

# Factors influencing pre-hospital decisions not to convey: a mixed methods study.

Submitted by Sarah Louise Black to the University of Exeter as part-fulfilment of the degree of  
Doctorate in Clinical Research 2017

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Date of Submission 17/07/2017

Signature .....



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## **Abstract**

This study has used a mixed methodology to explore the impact of geographic, temporal and ambulance crew skill factors on ambulance clinicians' decisions to leave a patient on scene after attending a 999 call.

Four phases of work were undertaken using both qualitative and quantitative methods to build an understanding of the complex nature of pre-hospital clinical reasoning.

A novel scale, the DMASC survey was developed, which indicated four factors influence decision-making in this context. More experienced staff scored significantly differently to other staff groups on the 'Experience' and 'Patient characteristic' subscales of the tool. Qualitative work explored these findings in more detail and five inter-related themes were identified, namely, 'Communication', 'The three 'E's', education, experience and exposure', 'System influences', 'Professionalism' and 'Patient characteristics'. The final phase of the study undertook to analyse retrospective call data from one large ambulance service over a one-year period. All of the five predictor variables, rurality, time of day, day of the week, patient condition and crew skill level, influenced the likelihood of conveyance. Of these the level of clinical skill of the first crew at scene was independently significant.

The results of this work are discussed in relation to the strategic and operational context of NHS ambulance services.

The thesis is structured as a series of papers yet to be submitted for publication. Although this confers a degree of repetition, it provides a logical analysis of the methods used to explore factors that may influence paramedic's clinical decision making when deciding to leave patients at home following a 999-call attendance.

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## Chapter 1 Introduction

### 1.1 Introduction to the chapter

This chapter outlines the strategic and operational context within which National Health Service (NHS) Ambulance Trusts work, describing the development of the Paramedic profession and the national shift towards treating more patients without the need for transfer to an Emergency Department (ED).

National priorities and how they relate to local initiatives around ambulance service non-conveyance are examined in relation to the literature around patient safety and risk.

In order to support safe decision-making practice when leaving patients at home, a literature review of research in this area, along with a broad description of the predominant clinical decision-making model is included. The chapter ends with an explanation of the key research questions that this study aims to answer and a description of the study setting.

### 1.2 Background

#### *1.2.1 Ambulance service operations – from call to conveyance decision*

Traditionally NHS Ambulance Services have been seen primarily as a call handling service and a resource for the transportation of patients to hospital. Recent years however have seen an increased demand and services are challenged to examine methods of managing this increase whilst ensuring patient safety (Department of Health (DH), 2001, 2005).

Calls to the ambulance service are categorised depending on priority, with the aim that the most serious cases receive the quickest response. Prior to June

2012, response standards were split into 3 categories, A, B and C, dependent upon the severity of the patient condition at the point of telephone triage.

Category A calls, were defined as those considered to be immediately life threatening, category B calls were classified as serious but not immediately life threatening, and category C calls were deemed neither life threatening or serious, and were not subject to national response targets.

In June 2012 ambulance response time standards were revised (DH, 2012), with Category A calls split into 2 indicators, Red 1 and Red 2. All Red coded calls should still receive a response with a defibrillator within 8 minutes, but calls in the Red 1 category are the most time critical, where it is felt the patient's condition is immediately life threatening (such as a suspected cardiac arrest).

The 8-minute response time clock starts for Red 1 calls the moment the caller is connected to the ambulance switchboard, and means efficient triage in ambulance control centres is paramount; both to facilitate good health outcomes for the patient and to achieve performance targets.

Calls categorised as Red 2, whilst still serious, are considered to be less immediately time critical and include conditions such as suspected stroke and possible heart attack. For these calls the clock can start up to 60 seconds after the call has been connected to the switchboard, with the delay providing time for the call handler to identify the most appropriate ambulance resource dependent upon the patient's needs. The 'Green' call category, replaced the category C component of the response prioritisation standards.

In part this technical amendment was made in response to knowledge that ambulance services were not utilising resources as efficiently as they could, and it was hoped this would reduce the need for services to inappropriately

dispatch resources immediately the address was confirmed, or dispatch multiple resources.

A further review of ambulance response categories is on going, and due to be published imminently (NHS England, 2017).

Figure 1 illustrates the stages in the 999-call process and the possible outcomes in relation to conveyance. Following a 999 call (or a transfer from NHS 111, the designated 'non-emergency number'), patients will receive one of three outcomes. A 'hear and treat' outcome is arrived at when a clinician in the ambulance control room is able to successfully resolve the call by signposting the caller to an alternative service or offering self-care advice.

'See and treat' outcomes are those where an ambulance clinician is despatched and the patient is treated at scene, with no onward conveyance required. This includes incidents where the pre-hospital clinicians make arrangements for GP home visits or follow up visits by other health care providers, in addition to cases where advice is given by the ambulance clinician but no clinical intervention is necessary.

Patients with a 'see and convey' outcome will be treated on scene by ambulance clinicians and subsequently conveyed to ED for further assessment and treatment. The focus of this current study is on the 'see and treat' area of ambulance care.

In addition to emergency 999 calls that may result in the patient being conveyed to an acute hospital, since 2007 there has also been a requirement for ambulance services to convey patients where a General Practitioner (GP), Midwife or other Health Care Professional (HCP) identifies the patient's need as

'urgent'. Due to the nature of these calls the majority of them will receive a Green category response, with only a small proportion in the Red categories.



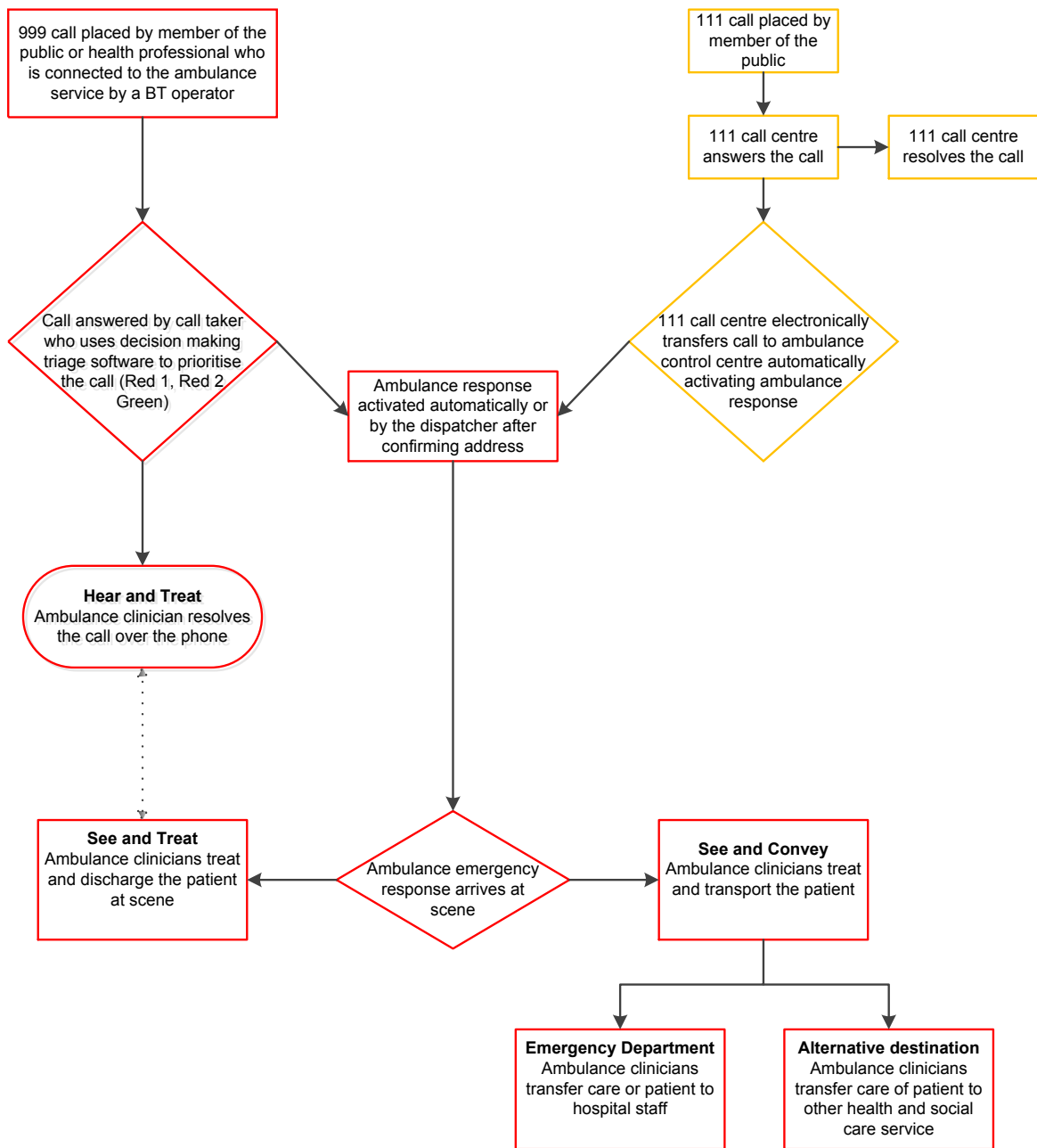


Figure 1: Process of a 999-call (Adapted from National Audit Office, 2017)

### 1.3 Literature review

The following narrative review provides a summary of topics related to pre hospital decision making around leaving patients at home. This approach is suited to areas where there is a need for broad coverage of a subject, and it is more flexible than a systematic literature review, which is traditionally directed towards a more narrow, focussed topic area (Collins and Fauser, 2005). It is acknowledged that the more individual narrative review method may not be as comprehensive as a systematic review, however time and resource constraints are a consideration in the current study and a full systematic review is outwith this. Whilst the choice of literature cited in a narrative review is influenced by the reviewer, included papers have been chosen based on their relevance to the study questions, the availability of full text reports and publication in English.

This literature review accessed a variety of sources, including, Medline, CINAHL, JSTOR, BNI, and Embase, in addition to psychological databases including PsychArticles. Public access sites including BioMed Central and PubMed were also searched. Where resources were not available electronically a manual search technique was employed. Key words used in electronic searches included:

*Emergency medical service, EMS, emergency treatment, emergency medicine, ambulance, pre-hospital, paramedic\*, EMT, ambulance\*, out of hospital, patient transport\*, transport, non-conveyance, clinical decision making, clinical reasoning*

Other strategies for literature searching used included reference chaining, cross checking the reference lists of relevant articles; searching key journals and conference proceedings in the sphere of paramedic science, and open access

thesis searches. Key strategy and policy documents located from the Department of Health (DH), NHS England (NHSE) and the Association of Ambulance Chief Executives (AACE) inform the following section, which aims to provide an overview of the context in which NHS ambulance services operate.

### *1.3.1 Rising demand – non-conveyance in context*

In 2016 there was an increase of 5.5% in patients attending the ED, whether via ambulance transfer or as a 'self-presenter'. This equates to an extra 2,210 patients each day. Of those who attended an ED in 2016, official statistics for England state that 16.2% spent more than four hours in the department, an increase of 4.8% on 2011 figures. Rising admissions and growing delays in the ability of hospitals to discharge patients, mean that flow through the system is compromised, a situation which has been referred to as 'Exit Block' (Royal College of Emergency Medicine, 2016).

