ECPs finish at two. So she’s not getting the very best decision for her. She’s gonna have to go to A&E...” [Paramedic]

Effective alternative care pathways were identified in some areas but the prevailing picture was of considerable variation in availability and access, within and across Trusts. Rural areas appeared to have more limited availability of alternative pathways, which often restricted decision options to ED or GP care. Barriers to accessing suitable alternative care options mean that patients are being conveyed to ED even when paramedics consider it is not the best option, which potentially increases the risk for the individual patient and other patients needing ED care.

Disproportionate risk aversion

Non-conveyance was perceived as involving risk for both patient and paramedic. Varying levels of risk tolerance were apparent and to some extent influenced by competence, confidence or negative experiences.

“It’s that initial time from us saying, we’re leaving now and we’ve done x, y and z to refer you on to another service and from when that other healthcare professional takes over it’s that time that we are at most risk and it is the forefront of our mind when we make these decisions about whether it’s safe or not and whether it impacts on us and our professional registration.” [Paramedic practitioner]

Conveyance to ED was considered the “*default safety net*” because “*you don’t lose your job from taking a patient to hospital*”. Transfer of clinical responsibility was also viewed by many as key to reducing personal vulnerability. Some paramedics felt that this was not necessary in every instance and was likely to be very time consuming, with negative impacts on ambulance service resources and service delivery.

“It’s so much more now about covering yourself...I was speaking to a paramedic and he went ‘every single patient, I will refer. Even if it’s just be ringing up their doctor and saying I went out to this patient...’ Which is not necessarily a bad thing but then I think well why do we need to do that with every single patient, for example someone that’s just cut their finger.” [Paramedic]

The risk to professional status was a particular concern for paramedics where there was low confidence in organisational support in the event of an incident, and where the approach to investigation was perceived as focussing on blame rather than organisational learning. Fear of repercussions was also cited as a barrier to incident reporting. The issues identified in relation to risk aversion represent potential cultural

barriers to improving service delivery and patient safety within Ambulance Service Trusts.

Staff training and development

Paramedics identified the beneficial impact of additional training on their competence and confidence, supporting better decisions and enhancing communication with other clinicians. Such training was sometimes optional, relying on personal investment of time; consequently, staff in the same role may have different training/skills.

“The more I’ve learnt the more I’ve learnt about different conditions that I wasn’t aware of before or was not as aware of so it is enlightening ... But I do worry about a lot of other people that haven’t done those courses and that will be encouraged to leave people at home” [Paramedic]

Training and skill use was regarded as important to ensure that staff were kept up to date and competence maintained, particularly for situations encountered infrequently. However, the impact of operational demands was a source of concern:

“... but every time you get nearly due your update it gets cancelled because of operational demands. It’s very short term management where people say we’ll make better decisions with more training but there just isn’t the investment. ‘Cos we can’t invest because we won’t get the money if we don’t make the 8 minutes.” [Paramedic]

Despite changes in service roles and training, paramedics felt that other healthcare professionals were unaware of their enhanced skills and responsibilities, making communication and referrals difficult. Frustration was also expressed regarding national variations in the implementation of specialist roles, this limiting career

progression and ability to fully utilise skills. Skill use by specialist paramedics was also constrained by difficulties in ensuring they are dispatched to suitable patients.

“...at the minute, there’s no difference between my role and a paramedic in the sense that I’m going to specific jobs to facilitate non-transport, it’s just pot luck whether I turn up and can use my practitioner skills for non-transport.” [Paramedic practitioner]

System constraints on training, development and skill use have the potential to inhibit the competence and confidence of paramedics to deal with complex decisions, in particular where non-conveyance may be an option.

Communication and feedback to crews

Paramedics work in relative isolation compared to their hospital based colleagues and have to make important decisions at scene, without easy access to other opinions.

There is a risk that decisions are based on partial knowledge of potential options when decision support was limited. Paramedics identified a range of passive support systems they consulted, such as pathway algorithms, e.g. decision aids for assessments to identify the most appropriate pathway for patients with suspected stroke, STEMI or major trauma. The electronic patient report form (ePRF) was being developed for crews to access information about local services and JRCALC (Joint Royal Colleges Ambulance Liaison Committee) clinical guidelines but the ePRF was not universally available. Perspectives on active support systems (e.g. clinical hubs based in control rooms and staffed by nurses, physicians or specialist paramedics) were mixed, with some reporting them to be helpful while others cited less favourable experiences.

Paramedics sometimes consulted informal peer networks when faced with difficult decisions or attempted to telephone the patient's GP for advice. Difficulty in making contact with GP's, particularly out-of-hours, was an issue, and a variable that sponsored conveyance. There were also accounts of positive experiences and relationships with out-of-hours and other services (e.g. falls teams).

Information conveyed to crews when dispatched to calls had the potential to inform and frame crew expectations, but this information was often limited and potentially misleading. In the context of information constraints clinicians expressed that it was important to remain open minded, for example when attending 'frequent callers'. Clinicians reported feeling 'overloaded' by the amount of information (e.g. policies, procedures, protocols) provided as internal communications. It was said to be challenging to access and keep up to date with information communicated via multiple channels and a common concern was the potential to miss something important.

"If there's a high amount of clinical updates and a reduced amount of time. I think there's a safety issue in that you'll look at the red ones and then miss the green ones because you haven't got much time or there's so many of them that you can't become versed with them all and therefore you will miss opportunities to be made aware or increase your knowledge about pathways." [Emergency care practitioner]

In contrast, claims of a dearth of routine and constructive feedback on clinical decisions was felt to limit opportunities to reflect and learn.

"I worry about some decisions that I've made because we never get feedback and I never ever get told whether I made the right decision to either leave somebody at home or take them to hospital and whether what treatment I did was right. If you take them to A&E it's hard to get feedback." [Paramedic]

Paramedics raised concerns over the utilisation of reporting and feedback mechanisms. Despite organisational efforts to encourage incident reporting, accounts of variability in the extent and quality of reporting (e.g. incidents, vulnerable adults) seemed to indicate ambiguity over appropriate practice and/or apathy, particularly when feedback was not received. It was suggested that a lack of constructive feedback and information sharing also enabled the organisational 'grapevine' to fill the void with negative stories, fuelling perceptions of vulnerability and promoting risk averse behaviour.

Limited awareness of alternative care options is likely to increase ED conveyance, regardless of appropriateness. Limited access to feedback represents a barrier to individual and organisational learning and improvement.

Ambulance Service resources [staff, vehicles & equipment]

High demand strained ambulance service resources. Variations in access to specialist paramedics, vehicles, equipment and drugs had the potential to impact on decisions about patient care. The tension between service demands and availability of resources was identified as a source of pressure for staff.

"We're often under resourced. We often don't know where we can refer and what we can do. But also, there's always that pressure that they need you to come clear for the next job so you're rushing jobs. There's always that element where you feel vulnerable because you've not got the time to do everything properly." [Paramedic]

Availability of ambulances during busy periods could be challenging and contributed to the dilemma for solo responders over whether to wait or attend another call.

Accessing specialist vehicles such as bariatric ambulances was particularly difficult due to the small number available and ensuring proximity to where they were needed.

In some instances basic equipment (e.g. thermometers) was missing from vehicles, which meant clinical information could not be obtained. Participants also reported occasions when they had worked on vehicles containing equipment or drugs they were not trained to use.

"I'm conscious that I've been on a vehicle this week and the equipment on there, had things like a splint, that I'd never used before and I'm working with someone who is junior, who has been trained in it. You get those sorts of things. You also get that ambulance service staff are now purchasing their own equipment" [Paramedic]

These issues highlight the pressures paramedics face and the potential impact of available resources, including skills and equipment. Where resources to assess or manage patients are limited, non-conveyance poses greater risk and the default option is conveyance to ED.