These system pressures have a direct impact on the ability of ambulance services to handover the care of their patients that is not unique to the U.K (Eckstein and Chan, 2014). A recent Freedom of Information request (Monitor 2016) highlighted that between March and November 2015 there were 92,645 ambulance handovers greater than 30 minutes, with 14% taking between one to two hours and 1.5% taking more than two hours. When an ambulance is queuing outside the ED it remains unavailable for other 999 tasking, reducing the capacity of the ambulance service to be responsive to new incidents. A National Audit Office (NAO) report suggests that since 2011 there were 12,500,000 operational ambulance hours lost due to delayed transfers of care at hospitals (NAO, 2017).

The picture of rising demand on ambulance services is also significant, DH Information Centre statistics for 2009/10 show year on year increases in the number of calls received. There were 7.87 million calls received in this time period, with 6.42 million resulting in an emergency response, an increase of 4.3%. In the same time frame, 4.7 million emergency and urgent patient journeys were undertaken by ambulance services; a 4.2% increase on the previous year. The majority of these (86.3%) were taken to type 1 or 2 Emergency Department destinations, with the remaining 13.7% taken elsewhere but still conveyed by the ambulance service. For every 100 calls attended 73 patients were conveyed, however 1.6 million patients were treated at scene without the need for onward transportation.

More recent studies suggest the growth rate has increased to 5.2% since 2011-12 with 10.7 million calls received in 2015-16, (NAO, 2017). A review commissioned by AACE reported English ambulance services have shown a 25.7% increase in overall demand between 2006-2103 (Edwards, 2014).

The AACE review showed the scale of the issue, with a growth in emergency ambulance journeys of 17.7% and, on average, a rise of 14 minutes to the whole job cycle time. With no significant expansion in available resources, the consequence of an increase in the job cycle time is that ambulances are not free to be deployed to the next emergency call.

### *1.3.2 Strategic interventions to reduce the impact of rising demand*

Several key strategic papers published between 2005 and 2011 (DH, 2005; National Audit Office, 2011; ACCE, 2011) have shaped the future direction of ambulance service provision, setting goals aligned with the wider aims of the

NHS to reduce inappropriate admissions to the ED, whilst recognising the pivotal role that ambulance service providers have in acting as a conduit to signpost and refer patients to other NHS health and social care settings.

Since the publication of 'High Quality Care for All' (DH, 2008) there have been financial incentives to reduce ambulance service conveyance. The introduction of the NHS Commissioning for Quality and Innovation (CQUIN) payment framework mandates that a proportion of all providers' income is conditional on delivering service quality and innovation. During 2011/12 this conditional payment represented 1.5% of the Emergency 999 Ambulance Service block contract value, (£1.409 million).

The NHS South West Strategic Framework for 2008/09 to 2009/10 outlined an ambition for urgent and emergency care providers to reduce ED attendances at Acute Hospitals by 10% per annum, in an effort to ensure that people received healthcare in more appropriate settings. In line with this, and the introduction of the CQUIN scheme, the NHS Ambulance Trust in which this study is set adopted local strategic objectives to ensure it contributed to this ambition.

The CQUINs relating to non-conveyance were introduced in 2011/12 and a process of continuous monitoring of the 'non-conveyance trajectory' commenced. At the initial baseline, 38% of patients attended at scene remained at home without onward transfer, and in order to increase this a strategic work programme entitled 'Right Care, Right Place, Right Time' was introduced. The 'Right Care' initiative, as it became known, aimed to support the organisation's philosophy of keeping patients at, or closer, to home when clinically and socially safe. Key work-streams included investigating options for health promotion, alternative outcomes to clinical triage and exploring the clinical skill mix to

support the strategic agenda and further reduce the number of conveyances to Emergency Departments.

In 2017 NHS England introduced a national CQUIN scheme for all ambulance services. The aims of this two-year programme are to ensure that reductions in ambulance conveyance to Type 1 and Type 2 Emergency Departments continue, with ambulance services challenged to maintain their baseline and agree appropriate reductions in conveyance to ED through local discussion with Clinical Commissioning Groups (CCGs).

There is however, significant variation in the proportion of patients who are left at scene following a 999-call attendance by UK ambulance services. The publicly accessible performance dashboard of AACE highlights variation in the proportion of patients attended and discharged at scene; during April 2017 this ranged from 23% to 49% against a national average of 37% (AACE 2017). The study site, since May 2016, has reported non-conveyance rates higher than all other ambulance services, with a range from 49% to 52%. The cause of this variation between services is unknown, although a current UK-wide study to examine this disparity is underway (O’Cathain, Knowles, O’Hara, Jaques, Coster, et al forthcoming).

Aside from financial incentives, the focus on managing demand within the ambulance service has been increasing the number of ‘hear and treat’ outcomes (Turner, Snooks, Youren, Dixon, Fall et al, 2006) and the expansion of the paramedic role, to develop Emergency Care Practitioners (ECPs) (DH, 2005).

The Changing Workforce Programme (CWP), in partnership with the NHS Modernisation Agency, developed the ECP role in two waves. Funding was

secured from the DH in 2003 and the first implementation of the role occurred across seven areas, one of which was included in the current study site. The aim of the new role was to facilitate the paramedic workforce in learning the skills required to assess and manage minor injury and illness. This linked with the aims expressed both in the NHS Plan (DH, 2001), and by the Joint Royal Colleges Ambulance Liaison Committee (JRCALC) around expanding and developing the workforce, providing more opportunities for continuing professional development and contributing to a set of generic core competencies and national standards. The ECP programme was independently evaluated by a team of researchers to establish the clinical and cost effectiveness of this new way of working (Mason, Coleman, Ratcliffe, Turner and Nicholl, 2004).

### *1.3.3 Population, geographic and system influencers of demand*

The phenomenon of rising demand for emergency health care is not restricted to UK ambulance services. Studies from the United States of America (USA) have indicated that with an increasingly older population, and with more people living below the poverty line, so demand increases (Cadigan and Bugarin, 1989). In a prospective cohort study, also in the USA, Shah, Glushak, Karrison, Mulliken, Walter, Friedmann, Hayley, and Chin, (2003) identified that the factors associated with the use of the emergency service were patients being greater than 85 years of age, with poor social functioning and a decrease in their daily living activities. An observational study in Japan also found significant increases in ambulance transport in patients older than 85 when compared to those between 65 and 84 years (Tokuka, Abe, Ishimatsu, and Hinohara, 2010).

Ruger, Richter and Lewis (2006) observed a range of clinical and economic factors associated with ambulance transfer to the ED. Severity of illness, age and arrival between the hours of midnight and 8am were linked to ambulance conveyance to ED (Ruger et al, 2006).

Previous studies examining the demographic and clinical characteristics of non-conveyed patients are scarce; with only one relevant UK study identified which examined a small number of patients, with a focus on the call prioritisation system rather than clinical assessment, to identify the epidemiology of this patient group. (Marks, Daniel, Afolabi, Spiers and Nguyen-Van-Tam, 2002). However there is recognition that alongside increasing demand for the ambulance service high proportions of calls received do not require an emergency ambulance and could be dealt with more appropriately within primary care settings (Snooks et al, 2002).

In a qualitative study of patients and their carers who called the 999 emergency number for a clinical condition considered more appropriate for primary care, Booker, Simmons, and Purdy (2013) suggested that the perceived 'value' of clinical assessment and examination in hospital versus primary care influenced patient and carer behaviour. Misconception of the 'urgency' of their condition, patients reported that community based assessment might delay access to hospital based specialists, and the ambulance service was considered to be a method to bypass these perceived obstacles (Booker et al, 2013).

There is some evidence that socio-economic factors influence calls to the ambulance service which are subsequently considered to be medically unnecessary in Japan (Kawakami et al, 2007), whilst in the US Billitier, Moscati, Janicke, Lerner, Olsson et al (1996) have shown that of the 11% of patients



arriving at emergency departments in New York whose use of an ambulance was unwarranted, many had no alternative means of transport and lacked private health insurance.

Studies from the UK have highlighted that as many as half the patients who arrive at hospital following a 999 call are discharged with no onward referral (Woollard and Ellis, 1999). There also appears to be some confusion over the level of skills that a paramedic can bring to an incident, with Stephenson and Cooke (1998) highlighting that GPs studied overestimate the skill set and make inappropriate patient referrals to the emergency ambulance service.

Blunt, Bardsley, and Dixon (2010) have suggested that the availability and ease of access to other providers may also be a factor, compounded by public confusion around the complexity of negotiating this access (Salisbury and Bell, 2006). Changes to the 'Out of Hours' contracting arrangements, and patient perception of service provision following the introduction of non-emergency contact numbers, have also been reported (Jones and Bengner, 2008).

#### *1.3.4 Clinical Risk and non-conveyance*

There is no consensus in the literature regarding the safety of pre-hospital clinicians decisions to leave patients at home. Cooke, Fisher, Dale, McLeod, Szczepura et al (2004), in their systematic review of innovations associated with the reduction of attendance and waits in the emergency department, were clear that the effectiveness of paramedic decisions to discharge patients at scene, or decide on alternative pathways of care other than hospital conveyance has not been adequately studied to confirm its safety.

Extending the Cooke et al (2004) review, Fisher, Freeman, Clarke, Spurgeon, Smyth, et al (2015) undertook a wide-ranging review of patient safety in ambulance services. In a systematic review they located thirty-nine papers relevant to discharging patients without an attendance at hospital. This review identified that although rates of litigation against UK ambulance services are not high, many of those recorded relate to non-conveyance decisions. In addition they found that, of the 'Rule 43' reports (which are rulings to prevent future death) from HM Coroner relevant to ambulance services, there were three topic areas of concern. These were non-conveyance, patient assessment and management, and communication.

Risks of litigation with increased non-conveyance have been more widely studied in emergency medical systems outside the UK, but the results are equivocal. Colwell, Pons and Pi (2003) undertook a retrospective study of 6 years of complaints against a paramedic based emergency medical service in the United States. They found that more than less than 1% of all complaints were related to non-transport decisions; in contrast to Curka, Pepe, Zachariah, Gray, and Matsumoto (1995) who found 18% of complaints in the service they studied were related to non-conveyance. However there may be differences in the non transport protocols employed by the different services, Curka et al (1995) examined complaints against a predominantly fire service-based emergency medical service and this may impact on the comparability of the two studies and their usefulness to the NHS funded system.

In the UK, Dobbie and Cooke (2008) accessed all claims lodged with the National Health Service Litigation Authority (NHSLA) against ambulance services over a 10-year period. They concluded that non-conveyance was a significant cause of litigation and the contributing factor in several patient

deaths. For older patients who present to the ambulance service following a fall there is evidence that non-conveyance results in a higher rate of subsequent health care contacts and a higher risk of death (Snooks, Halter, and Close, 2006).

Patients who have been discharged at scene by ambulance clinicians may subsequently require attendance at hospital. This could be because their condition deteriorated, and could not have been foreseen at the time of the initial ambulance visit, or it may be due to an incorrect, and potentially unsafe decision. A national audit of ambulance service non-conveyance in England, undertaken by the National Ambulance Service Clinical Quality Group (NACQG, 2015) examined the proportion of non-conveyed patients who re-contacted the ambulance service. Within the audit timeframe, the re-contact rates of participating services ranged from 1.7 to 6.7%. As has already been noted, the site in which the current study will be set has the highest rate of non-conveyance in England, it is perhaps unsurprising then that this audit also showed it had the highest rate of re-contact.

Almost half (46.7%) of the re-attendances involved the same presenting condition for the first and second incident. Of 973 first attendances, falls were the predominant incident type (36.0%), followed by respiratory problems (10.3%) and those who were 'generally unwell' (9.6%). The audit used a severity rating for the re-contact cases. Of the 973 cases assessed there were two unexpected deaths and 36 cases where patients were assessed to have suffered severe harm. In addition to the risks of non-conveyance, this work also highlighted the impact of these re-contacts on ambulance service demand, within the study site 3% of the demand could be attributed to re-contact.

A UK based review of patient records associated with non-conveyance also highlighted the operational impact of re-contact, finding significant resource utilisation in these cases (Al-Sulaiti, Snooks and Porter, 2009). Non-conveyance decisions also tend to take longer, with the requirement to stay on scene to locate alternative pathways of care, which may not be cost effective (Dixon, Mason, Knowles, Colwell, Wardrope et al, 2009).

Papers examining the impact of the role of Emergency Care Practitioners within the pre hospital environment have suggested that with the advent this extension to the profession should come caution; as ambulance treatment at scene for minor injuries and illnesses brings more uncertainty and evaluations of the role need to do more than consider the cost benefits of reduced attendance at hospital (Fisher et al, 2015).

The accuracy with which paramedics are able to predict the likelihood of a medically necessary transfer has been found lacking in two US based studies, (Levine, Colwell, Pons, Gravitz, Haukoos et al, 2006; Brown, Hubble, Cone, Mullin, Schwartz, et al, 2009) which have suggested there is no evidence to support the reliability of paramedic decision-making.

However, there is some evidence that certain patient groups can be safely left at home. Studies in Scandinavia and the USA have indicated that patients who had suffered a hypoglycaemic episode may be safely left at home following a call to the emergency medical service. Mecham, Kreshak, Barger, and Shofer (1998) undertook a three day telephone follow up of recovered hypoglycaemic patients who had refused transfer to hospital and concluded that patients in their sample had safely been left at home. Anderson, Hogskile, Wetterslev, Bredgaard, and Sorensen (2002) used a logistic regression model to examine

predictors of transportation in 1148 hypoglycaemic patients and conducted a 72-hour follow up of patients who had been left at home. Finding that less than 1% of these patients had subsequently been admitted within 24 hours of emergency service attendance and less than 5% had a secondary hypoglycaemic episode they also concluded that the non-conveyance decision was safe. A UK based study, (Fitzpatrick and Duncan, 2009) did not find enough evidence to support the safe discharge at scene of hypoglycaemic patients.

Whilst it is apparent that there is concern around the ability of paramedics to safely leave patients who have contacted the emergency service at home, there is recognition that 'medically unnecessary' ambulance responses may also increase risk as 'blue light driving' with emergency lights and sirens on ambulance service vehicles also places patients, the public and ambulance clinicians themselves at risk through an increased chance of involvement in collisions (Murray and Kue, 2017).

In a UK multi-site, qualitative mixed method study, O'Hara, Johnson, Hirst, Weyman, Shaw et al (2014) aimed to explore the range and nature of influences on safety in decision-making by ambulance paramedics. They identified nine types of decision, which ranged from clear-cut decisions, for example the decision to convey in an emergency, through protocol-driven decisions, such as those made for patients with specific clinical needs where a specialist centre was required, to less clear-cut decisions in more complex cases, where decisions are mitigated by social circumstances and comorbidities. This study concluded that the more complex decisions generate the most uncertainty and risk for paramedics as well as patients.

There are some limitations to the literature cited which impact on the ability of a

reviewer to reach a conclusion about the evidence presented. A range of methodologies have been used to examine the clinical risks which may result from leaving patients attended by emergency ambulance services at home. Systematic reviews, usually considered to offer high quality evidence, have located only a very small number of relevant articles, and only one (Hubble et al 2009) included a meta-analysis, the other (Fitzpatrick and Duncan 2009) used a narrative synthesis, concluding that there were few high quality studies available.

Retrospective registry reviews, such as that presented by Anderson et al (2002), may be a relatively expedient way to collect data, however this method is more open to confounding and bias, due to the lack of a control group and historical threats to validity such as information and selection bias.

The work programmes which comprise O'Hara et al's work (2014) are illustrative of a well-conducted mixed method study but as the work is grounded in qualitative methods, there may be unconsidered quantitative elements that could broaden the findings and perhaps make the conclusions more widely generalisable.

#### *1.3.5 Clinical decision-making and paramedic education*

Having examined the literature on pre-hospital clinical decision-making, and noted concerns expressed around the safety of these decisions it is important to account for theoretical models of clinical decision making and how these map onto the development of paramedic education.

The Paramedic profession is still young, with the first Health and Care Professions Council (HCPC) standards of proficiency only published in 2003.

Compared to nursing and other allied health professions Paramedic education has only recently moved to a higher educational route from an historic vocational entry. The NHS Training Authority (NHSTA) held responsibility for ambulance service training and award systems from 1988 until 1996, when the Institute of Health and Care Development (IHCD) took on the role. The vast majority of pre-hospital clinicians who undertook the vocational IHCD courses progressed through a five week competency based skills training and driving course (known as the ambulance technician route) through to a nine week competency based skills programme with blue light driving course. This was followed by a period of consolidation in the clinical practice setting. A report commissioned by the UK College of Paramedics (Lovegrove and Davies, 2013) identified that there are over fifty HCPC approved courses delivering a route to registration as a Paramedic, offered by thirty-two different providers. Some of these routes are wholly higher education based; with a variety of diplomas, foundation and honours degrees in existence; however a small number of UK ambulance services still retain the in-service IHCD vocational training route. Although many registered Paramedics have subsequently undertaken study at a higher level, the majority of the current Paramedic workforce in the UK achieved their HCPC registration through the vocational route.

The development of professional paramedic education has important correlates to the style of learning associated with wider medical and nursing education. Vocational curricula have enforced learning clinical skills, underpinned with knowledge of signs and symptoms, alongside what was essentially protocol driven practice. It was not until 2000 that a set of national clinical guidelines were developed for UK ambulance services (JRCALC, 2000) and a shift; from a protocol driven delivery of pre-hospital care to autonomy in clinical decision

making; afforded by the adoption of best practice guidance was made. The vocational route has been criticised for its 'surface learning' approach (Williams and Woollard, 2002; Kilner, 2004), which does not allow students a thorough understanding of their subject area. With a shift away from the rigid application of protocols to the freedom to apply clinical discretion in the context of evidence based guidelines, an important element of underpinning knowledge has been missed, namely education on clinical decision-making. This gap, between the changing experience and expectations of modern pre-hospital practice and the underpinning education provision, has been noted in a variety of publications, including reflective case presentations (Roberts, 2015), comparisons of both HE and vocational routes to Paramedic practice (Ryan and Halliwell, 2012), and qualitative work (Atack and Maher, 2010). Albeit in an Emergency Medical System (EMS) outside the UK, participants in Atack and Maher's 2010 study reflected that there were significant patient safety concerns arising from a lack of education around clinical decision-making. This coupled with what the authors described as 'scope creep' impacts on the pre-hospital clinicians confidence in their decision-making ability.

The expansion of the scope of Paramedic practice; to include a larger set of clinical skills, pharmacological interventions and technology; is a familiar concern, shared between US and UK emergency service environments. In the UK there has been a shift towards Paramedic practice encompassing more of the lower acuity patient conditions, those who may previously have been dealt with by General Practitioners. It is recognised that this patient group, who often present with a wide range of existing co-morbidities, contribute to uncertainty in the clinical decision-making of ambulance staff.



### *1.3.6 Clinical reasoning and diagnostic error*

Theoretical literature relevant to decision making has a long history in psychology from the application of formal conditional logic to the study of reasoning in more naturalistic settings. Decision-making essentially involves making a choice between alternative courses of action and the concept encompasses terms such as cognitive strategies, heuristics and biases. In addition the terms 'reasoning', with its logical connotations and 'judgement', with its more affect-laden association are often used interchangeably.

Elstein and Bordage (1979) made clear the distinction between the theoretical 'information processing' approaches to decision-making (Newell and Simon 1972) and the 'judgement' approaches (Hammond, Stewart, Brehmer and Steinmann, 1975). Descriptions of the use of deductive reasoning or intuitive reasoning strategies are well documented, although more recent work focussing on decision making in clinical scenarios suggests that linear approaches described by the information processing approach are not readily applicable to the often 'less controlled' clinical situations faced in practice (Hancock and Durham 2007).

Currently Dual Process theory (Evans 2008; Croskerry 2009, 2009a; Norman 2009) is the principal model used to explain clinical decision-making. Evans (2008) suggests that decision-making occurs through one of two cognitive pathways. System 1 refers to spontaneous, fast, intuitive decision-making that largely occurs without conscious thought (Croskerry, 2009). System 2 is slower, conscious and more deliberate, and is employed in contexts where there is a requirement to pay closer attention in an analytical fashion. Dual process theory can be viewed as an extension of the Cognitive Continuum ideas

proposed by Hammond (1978) which see information processing and judgement approaches as opposite ends of a continuum rather than separate entities. Hamm (1988) states that clinical decisions will commonly fall at some point along the continuum and that context plays an important role with decisions influenced by a complex range of factors including knowledge, experience and the type of cues available.

Croskerry (2009) indicates that the system 1 thinking in clinical decision making is bound in the context of the situation, and will be influenced by many factors. Whilst this system uses heuristics to recognise patterns, there are risks that less experienced clinicians will lack the exposure on which to base these, resulting in an inherent risk that a incorrect diagnosis will be made when the presentation is atypical. System 2 reasoning may be employed when the signs and symptoms of a problem are not so readily recognised, but this type of reasoning is not so immediate in its provision of solutions, because it is necessarily analytical and takes longer.

The process of clinical reasoning within the pre-hospital arena is often likened to that of the wider ED environment, which has been described as “...a *natural laboratory for error*” (Croskerry, 2009). However, there are some significant differences in the conditions in which clinical decisions are made in both environments. Emergency Care Physicians have a very different educational background to the Paramedic profession. Resources that support decision-making are more readily available in a hospital setting than the pre-hospital environment. Access to diagnostic equipment, laboratory tests, the availability of a patient’s medical history, and a wider team to consult with; arguably make

clinical reasoning safer within a hospital. In a survey of ambulance clinicians within the current study site, Zorab, Robinson and Endacott (2015) highlighted the problems with accessing complete healthcare records in the pre-hospital environment, but identified the benefits that this would bring when making decisions regarding the most appropriate care for patients. Notably, the NHS England National Ambulance CQUIN (NHSE, 2017) aims to ensure enablers such as access to the NHS 'Summary Care Record' are available to ambulance services, although this is likely to be at a distance from the paramedic/patient interaction.

#### 1.4 Study setting

The setting for this study is within one NHS ambulance service in England. At the start of the study the Trust served a total population of almost three million, with an estimated influx of over 17 million visitors each year. Covering four counties in the South West of England; over an area of over 17,000 square kilometres; including 32,000 kilometres of road and 1,330 kilometres of coastline, the operational area is predominantly rural with a number of major urban centres.

In 2011 the service became one of the first NHS ambulance providers to be awarded Foundation Trust status, and in February 2013 acquired one of its neighbouring ambulance services, becoming geographically the largest in England, with an enlarged operating area of 26,000 square kilometres, equating to 20% of England, over seven counties. Now serving an increased population of over 5.3 million the Trust has the highest proportion of elderly people living in the region: 19.7% of over 65 year olds, compared with 17.5% in most other

English regions and 11% in London (SWASFT 2014). It is now the most rural ambulance service in the country, which has major implications for service delivery.