DISCUSSION

The findings from this research provide insight into nine types of transition decisions encountered by paramedics, identify seven overarching system risk factors influencing decisions and highlight challenges faced by paramedics in delivering safe care. The seven multi-level influences identified should not be considered discrete, but rather as overlapping and interrelated issues. Coping with the increasing demand for ambulance service care and a diverse set of clinical needs are key issues impacting on paramedics who are striving to meet patients' needs as well as developing their own potential. The focus on reducing conveyance rates to ED intensifies the need to ensure that crews

have the skills to be able to make appropriate conveyance decisions if potential risks to patients are to be minimised. This study also highlights the challenges of developing staff and ensuring that their skills are utilised where most needed within the context of organisational resource constraints and operational demands. There is evidence that specialist paramedics are having an impact on non-conveyance rates, with discharges of 20% or more compared with usual care^{10,11}, although, this higher level of education and training represents a minority of paramedics. It has also been recommended that more evidence is needed regarding the appropriateness and safety of conveyance decisions by staff in these specialist roles¹¹.

Non-conveyance decisions are problematic in terms of knowing what services are available and being able to access them, with conveyance to ED often used as the default option to reduce risk of delays or leaving patients unsupported. Fragmentation of provision, as evidenced in our study, is acknowledged in recent reports that emphasise the need for 24/7 seamless urgent and emergency care^{18,19}. Access to appropriate alternatives to ED also hinge upon working across professional and service boundaries, but perceptions of the ambulance service among other professionals as primarily a transport service remain a barrier. However, participants were optimistic that this barrier was being reduced through building trusting relationships and in the case of specialist roles, there are studies showing successful collaborative working with other health professionals¹⁰.

Findings of risk aversion, including perceptions that highly detailed documentation was needed to support decisions, combined with mistrust of managerial support

should anything go wrong following non-conveyance, are consistent with other research²⁰.

It was apparent that the extent and nature of demand for ambulance conveyances represents a notable source of strain and tension for individuals and organisations. Similar issues were identified in an ethnographic study of changes in the paramedic role which identified work intensification and a target culture as placing huge pressures on 'road staff'²¹.

The aim of this study was to explore multi-level system influences on decision making by paramedics, focussing on care transitions and potential risk factors. The findings highlight the increased scope and complexity of paramedic transition decisions. An increased focus on reducing conveyance to ED relies on the availability of suitable ambulance service resources and alternative care options for patients. Although the findings emphasise areas of system weaknesses, including structural and attitudinal constraints, there were specific aspects that were reported to be working well across the three Trusts, for example: specific care management pathways, local roles and ways of working, and technological initiatives that merit further investigation to inform service improvement.

STRENGTHS AND LIMITATIONS

The use of multiple methods provided consistent evidence around key issues. The consistency of findings across participating Trusts suggests that the issues identified may be generic, and relevant to other ambulance services. The secondment of

ambulance service staff as researchers allowed data to be compared from 'insider' and 'outsider' perspectives.

This was a relatively small scale qualitative study involving three Ambulance Service Trusts and did not include any direct measures of patient safety. The scope of the study was limited to a self-selected sample of paramedics (n=50). Specialist paramedic roles represented a relatively small proportion of the overall sample. The perspective of linked services providers (e.g. ED, GPs and other care pathways) would have provided broader insight on the system influences examined from the ambulance service perspective.

IMPLICATIONS

The current study provides a new and in depth understanding of decision making by paramedics. This is particularly important given the recent emphasis on ambulance services providing care closer to home⁵. The study highlights the increased complexity of paramedic decisions and system influences that may exacerbate risk. Failure to consider how ambulance services can best function within the wider NHS system of urgent and emergency care may negatively impact on patient care. For example, ambulance services need to ensure an appropriately skilled workforce and supportive culture, and the wider urgent and emergency care system level should provide access to appropriate patient care options.

Further research could explore the impact of enhanced skills on service delivery and how to balance the need for urgent and emergency care. This would also need to address barriers to training, development and skill use.