The study site has 96 ambulance stations, six air ambulance bases and three emergency control centres, employing over 4,000 clinical and operational staff.

## 1.5 Research Aims

A review of research priorities in pre hospital care (Snooks, Evans, Wells, Peconi and Thomas, 2008) scrutinised gaps in the research literature and used a Delphi methodology to prioritise topics for future work. Managing the increased demand for emergency care by safely reducing transports to ED for minor conditions was a key theme, with half of the top 20 priorities concerned with reducing conveyance through the identification and provision of safe alternatives to hospital transfer. A more recent review of the top ten research priorities in emergency medicine (Smith, Keating, Flowerdew, O'Brien, McIntyre et al, 2017) placed the issue of ED overcrowding and safe alternatives for patients with mental health needs as key areas for future work. This current study can be aligned with these priorities so is both topical, and timely.

### *1.5.1 Research question*

The primary research question for this dissertation is: *How do geographic, temporal and ambulance crew skill factors influence the decision to leave a patient on scene after attending a 999 call?*

### *1.5.2 Research objectives*

1. To develop a novel questionnaire survey of decision-making in ambulance service non-conveyance;
2. To explore how crew skill factors (clinical grade, length of experience and information processing style) influence non-conveyance decision-making;
3. To investigate the factors paramedics identify as influencing their decision to discharge patients at scene following a 999 call;
4. To analyse a large dataset of all ambulance attendances over one year in a single NHS Ambulance Trust to identify how geographic, temporal and crew skill factors influence non-conveyance.



## **Chapter 2. The Research Methods**

### 2.1 Introduction to chapter

This chapter will provide an overview of the research methods employed in each strand of the study, and justification for their use. Challenges and issues associated with each methodology will be discussed. The study processes will be explained and the chapter will close with an outline plan for data analysis and integration.

### 2.2 Critical overview of research methods available

Historically, there has been a clear preference for the use of qualitative methodologies to examine issues of clinical decision-making both in paramedic practice and in the wider health care setting. Ethnographic approaches, using participant observation and semi-structured interviews have been used by Wyatt (2003) to examine paramedics' reflections and perception of the tacit knowledge they utilise when making clinical judgements. Hagbagherry, Salsali and Ahmadi (2004) took a similar approach, using a grounded theory perspective to gain insight into nurses' views on the factors influencing their clinical judgements. Anderson, Hogskile, Wetterslev, Bredgaard, Sorensen et al (2002) favoured participant observation when they studied the decision-making processes employed by triage nurses in the ED. However, these studies are not based in a UK system, and where interviews were used they were tape-recorded directly after the observation session.

Access is one of the most obvious disadvantages of the participant observation method and in the current study setting there is an element of risk involved if the observation is cited in an emergency ambulance driving at high speed.

Whilst this method has ecological validity due to the inherent sensitivity to context, this also causes some problems for the representativeness of the data (Denscombe, 2007; Marshall and Rossman, 1999). Additionally, because of the potential impact on operational demand an observational methodology would not be considered appropriate by the organisation in which this study is set.

This approach would also raise ethical issues regarding patient confidentiality, and taping an interview straight after observation may not be feasible, as the crew will likely be tasked immediately to another incident.

A range of interview methods have been conducted in the pre-hospital setting to examine research questions similar to those in the current study. Halter, Vernon, Snooks, Porter, Close et al (2011) used semi structured interviews to elicit information regarding the low uptake of a clinical assessment tool which aimed to provide support to ambulance staff making 'treat and refer' decisions about elderly patients who had fallen. Porter, Snooks, Youren, Gaze, Whitfield et al (2007) used focus groups to examine the issues around ambulance service conveyance.

One large-scale study involving mixed methods was undertaken by O'Hara, Johnson, Hirst, Weyman, Shaw, et al (2014) to examine the decision-making of paramedics during transitional phases of pre-hospital care. This multi site study utilised observational methods, reflective diaries and focus groups to describe the types of decisions made and how the system acts to influence them.



Semi structured interview methods can be helpful at gaining insight from key informants, the depth of the information provided by the participant can be checked for accuracy at the point of collection and because there is often a more personal, therapeutic element and as they are scheduled in advance there is a relatively high response rate. However interviews are time consuming to conduct and analyse, reliability may be compromised by the interviewer effect, and by their focus on one individual the range of experience and opinion expressed may be limited (Denscombe, 2007). Focus group methods are increasingly popular in health science and are considered to be a valuable qualitative research technique (Madriz, 2000). However the relevant published studies in the area do not report on group interactions, which has been described as an important but underused output of the focus group method (Wilkinson, 1998; Duggleby, 2005).

A small number of quantitative studies examining clinical decision-making were found when considering appropriate methodologies. Hoffman, Donahue, and Duffield (2003) used a survey technique to investigate the role of context in the clinical decisions made by nurses, as did Tracy, Dantas, Moineddin, and Upshur (2005) to elicit self-reports of decision-making by GPs. Self-completed questionnaires share some similarities to structured interviews, although they have the benefit that they reduce the effect of the interviewer on the participant (Robson, 1993).

Botti and Reeve (2003) describe a quasi-experimental approach to examine decision-making in undergraduate nurses with the use of six clinical simulations/case studies. This is similar to the method employed by Falzar, Moore and Garman (2008) who used vignettes to examine the decisions made by psychiatric trainees.

Alexander (2010) used a novel qualitative research technique to explore paramedic decision-making. Participants were presented with two clinical vignettes and asked to 'think out loud' as they described the stages of their clinical decision-making, with an opportunity for later reflection. A verbal protocol analysis was applied to the transcripts generated from the clinical scenarios. Theoretical clinical vignettes have also been used within focus group settings to understand decision-making in resuscitation attempts (Brandling, Kirby, Black, Voss and Bengler, 2017). While the use of a clinical scenario places decision-making in a more realistic setting; and is one which is familiar to pre-hospital staff who use hypothetical cases in routine training; the use of this method was not felt appropriate for this study. The researcher is not a paramedic, and to take a role leading a clinical discussion would lack credibility.

### 2.3 Research philosophy

Cresswell (2009) has described the basic characteristics of four types of paradigm, or 'worldview' as it is more commonly framed, in mixed methods research. While post-positivist and constructivist paradigms have historically been associated with quantitative and qualitative approaches, and participatory worldviews are linked to political concerns, the current research is framed in a pragmatist worldview.

A pragmatist ontology captures various perspectives, examining both singular and multiple realities to test hypotheses (Cresswell and Plano-Clark 2011), valuing both objective and subjective knowledge (Cooper, Porter and Endacott, 2011). It has been suggested that this stance is the one most commonly used in mixed methods research (Tashakkori and Teddlie (2003), as it cites the

research question as more important than either the philosophical paradigm or the method used. This stance is centred in the real world, where the epistemological approach utilises a practical, applied viewpoint to inform the choice of methodology, recognising that both qualitative and quantitative research techniques may be used in a single study. It is pluralistic in nature allowing the freedom to move between deductive and inductive enquiry dependent upon the focus of the data collection, and combine them.

#### 2.4 Choice of methodology

The status of all research, whether quantitative or qualitative in nature, depends upon the quality of the methods used. Research questions should be matched to the appropriate design, for example correlational methods to identify factors which influence outcomes, ethnographic, qualitative approaches to study culture and grounded theory techniques to generate a theoretical position.

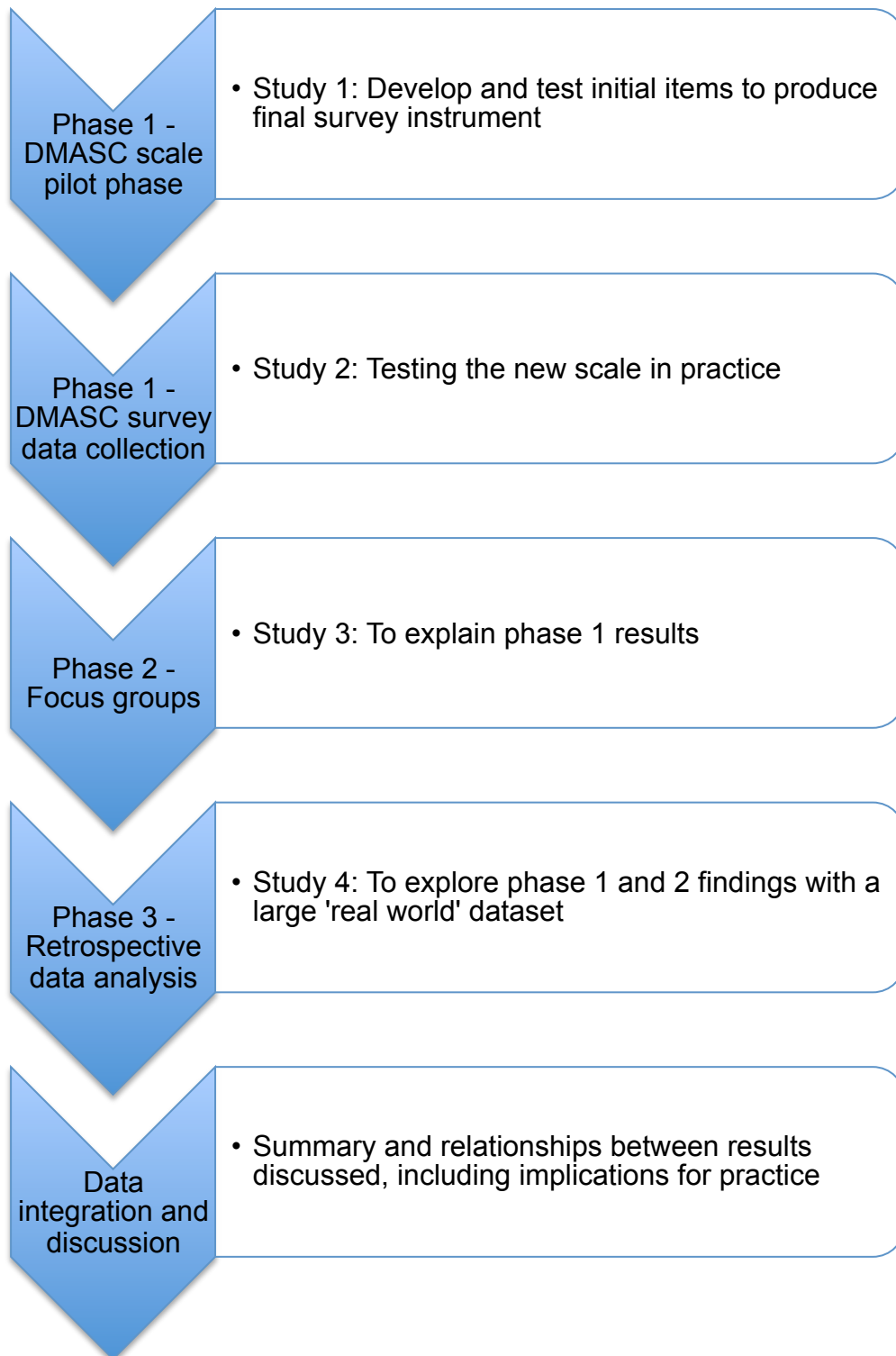
In order to answer the research questions this work will use a mixed method approach (Tashakkori and Teddlie 2003) where both quantitative and qualitative data are collected and the data are integrated in a final analysis (Cresswell, Fetters and Ivankova, 2004). The choice of a mixed method approach was based on the need to assess relationships within the quantitative data and explore the reasons behind them in the qualitative phase, with a final retrospective quantitative data collection to reflect the real world application. Cooper et al (2011) have stated that the use of a mixed methods approach is the most appropriate to answer questions in the emergency care setting, with qualitative elements adding to the understanding of quantitative findings. The current multi-phase design lends itself to an emergent approach whereby the

second phase can be built on learning from the first and both will be used to inform the interpretation of a large 'real world' dataset to triangulate the results. The rationale for integrating data in this current study is that neither of the mono method approaches is considered enough on its own to identify the factors associated with non-conveyance decisions made by ambulance clinicians and uncover the complex causes of uncertainty which may be experienced by them in relation to leaving patients at home. A mixed methodology has the benefit of enhancing the relevance and depth of results when studying complex interactions in natural settings (Schifferdecker and Reed, 2009; Johnstone, 2004).

This study will use a multi-phase mixed design, consisting of three distinct phases (Cresswell and Plano Clark 2011). This design allows for the collection of data in both sequential and concurrent timings within one series of studies. The quantitative survey data will be collected and analysed first (studies 1 and 2) followed by the qualitative data (study 3) that will be used to assist in the explanation of the quantitative results gained in the first phase. These results will be used to guide the focus of analysis in the final quantitative element (study 4), utilising a dataset containing information on conveyance rates in the study site over one calendar year. The final stage of the design is the integration of the data from the three phases. Data will be merged to relate the results to each other triangulating the findings from each phase in order to enhance or clarify the results by seeking complementarity (Greene, Caracelli, and Graham, 1989).

In this multi-phase design both the qualitative and quantitative components will have equal priority, recognising the pragmatist stance that both will play an important role in answering the research questions.

An outline of the planned progression of the study is shown in figure 2 and more detailed descriptions of the methodology to be applied in each separate study will follow.



**Figure 2** – Study progression

## **2.5 Study 1: Development and preliminary psychometric evaluation of the Decision Making in Ambulance Service non-Conveyance (DMASC) Scale**

Although there are many validated measures that examine the preference for specific styles of decision-making, there is no existing scale that measures constructs relevant to the non-conveyance context in an ambulance setting.

### *2.5.1 Design*

A two-stage process to develop and test a new survey instrument, the Decision Making in Ambulance Service non-Conveyance (DMASC) scale, will be used. Pre pilot development work with a stakeholder reference group will assist in the selection and development of the survey items. Phase two will involve piloting the DMASC and evaluating the potential for item reduction in order to compile a final survey tool.

In addition to the proposed DMASC scale a shortened version of an existing tool, the abridged version of the Rational Experiential Inventory (REI-40) (Pacini & Epstein 1999) will be administered. The REI-40 is a previously published psychometric tool, which has been validated in a number of different populations and is used to determine a respondent's preferred decision-making style. It has been shown to be highly reliable and consistent with other instruments that aim to assess decision-making from a dual process theory perspective (Pacini & Epstein, 1999; Bjorklund & Backstrom, 2008; Calder, Forster, Stiell, Carr, Brehaut et al, 2011; Jensen, Bienkowski, Travers, Calder, Walker et al, 2016). The inclusion of this tool in the pilot phase of the DMASC development will aim to elicit responses on its acceptability and face validity to

the population of interest.

### *2.5.2 DMASC Item development*

Initial items will be generated following examination of the literature, a technique utilised by Ivankova and Stick (2007), and Rattray, Johnston and Wildsmith (2014). Using this deductive approach to scale development it is hoped that items in the final measure will exhibit content validity (Hinkin 1998).

### *2.5.3 Procedure*

This initial pilot of the DMASC tool will be administered to a sample of ambulance clinicians in different geographical areas of the study site whilst they undertake annual statutory training. Responses to the pilot, which will be administered in a paper format, will be collated for analysis with a view to item reduction and enhancement.

### *2.5.4 Statistical analysis*

A preliminary Exploratory Factor Analysis (Principal Components) will be undertaken to examine whether the new scale describes factors that may influence a pre-hospital clinician's decisions not to convey a patient to the ED. The analysis will consider whether the tool demonstrates sufficient reliability and construct validity, and its potential usefulness in informing and predicting the likelihood of a non-conveyance decision being reached.

Consideration will be given to the range and spread across all response options. Priest, McColl, Thomas and Bond (1995) state that poor discriminatory power is suggested by any item with a limited range of response options, or

high endorsement of any single option. The analysis will aim to remove items that demonstrate a limited range.

Visual examination of the spread of responses will provide an initial indication of whether the data are normally distributed, an assumption of the General Linear Model. The skew and kurtosis of individual item scores will be explored, as positive values of skewness indicate too many low scores in the distribution, and positive values of kurtosis are indicative of a heavy tailed distribution.

Items will be checked for clarity and relevance. Although more subjective, this criterion will aim to reflect the comments of participants by considering for removal any items where ease of understanding or is relevance noted.

Finally consideration will be given to the retention of items deemed theoretically important, despite not meeting either one or more of the above.

## **2.6 Study 2: Decision-making in Ambulance Service non-conveyance – The DMASC survey**

The design and construction of the final DMASC survey will be informed by the results of the preceding study.

### *2.6.1 Participant recruitment and sample size*

Participants for this phase will be identified using a stratified random sampling technique, which will be undertaken by a member of the R&D team at the study site, not by the researcher, to ensure anonymity.



The payroll numbers of clinical grades of staff at Ambulance Technician level and above will be selected and stratified in relation to the proportion of clinicians at that grade in each county area covered by the organisation.

Calculation of sample size for study 2 will be undertaken using G\*Power 3.1, a flexible statistical power analysis programme for social, behavioural and biomedical sciences (Faul, Erdfelder, Buchner, and Lang, 2009).

### *2.6.2 Procedure*

The DMASC survey and the REI-40 will be presented to potential respondents in an electronic format via a personal e-mail communication from the generic mailbox of the Research and Audit Department within the study site.

This will contain a link to the Survey Monkey™ platform and include an introductory paragraph outlining the aims of the study, contact details of the researcher and assurance of the confidentiality and anonymity of responses. Consent to participate will be assumed if the survey is completed, although an option to withdraw all or part of any responses received will be provided. Reminder emails will be sent to all participants, not just non-responders, at two subsequent intervals, along with a final reminder of the closing date of the study.

### *2.6.3 Statistical analysis*

Demographic data will be analysed using descriptive statistics. Relationships between participant demographic characteristics and their influence on the DMASC subscale scores will be assessed with two-way mixed within and between groups ANOVA. Differences between clinical grades and groups on

the REI-40 Rational and Emotional subscale scores will be explored using one-way ANOVA.

### **2.7 Study 3: Discharge at scene. Paramedic perceptions on non-conveyance following an emergency call.**

The third, qualitative phase of the study will involve focus groups with ambulance clinicians to explore and explain the context of results gathered from the DMASC survey. Focus groups are a specific type of group interview used to explore a topic in depth. They can take a more directed, planned format (Kreuger, 1998) or a more informal approach (Beck, Trombetta and Share, 1986). The distinctiveness of the focus group method over other interview approaches is the emphasis on the interaction within the group as a means of generating information (Denscome, 2007), and it has been noted that description of this interaction this is often lacking in reports of focus group work (Duggleby, 2005).

#### *2.7.1 Participant recruitment*

The practicalities of organising a focus group are well documented (Morgan and Kreuger, 1998) and considering this a convenience sampling method will be used in the current study as a pragmatic solution to the anticipated difficulty of other probability sampling techniques. The study site is large and geographically diverse, it is not feasible for one researcher to undertake data collection in all areas of the organisation. Purposive sampling was considered, with a sample chosen from the respondents to the DMASC questionnaire, however it is likely that such a sample would include individuals from across the

organisation, and the practicalities of finding a location and a time when all are able to attend cannot be underestimated.

Therefore dates will be allocated and volunteers will be invited to attend. It is recognised that this form of sampling is highly vulnerable to selection bias and influences beyond the researcher's control. It is also understood that this method of sample selection has less credibility than alternative methods.

However every effort will be made to ensure that the participants of the groups are representative of the wider clinical workforce, and the opportunity to participate will be extended if the sample willing to participate is small or unrepresentative.

### *2.7.2 Procedure*

Data from the focus groups will be collected by the use of an audiotape, which will be transcribed after the event. All participants of the focus group will be given an opportunity to view the transcript to ensure it is an accurate replication of the discussion. This will enhance the rigour of the findings as participants will be able to validate the researcher's account.

### *2.7.3 Thematic analysis*

Thematic analysis of the transcription will be undertaken using a well-documented method (Braun and Clarke 2006). As the researcher will undertake the transcription familiarity with the data will be gained. Examining the data systematically will generate initial codes, cross referencing continuously, and employing flexibility so that items may be coded more than once if relevant.

These initial codes will be collated into possible themes, which will be reviewed against the smaller coded extracts and the wider dataset to ensure that all possible themes have been identified and named.

## **2.8 Study 4: Convey or not convey? Does crew skill level predict hospital admission rate in a UK regional NHS Ambulance Service Trust?**

### *2.8.1 Data handling procedure*

The use of large datasets within health care has become more common within the last five years (Raghupathi and Raghupathi 2014), as more providers are digitising their data, and information science becomes more sophisticated (Agarwal and Dhar 2014). Zhou, Chawala, Jin and Williams (2014) suggest that the analysis of 'big data' can best be considered through the 'four V's. These are Volume, Velocity, Veracity, and Variety. For the purpose of this work package the challenges associated with volume, and veracity will be described in relation to data cleansing and reduction.

Data handling has historically been given less attention than the importance of good study design, although it has been recognised that data quality can have significant impact on the robustness of reported results (Van den Broeck, Argeseanu Cunningham, Eeckels, and Herbst, 2005). Zhou et al (2014) use 'volume' to refer to the size of the dataset, and the challenges of systems to both extract, store and analyse large quantities of information. The number of data items is also linked to their veracity – there is no guarantee that a larger set of data is more accurate; indeed the volume of data can result in challenges

to data quality, which are more difficult to identify due to the size of the available information.

### *2.8.2 Data sources*

Data obtained for this phase of the study will be compiled from more than one core source, and integrating data from a variety of sources is another challenge to robust analysis. It is anticipated that some variables will require re-coding, for example where the output is in the form of a string variable. A robust quality assurance system will be employed to ensure that the frequency of any re-coded items matches those in the original source. Missing data will be identified and coded prior to analysis.

### *2.8.3 Statistical analysis*

A descriptive review of the data will be undertaken, and the characteristics of incidents where patients were either conveyed or left at scene will be explored with  $\chi^2$  and the Mantel-Haenszel test for trend. A binomial logistic regression will examine the independent effects of time of day, day of the week, provisional diagnosis, rurality and crew skill level on the probability of conveyance.

## **2.9 Proposed data integration strategy**

Data analysis for the main phases in the study will be undertaken at four points, after the initial quantitative phase, after the follow up qualitative phase, and with an examination of a large data set from all ambulance attendances. Finally, in

line with the mixed method approach an analysis of the integrated data will attempt to interpret how the qualitative data explain the quantitative results.

## **2.10 Research Governance and Ethical Approval**

The University of Exeter provided ethical approval of this study (Appendix A).

The NHS Research Ethics Committee South West provided their opinion that NHS ethical approval was not required for this study (Appendix B).

Research governance approval was provided by South Western Ambulance Service NHS Foundation Trust (Appendix C).