Limited and variable access to services in the wider health and social care system is a significant barrier to reducing inappropriate conveyance to ED. More research is needed to identify effective ways of improving the delivery of care across service boundaries, particularly for patients with limited options at present (e.g. mental health, end of life care, older patients). Research should address structural and attitudinal barriers and how these might be overcome.

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DECLARATION OF CONFLICTING INTERESTS

None.

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REFERENCES

1. Bigham BL, Buick JE, Brooks SC, et al. Patient Safety in Emergency Medical Services: A Systematic Review of the Literature. *Prehosp Emerg Care* 2012; 16 (1): 20-35.

2. Fisher JD, Freeman K, Clarke A, et al. Patient safety in ambulance services: a scoping review. Health Serv Deliv Res. In Press.
<http://www.nets.nihr.ac.uk/projects/hsdr/10100812> (accessed 15 September 2014).
3. Turner J. Building the evidence base in pre-hospital urgent and emergency care: a review of research evidence and priorities for future research. 2010. London, Department of Health.
4. Atack L, Maher J. Emergency Medical and Health Providers' Perceptions of Key Issues in Prehospital Patient Safety. Prehosp Emerg Care. 2010; 14(1): 95-102.
5. Keogh B. High quality care for all, now and for future generations: Transforming urgent and emergency care services in England - Urgent and emergency care review End of phase 1 Report. 1-30. 2013. NHS England.
6. Darzi A. High quality care for all: NHS next stage review final report. London: Department of Health 2008.
7. Snooks HA, Halter M, Close JCT, et al. Emergency care of older people who fall: a missed opportunity. Qual Saf Health Care 2006; 15(6):390-392.
8. Porter A, Snooks H, Youren A, et al. 'Should I stay or should I go?' Deciding whether to go to hospital after a 999 call. J Health Serv Res Policy 2007; 12(suppl 1):32-38.
9. Halter M, Vernon S, Snooks H, et al. Complexity of the decision-making process of ambulance staff for assessment and referral of older people who have fallen: a qualitative study. Emerg Med J 2011; 28(1):44-50.

10. Hill H, McMeekin P, Price C. A systematic review of the activity and impact of emergency care practitioners in the NHS. *Emerg Med J* Published Online First: [July 13, 2013].
11. Tohira H, Williams TA, Jacobs I, et al. The impact of new prehospital practitioners on ambulance transportation to the emergency department: a systematic review and meta-analysis. *Emerg Med J* Published Online First: [November 15, 2013] doi:10.1136/emered-2013-202976.
12. Hammersley M, Atkinson P. *Ethnography: Principles in practice*. 3rd ed. London: Routledge; 2007.
13. Dixon-Woods M. Why is patient safety so hard? A selective review of ethnographic studies. *J Health Serv Res Policy* 2010; 15(suppl 1):11-16.
14. Waring J, Bishop S. 'Water cooler learning': Knowledge sharing at the clinical "backstage" and its contribution to patient safety. *J Health Organ Manag* 2009; 24(4):325-342.
15. Waring J, McDonald R, Harrison S. Safety and complexity: Inter-departmental relationships as a threat to safety in the operating department. *J Health Organ Manag* 2006; 20:227-242.
16. ATLAS. ti 7 [Version 7]. ATLAS. ti Scientific Software Development GmbH: Berlin, Germany.
17. Vincent C, Taylor-Adams S, Stanhope N. Framework for analysing risk and safety in clinical medicine. *Bmj* 1998; 316(7138):1154-1157.

18. Ambulance Service Network. A vision for emergency and urgent care: the role of ambulance services. 1, 16. 2008.
19. Fernandes A. Guidance for commissioning integrated urgent and emergency care: A 'whole system' approach. 1-75. 2011. RCGP.
20. Porter A, Snooks H, Youren A, et al. Covering our backs: ambulance crews attitudes towards clinical documentation when emergency (999) patients are not conveyed to hospital. Emerg Med J 2008; 25(5):292.
21. McCann L, Granter E, Hyde P, et al. Still Blue Collar after all these years? An Ethnography of the Professionalization of Emergency Ambulance Work. J Manag Stud 2013.