## **Development and preliminary psychometric evaluation of the Decision Making in Ambulance Service non-Conveyance (DMASC) Scale**

**Target Journal:** BMC Open

### **3.1 Abstract**

There is currently no standardised way of assessing the factors that may influence ambulance clinicians' decision-making when leaving at patients at scene. This paper describes the development of a survey instrument which aims to identify these factors and may be used to predict the likelihood of a non-conveyance decision being reached.

Data from two studies are reported. Twelve participants contributed to the development of the survey items that comprised the pilot, and forty clinicians undertook to complete the pilot survey during statutory training.

From an initial set of thirty-five items, exploratory factor analysis revealed four components, which may influence decision-making in this context. These were 'Experience', 'Support', 'Patient characteristics' and 'Safety netting'.

Development of a standardised scale provides the opportunity to increase the understanding of the factors that influence pre-hospital decisions to leave patients at home following a 999 call. Further study of this developmental scale, with a larger sample, is desirable to confirm the four-factor structure.

### **3.2 Introduction**

Historically, the role of Paramedics has been perceived as responding to patients who have suffered an accident or a severe medical emergency.

However, patients suffering such significant trauma or an acute medical emergency do not represent the largest group phoning 999 services. In fact the majority of calls to the Ambulance Service are from patients with more minor

conditions, which can often be managed without the need for a 'blue light' response. It is now common for patients calling the Ambulance Service to receive care advice over the phone, or to be 'sign posted' to alternative clinical services. Additionally, in many cases where an ambulance clinician is dispatched, they are often able to treat the patient at their home.

These alternative methods of care mean that most patients do not need to be conveyed to Emergency Departments (EDs). Nevertheless, attendances at Emergency Departments have increased significantly over the last decade; although over 40% of patients are discharged home with no treatment. A recent nationwide review found that up to 50% of 999 calls where an ambulance was dispatched are managed at the scene without the requirement for a hospital transfer (Keogh, 2013).

There is wide variation amongst ambulance services in England in the proportion of patients who are left at home following an emergency ambulance attendance. Aggregated data for 2015/16 shows that the percentage of patients who were managed without the need for an ED visit varied between 31% and 53%, against an average in England of 38% (NHSE AQI summary).

Understanding the factors involved in this variation and how paramedics make decisions to leave a patient at scene following a 999 call is the key focus of this study.

### **3.3 Aim**

The aim of the study was to design a scale that:

- Describes factors which may influence a pre-hospital clinician's decisions not to convey a patient to the ED,
- Demonstrates sufficient reliability and construct validity,
- Can be used to inform and predict the likelihood of a non-conveyance decision being reached.

### **3.4 Methods**

#### *3.4.1 Survey construction and pilot*

The first stage of the study employs a cross sectional survey methodology. Although there are many validated measures that examine the preference for specific styles of decision-making, there is no existing scale that measures constructs relevant to the non-conveyance context. As a psychological construct (such as the decision not to convey a patient to hospital) is essentially an abstract representation of a phenomenon, which is unobservable as a behavioural dimension (Nunnally, 1978), it is central to the development of new measures that any survey instrument adequately represents the constructs of interest (Hinkin, 1998).

#### *3.4.2 Design*

A two-stage process was undertaken to develop and test the survey instrument, the Decision Making in Ambulance Service non-Conveyance (DMASC) scale. The first stage of pre-pilot development work was undertaken with a stakeholder reference group who were involved in the selection and development of

potential survey items. Phase two involved piloting the DMASC and evaluating and assessing the potential for item reduction in order to compile the final survey.

### *3.4.3 Item development*

The initial items were generated following examination of the literature, a technique utilised by Ivankova and Stick (2007), and Rattray, Johnston and Wildsmith (2014). Using this deductive approach to scale development it was hoped that the items would exhibit content validity in the final measure (Hinkin 1998). Seven areas relating to clinical decision-making in the non-conveyance context were initially proposed:

- Decision making awareness
- Need for support/autonomy
- Situational/patient characteristics
- Experience
- Perceived risk
- Ambulance specific issues (policy/registration concerns)
- Safety netting (ensuring systems are in place for safe monitoring and follow-up)

An initial list of 29 possible items aimed at measuring these constructs was shared with a group of experienced ambulance clinicians and clinical supervisors working in the ambulance control room (see Appendix D). These twelve individuals are part of the 'Right Care' Champions group in the ambulance service in which this study is set. The Right Care Group exists to support the organisation's non-conveyance trajectory but frames the approach

in a way felt to be more resonant with clinicians, that of delivering 'the right care, in the right place at the right time'. This group agreed to a role as 'expert reference group' for this component of the wider study.

The group reviewed copies of the proposed items as the first stage of producing a pilot survey. Feedback was received both through discussion during a group meeting, and also in written form as the Right Care Champions commented on the items.

Of the 29 items presented for discussion, three were removed following stakeholder feedback. A single proposed item looking at the consideration of risk was not felt to be appropriate by the majority of the group. The item '*I do not consider the consequences for the patient when making a decision not to convey*' was felt to be indicative of dangerous clinical practice and stakeholders suggested this would attract a positive response bias, as it was felt that no registered clinician would indicate that they had not considered the consequences of their actions. The stakeholder reference group considered that any perceptions relating to risk taking would be more effectively, and appropriately, identified during focus group sessions.

The item '*I involve others in the decision to leave a patient at home only when the situation requires it*' was removed as the reference group considered there was overlap with similar items. A further item, relating to experience was removed as it was felt there was duplication with a subsequent item. This was a

positively loaded variant of *'My past experience has little to do with how I make the decision not to convey'*.

Suggestions for making the existing items clearer were received, alongside suggestions for new items. Five items were slightly re-worded, four of which related to the 'Need for support/autonomy' construct, and one to the 'safety netting' construct. The reference group proposed ten new items, five of which were weighted to the 'safety netting' construct. Some of the proposed new items concerned the issue of influence, and how decisions might be influenced in practice by workload. For example, on a busy shift it is not uncommon for the Ambulance Control Centre to encourage paramedic staff to clear the scene as soon as possible so they can be tasked to a new incident. Discharging patients at scene safely often takes more time than conveying them to the ED, especially in large urban conurbations.

Awareness of the alternative options was also thought to be important, whilst one survey item stated *'I mentally list the alternative options available to me'*, feedback from the group was that not all ambulance clinicians may be aware of these alternatives. The group also indicated that if a clinician is working outside of their usual geographic area, for instance on an overtime shift or on a 'relief' shift line, their awareness of alternative options may also be lacking.

Following this feedback the survey items were refined before undertaking a pilot with a wider sample of clinical staff. Thirty-five items were included in the pilot,

although it was anticipated that the number of items would reduce significantly following statistical analysis.

The distribution of items against each proposed factor in the pilot questionnaire is shown in table 1.

**Table 1:** *Distribution of items in the pilot questionnaire*

<b>Factor</b>	<b>Number of items</b>
<i>Decision making style</i>	4
<i>Need for support/autonomy</i>	6
<i>Situational/patient characteristics</i>	8
<i>Experience</i>	4
<i>Ambulance specific issues (policy/registration concerns)</i>	3
<i>Safety netting</i>	10

The opinion of the stakeholder reference group was that the items demonstrated clarity, the range of response options was relevant and that completion of the survey should not have an unacceptable time burden on participants.

A five-item Likert response format was used to measure the frequency with which respondents felt each statement reflected their decision-making in practice.

#### *3.4.4 Administration of the pilot questionnaire*

This initial pilot of 35 items (see tables 2 - 7) was administered to a sample of 40 ambulance clinicians in different geographical areas of the study site whilst

they were undertaking annual statutory training. After explaining the nature of the study and providing some background context the researcher asked for volunteers to participate in the pilot. It was specified that completion of the pilot instrument was not mandatory, and the researcher left paper copies of the survey for willing participants to complete, which were collated and returned by post.

**Table 2:** *Pilot survey items relating to decision-making style*

<b>Number</b>	<b>Item</b>
11	I take the time to consider the 'what ifs' every time I make a decision to leave a patient at home
12	I regularly reflect on my patient contacts and the decisions I make
20	I mentally list the alternative options available to me before making a decision
21	I trust my initial instinct when making clinical decisions

**Table 3:** *Pilot survey items relating to the need for support/autonomy*

<b>Number</b>	<b>Item</b>
1	I make non-conveyance decisions autonomously using the information available to me
2	I seek clinical support from operational colleagues when making a decision not to convey
3	I seek clinical support from other Health Care Professionals when making a decision not to convey
4	I seek clinical support from Clinical Supervisors in the Control room when making a decision not to convey
9	I lack confidence when making decisions to leave a patient at home
10	I am confident in my ability to make a decision to leave a patient at home



**Table 4:** *Pilot survey items relating to situational/patient characteristics*

<b>Number</b>	<b>Item</b>
5	I make non-conveyance decisions based on clinical need
6	I make non-conveyance decisions based on social need
14	My decision to leave a patient at home is influenced by ambulance control
15	The information on the Mobile Data Screen can influence my decision not to convey
26	I consider leaving patients at home when they have social needs even if there is no responsible adult to sit with them
27	A patient's reluctance to go to hospital would not influence my decision to leave them at home
28	I am more confident in my decision to leave a patient at home if there is someone with them
29	I would only leave a patient at home if they consent to be left

**Table 5:** *Pilot survey items relating to experience*

<b>Number</b>	<b>Item</b>
7	I make decisions based on those I have made in the past in similar circumstances
8	Knowledge of patients I attend regularly influences my decision to convey
30	My past experience has little to do with how I make a decision to convey
31	I am confident that my clinical education supports me in my decision-making

**Table 6:** *Pilot survey items relating to ambulance specific issues*

<b>Number</b>	<b>Item</b>
16	When considering leaving a patient at home I feel I have to 'cover my back'
17	I consider Trust policy requirements when leaving a patient at home
18	I feel pressure to increase my non-conveyance rate

**Table 7: Pilot survey items relating to safety netting**

<b>Number</b>	<b>Item</b>
13	I am prepared to leave a patient on scene until another Health Care Professional attends
19	I ensure I safety net appropriately
22	I am able to return and review patients I have left at home
23	I access alternative care pathways when leaving a patient at home
24	Alternative care pathways are not always available to me when I make a decision not to convey
25	I would consider leaving a patient at home when operating outside of my local area
32	I am aware of alternative care pathways outside of my local operating area
33	Appropriate safety netting is difficult in practice
34	I understand the concept of safety netting when leaving a patient at home
35	I am confident I can make safe non-conveyance decisions

#### *3.4.5 Pilot participant demographics*

Of the 40 ambulance clinicians who participated in the pilot of the survey tool, 79% (n = 30) were aged between 35 and 55 years. The majority of the participants in the pilot phase were clinically qualified to Paramedic level (70%), with 13% holding an Advanced Technician qualification. Four were clinically qualified to Practitioner level and there were two student paramedics.

Educational qualifications to GCE/CSE/GCSE level (UK secondary school leaving standard) were held by 35% of the pilot participants, with 29% holding a full BSc/BA degree. Over half the participants (55%) had been in the ambulance service for over 15 years, and 39.5% had been employed in their current role for between 7 – 15 years.

### 3.5 Results

The initial descriptive statistics were examined to identify those that had poor discriminatory power, or demonstrated a skewed distribution. A preliminary Exploratory Factor Analysis (Principal Components) of the 35 pilot items was conducted to identify and remove redundant or psychometrically inadequate items. Item skewness and kurtosis were assessed using the single sample z-test (Tabachnik and Fidell 1996). Examination of histograms and normal distribution curves for the items indicated 18 potentially skewed items, with a range of standard deviations and means displayed – from 0.677 (mean 4.05) to 1.335 (mean 2.25). Five items that appeared to have a negative kurtosis were removed from the scale at this stage.

Z scores were calculated for the 30 items remaining and any greater than 1.96 (significant at  $p < 0.05$  in the normal distribution table), were removed, which ruled out a further 13 items. These were items 1, 5, 7, 9, 10, 12, 15, 16, 17, 20, 21, 24, and 34. An orthogonal (Varimax) principal components analysis was completed on the remaining 17 items.

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.948	17.344	17.344	2.948	17.344	17.344	2.308	13.578	13.578
2	2.314	13.612	30.956	2.314	13.612	30.956	1.880	11.058	24.636
3	1.934	11.378	42.335	1.934	11.378	42.335	1.804	10.615	35.250
4	1.669	9.820	52.155	1.669	9.820	52.155	1.775	10.441	45.691
5	1.431	8.415	60.570	1.431	8.415	60.570	1.710	10.061	55.752
6	1.141	6.713	67.283	1.141	6.713	67.283	1.673	9.840	65.592
7	1.054	6.198	73.481	1.054	6.198	73.481	1.341	7.889	73.481
8	.873	5.134	78.614						
9	.710	4.178	82.793						
10	.620	3.648	86.441						
11	.524	3.083	89.524						
12	.421	2.475	91.999						
13	.407	2.392	94.391						
14	.319	1.878	96.269						
15	.297	1.749	98.017						
16	.216	1.272	99.290						
17	.121	.710	100.000						

Extraction Method: Principal Component Analysis.

**Table 8:** *Principal Component Analysis of 17 pilot items*

Table 8 shows the total variance before extraction. Of the 17 linear components in the dataset, factor 1 accounted for 17% of the variance, factor 2 for 13.6% and factor 3 for 11.3%. There were seven factors with an eigenvalue of greater than one. Following extraction, once the factor structure was optimised, factor 1 explained 13.6% of the variance. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.453. Six individual variables had a KMO of greater than 0.5, and eight significantly lower than 0.5. Three were very close to the 0.5 threshold, so the analysis was re-run with just the nine variables with a reasonable KMO (close to the 0.5 threshold or above). This iteration of the analysis removed all items associated with the 'Decision-making style' and 'Ambulance specific issue' factors.

A second PCA was conducted with all the same settings as previously on the nine remaining items. The overall KMO was 0.549 and the anti-image correlation matrix showed that seven of the nine items had a KMO of greater than 0.5. Bartlett's test of sphericity  $\chi^2$  (36) was 58.016,  $p < 0.01$ , indicating that the correlations between the items were large enough to run the principal components analysis, see Table 9.

**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	1	2.041	22.675	22.675	2.041	22.675	22.675	1.779	19.765
2	1.766	19.626	42.301	1.766	19.626	42.301	1.638	18.203	37.968
3	1.521	16.898	59.199	1.521	16.898	59.199	1.584	17.601	55.569
4	1.147	12.742	71.941	1.147	12.742	71.941	1.473	16.372	71.941
5	.711	7.903	79.844						
6	.573	6.368	86.211						
7	.508	5.648	91.859						
8	.393	4.361	96.221						
9	.340	3.779	100.000						

Extraction Method: Principal Component Analysis.

**Table 9:** *Principal Component Analysis of nine items*

This second PCA extracted four factors with eigenvalues greater than one, accounting for 71.94% of the variance. The nine items were associated with the four factors as shown in table 10.

Factor	Items
Experience	<i>Knowledge of patients I attend regularly influences my decision to convey</i>
	<i>My past experience has little to do with how I make a decision to convey</i>
Support	<i>I seek clinical support from operational colleagues when making a decision not to convey</i>
Patient characteristics	<i>I consider leaving patients at home when they have social needs even if there is no responsible adult to sit with them</i>
	<i>A patients reluctance to go to hospital would not influence my decision to leave them at home</i>
	<i>I would only leave a patient at home if they consent to be left</i>
Safety netting	<i>I am prepared to leave a patient at scene until another Health Care Professional attends</i>
	<i>I am able to return and review patients I have left at home</i>
	<i>Appropriate safety netting is difficult in practice</i>

**Table 10:** Final factor structure for DMASC scale

The nine-item scale failed to achieve balance across all factors, as the number of items relating to each subscale was not equal. A decision was taken to include a further three items which had been removed in order to achieve this. Of the items added, two related to the 'need for support/autonomy' factor (items 1 and 3), and one was related to the 'experience' factor (item 30).

### **3.6 Discussion**

This paper has described the development of a measure (the DMASC survey), to identify and assess factors that may influence a pre-hospital clinician's decisions not to convey a patient to the ED. A nine item four component structure emerged from the exploratory factor analysis. These components were labelled 'experience', 'need for support/autonomy', 'patient characteristics' and 'safety netting', and explained 71.94% of the variance.

Reliability in the development of the DMASC was satisfactory and the item-factor correlations supported the inclusion of each item within each of the four components. Using an expert reference group to develop the scale supported content validity, with the clarity and relevance of items confirmed in the initial stages.

There are, however, a number of limitations to this study. Participant self-report methods may be subject to a range of biases, including social desirability bias. Whilst the aim of this pilot study was to understand the potential psychometric utility of the DMASC scale, self-report may also be influenced by extreme responders or those who prefer the mid point in a ratings scale. The

study was underpowered; the sample size was small for running an exploratory factor analysis. Ferguson and Cox (1993) have suggested that the sample size required should be over one hundred. Additionally, the KMO measure of sampling adequacy (0.453) was lower than 0.5, which is the standard threshold for acceptability, and also indicates that more data would have been useful. The final survey instrument included three items that were not incorporated in the final principal components analysis. These were added in to achieve balance across the four subscales; future Confirmatory Factor Analyses using the twelve-item scale in a larger sample would be helpful in determining the psychometric and research utility of the scale.

Despite these constraints, this approach to developing a new measure of ambulance service personnel decision-making has the merit of starting with concepts considered by an expert reference group to be most relevant; and subjecting these preliminary items to further psychometric evaluation. Further studies could explore the concurrent validity of the subscales with other measures of decision-making and their predictive validity in distinguishing between how practitioners of different grades and length of experience decide whether to leave patients on scene.





## **Title Decision-making in Ambulance Service non-conveyance – The DMASC survey**

**Target journal:** Emergency Medicine Journal

### **4.1 Abstract**

A variety of factors may affect the decision making of pre-hospital clinicians when considering the appropriateness of conveying a patient to the Emergency Department. This study was undertaken to determine those that ambulance clinicians consider most salient when making a decision to leave a patient at scene following attendance at a 999 call. A cross-sectional electronic questionnaire, the Decision-making in Ambulance Service non-Conveyance (DMASC) Scale was used to survey 350 pre-hospital clinicians from a large UK NHS Ambulance Trust. The study instrument included items pertaining to four subscales: the autonomy with which non-conveyance decisions were made; steps taken to safeguard those decisions; the impact of previous experience; and patient characteristics on the decision to leave a patient at home. The 12 items contained in the DMASC scale were followed by the Rational Experiential Inventory (REI-40); a validated psychometric tool that determines preferred decision-making style.

Of 121 respondents (34.6% response rate), 89.3% had over seven years service. Individual item responses indicate that respondents felt they make autonomous decisions, and do not frequently involve other Health Care Professionals in their decision not to convey. There were no overall significant differences between clinical grades and DMASC scores, although there was a significant interaction between grade and the subscales Experience and Patient Characteristics, with more skilled practitioners scoring

higher. Similarly this study found no overall difference on the scale in the length of time respondents had been in their clinical role and their score, although there was a significant difference between staff in post less than two years, and their colleagues in post for between seven and fifteen years on the Safety Netting subscale.

Scores from the REI-40 showed no overall significant differences between different clinical grades and their decision making style, although ambulance crew with between 3 – 6 years' experience scored significantly higher on the Rational scale than those with between 7 and 15 years' experience.

## **4.2 Introduction**

Understanding how ambulance clinicians make decisions, specifically in relation to discharging patients at scene has never been more topical. English NHS Ambulance Services routinely leave between 30% - 50% of their patients at home without conveying them to an Emergency Department (AACE, 2016). This is very different to historical operating models, whereby the expected (and observed) outcome of a 999 emergency call was that an ambulance would transfer a patient to hospital.

Decision making in the pre-hospital environment has always been somewhat distinctive from other health contexts; ambulance clinicians make increasingly complex decisions, in a variety of settings, dealing with an ever-widening range of patient conditions, and often have few resources available to support them other than a single ambulance crew colleague (Jensen, Bienkowski, Travers, Calder, Walker et al 2016). Additionally, the route into the profession has largely

been vocational, with a shift towards higher education only in recent times meaning that a significant proportion of the workforce have received little or no formal training on the theory of clinical decision making and how to apply it to ensure safe practice (O'Hara, Johnson, Hirst, Wayman, Shaw et al 2014).

The development of professional paramedic education has important correlates to the style of learning associated with wider medical and nursing education. Vocational curricula have enforced learning clinical skills, underpinned with knowledge of signs and symptoms, alongside what was essentially protocol driven practice. It was not until 2000 that a set of national clinical guidelines were developed for UK ambulance services (JRCALC, 2000), accompanied by a shift from a protocol-driven delivery of pre-hospital care to autonomy in clinical decision making, afforded by the adoption of best practice guidance.

The vocational route has been criticised for its 'surface learning' approach (Williams & Woollard, 2002; Kilner, 2004; Cooper, 2005), which does not allow students a thorough understanding of their subject area. In moving away from the rigid application of protocols to a position where pre-hospital clinicians have the freedom to apply clinical discretion in the context of evidence based guidelines, an important element of underpinning knowledge has been missed, namely education on clinical decision-making. This gap, between the changing experience and expectations of modern pre-hospital practice and the underpinning educational provision, has been noted in a variety of studies, including reflective case presentations (Roberts, 2015), comparisons of both the

Higher Educational and vocational routes to Paramedic practice (Ryan & Halliwell, 2012), and qualitative work (Atack & Maher, 2010).

Some work has been conducted outside the UK to explore the preferred decision-making styles of paramedics. Using a validated psychometric tool, the REI-40 (Pacini & Epstein 1999), Jensen et al (2016) established that both qualified paramedics, and students, exhibited a preference for clinical decisions based on rational over experiential thought processes. Conversely, within UK ambulance service, Snooks, Kearsley, Dale, Halter, Redhead et al (2005) used a qualitative methodology and found ambulance crews report relying on their intuition and experience, especially in relation to decisions to leave patients at home.

Albeit in an Emergency Medical System (EMS) outside the UK, participants in Atack and Maher's 2010 study reflected that emergency service providers had significant patient safety concerns arising from their perceived knowledge gaps around clinical decision-making. This, coupled with what the authors described as 'scope creep', impacted on the pre-hospital clinicians' confidence in their decision-making ability. 'Scope creep' in this context describes the additional skills and responsibilities added to clinical practice without perhaps the requisite educational foundation and practical consolidation of clinical skills which may be afforded in other health professions. Within UK Paramedic practice the range of pharmacological treatments and clinical interventions available has increased almost exponentially within the last fifteen years (Commission for Health Improvement, 2003; Department of Health 2005; Clompus & Albarran, 2016). However beyond initial clinical training most services have a very limited

schedule of continuing professional development, often little more than one or two days annually to cover mandatory topics such as infection control and safeguarding (O'Hara, et al, 2014).

Clinical decision-making by paramedics has largely been studied utilising qualitative methodologies, with a wide focus on decision-making and how it may be supported, rather than a narrower one concerned with decisions to discharge patients at scene. In a recent systematic review Fisher, Freeman, Clarke, Spurgeon, Smyth, et al (2015) examined the literature in relation to patient safety and risk, while other studies have focused on specific patient groups. These have included elderly people who have fallen (Snooks, Anthony, Chatters, Dale, Fothergill, et al 2017; Halter et al 2011; Dixon, Mason, Knowles, Colwell, Wardrope et al 2008), specific conditions such as hypoglycaemia (Fitzpatrick & Duncan, 2009; Cain, Ackroyd, Stolarz, Alexiadis & Murray, 2003; Lerner, Billittier, Lance, Janicke & Teuscher, 2003; Anderson, Hogskilde, Wetterslev, Bredgaard; Moller et al, 2002) or epilepsy (Mecham et al 2001), and resuscitation (Brandling et al 2017, Marco & Shears 2003).

In a multi site, qualitative mixed method study, O Hara et al (2014) classified nine types of decision, from clear-cut decisions to convey a patient in an emergency; through decisions based on local protocols such as bypassing a local hospital to take a patient to a specialist centre. More complex decisions, which often involve primary care presentations, are described as those where paramedics experience higher degrees of uncertainty, as they are less clear-cut

and may involve a range of psychosocial considerations in addition to the clinical concern. O'Hara et al (2014) identified seven overarching system influences which may impact on decisions made during the transitions in pre-hospital care. These included managing increased demand and performance priorities, education and the availability of feedback, risk aversion, and access to alternative methods of discharging a patient.

There is not a large body of literature examining paramedic decision-making, and very little that relates specifically to the features that contribute to how pre-hospital clinicians make decisions to discharge patients at scene. The aim of this study was therefore to explore the individual and system factors that may influence the decision of a pre-hospital clinician not to convey a patient following a 999 call and establish the preferred decision-making style of pre-hospital clinicians in a large UK ambulance service.

## **4.3 Methods**

### *4.3.1 Participants*

A total of 350 ambulance clinicians were invited to voluntarily participate in this study. At the time this study was undertaken the study site employed 1,932 clinical staff, of whom 1,198 met the inclusion criteria. Participants' clinical grade was identified from their staff payroll number, and a random stratified sampling technique undertaken by a member of the R&D team, not by the researcher, to ensure anonymity.

#### *4.3.2 Inclusion criteria*

- Frontline A&E (999) ambulance clinicians employed on a permanent basis by the Trust.
- Frontline A&E (999) ambulance clinicians employed at a clinical grade of Ambulance Technician level or above.

#### *4.3.3 Exclusion criteria*

- Frontline emergency A&E (999) ambulance clinicians who are not employed on a permanent basis by the Trust.
- Frontline emergency A&E (999) ambulance clinicians who are at Emergency Care Assistant or Student Paramedic grades.
- Other ambulance service employees who are not frontline emergency (999) clinicians (e.g. Ambulance Care Assistants, administrative support staff, 999 Control Centre staff)

The decision to exclude clinical staff below the Technician grade was taken for pragmatic reasons as it is the policy of the study site that Student Paramedics and Emergency Care Assistants would not be working alone and making an autonomous decision to leave a patient at home.

On the advice of feedback from the Trust's Research and Development group (who provided Research Governance Approval for the study), Senior Clinical or Operational Managers were also excluded from the survey, as it was felt that the impact of their more strategic experience might not be representative of the wider clinical group of interest.

#### 4.3.4 Sample size

Sample size calculation was undertaken using G\*Power 3.1, (Faul et al 2009). A minimum sample size of 153 participants was required to detect a medium effect (Cohen's  $f^2 = 0.15$ , power 0.95). Previous staff surveys at the study site have achieved response rates of around 51% therefore in order to mitigate a non-response rate of 50% to the survey a total of 350 clinicians meeting the inclusion criteria were invited to participate.

#### 4.3.5 Materials

The DMASC survey instrument, developed and piloted within the study site, was used, along with the 40 items in the abridged version of the Rational Experiential Inventory (REI-40) (Pacini & Epstein 1999). The DMASC comprised 12 items reflecting four subscales as follows:

- Experience – the extent to which respondents considered their clinical experience and educational background influence decisions not to convey.
- Support – the extent to which respondents considered they required support or were autonomous in reaching a decision not to convey.
- Patient characteristics – the extent to which respondents felt confident in their decision not to convey if a patient was reluctant or refused consent
- Safety netting – the extent to which respondents were satisfied that patients who were discharged without conveyance would not be exposed to risk of harm.



A five-item Likert type response format was used for the DMASC tool, to measure the frequency with which respondents felt each statement reflected their decision-making in practice.

The REI-40 is a previously published psychometric tool, which has been validated in a number of different populations and is used to determine a respondent's preferred decision-making style. It has been shown to be highly reliable and consistent with other instruments that aim to assess decision-making from a dual process theory perspective (Pacini & Epstein, 1999; Bjorklund & Backstrom, 2008; Calder, Forster, Stiell, Carr, Brehaut et al, 2011; Jensen et al, 2016). The tool consists of twenty questions evaluating either rational or experiential thinking styles, with a further 10 assessing preference and 10 assessing the ability to use that style.

#### *4.3.6 Procedure*

A personal e-mail communication, containing a link to the electronic survey platform Survey Monkey™ was sent to each of the invited participants from the generic mailbox of the Research and Audit Department within the study site. The survey included an introductory paragraph outlining the aims of the study, contact details of the researcher and assuring respondents of the confidentiality and anonymous nature of their responses. Consent to participate was assumed if the respondent completed the survey, although an option to withdraw all or part of the response was provided. In order to preserve the anonymity of potential respondents, the author had no access to the mailbox from which the invitation was sent. Reminder emails were sent to all participants at two

subsequent intervals, along with a final reminder of the closing date of the study. No incentives were offered for participation in the study.

#### *4.3.7 Statistical Analysis*

All demographic data were analysed using descriptive statistics. The impact of respondent clinical grade and length of time in current clinical role on the DMASC subscale scores was assessed using a two-way mixed within (DMASC subscale score) and between (clinical grade/time in role) groups ANOVA.

Differences between clinical grades and groups based on length of time in role on the REI-40 Rational and Emotional subscale scores were explored using one-way ANOVA.

### **4.4 Results**

During the study period, 132 responses were received. Of these complete responses were obtained for 121 participants (92% of the total); these data are included in the analyses reported below.

#### *4.4.1 Participant characteristics*

Of the 121 respondents to the DMASC survey, 88.4% (n = 107) were qualified to at least Paramedic level, with 15% (n = 16) of these having obtained a specialist paramedic or Emergency Care Practitioner (ECP) grade. The majority of respondents (89.3%, n = 108) had been in the ambulance service for longer than 7 years, and 63.6% of the total respondents obtained their Paramedic qualification through the IHCD (vocational) route – see Table 11.

**Table 11: Participant characteristics**

	<b>N (%)</b>
<b>Age in years</b>	
18 – 25	7 (5.8)
26 -34	20 (16.5)
35 – 45	48 (39.7)
46 – 55	33 (27.3)
>55	13 (10.7)
<b>Clinical grade</b>	
<i>Specialist Paramedic/ECP</i>	16 (13.2)
<i>Paramedic</i>	91 (75.2)
<i>Advanced Technician</i>	14 (11.6)
<b>Route to Paramedic qualification</b>	
<i>IHCD</i>	77 (63.6)
<i>Higher Education Degree</i>	27 (22.3)
<i>Not Applicable</i>	14 (11.6)
<i>Missing</i>	3 (2.5)
<b>Highest qualification</b>	
<i>CSE/GCE/GCSE</i>	32 (26.4)
<i>AS/A level</i>	13 (10.7)
<i>Foundation Degree</i>	17 (14.0)
<i>Dip HE/BTEC</i>	21 (17.4)
<i>BSc/BA</i>	37 (30.6)
<i>MSc/MA</i>	1 (0.8)
<b>Length of service in years</b>	
0 – 2 years	6 (5.0)
3 – 6 years	7 (5.8)
7 – 15 years	64 (52.9)
>15 years	44 (36.4)

The majority of HCPC registered respondents gained their paramedic qualification through the vocational, IHCD route, (71.5% for paramedics and 87.5% for ECPs). However when exploring the highest qualification the participants had obtained, 62.5% of ECPs, 63.7% of paramedics, and 50% of advanced technicians had obtained a higher qualification than that gained at

secondary education level. Unsurprisingly, of the respondents who had been in the service for more seven years, 63.6% gained their paramedic qualification through the IHCD, and those that gained their paramedic qualification through the University route had a shorter length of service (48% up to six years service).

#### *4.4.2 Individual item responses*

Agreement with individual responses to each item on the DMASC scale is shown in table 12. This summary data would appear to indicate that respondents considered that they made decisions regarding non-conveyance autonomously, rarely seeking support from colleagues or other health professionals. They report that previous clinical experience does not seem to affect their decision-making, although patients they see regularly may influence them.

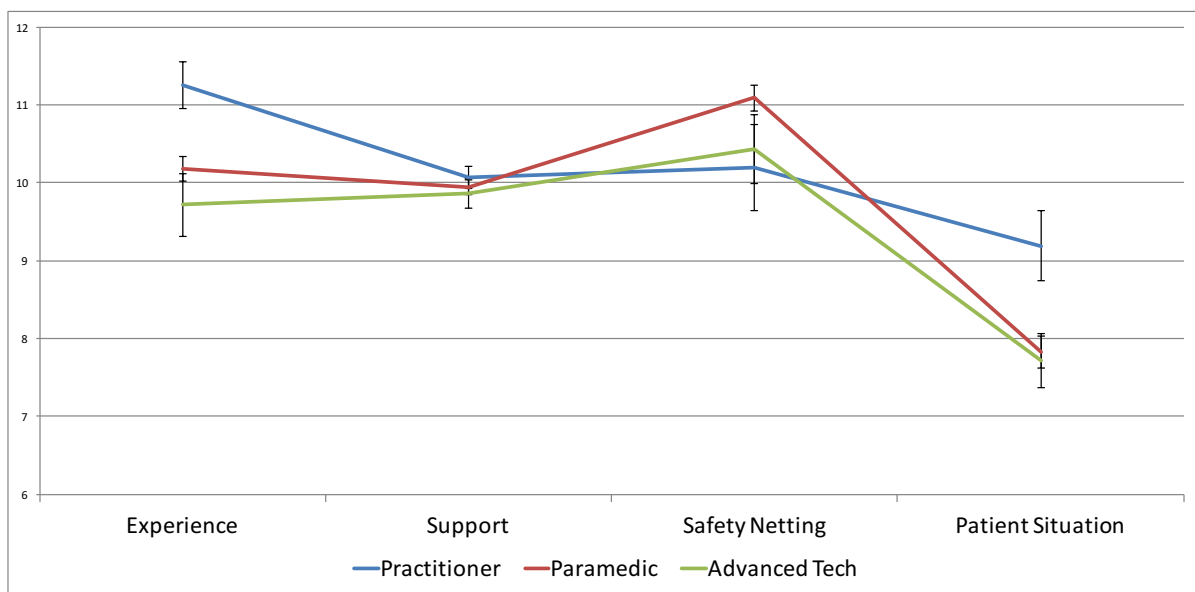
Few of the respondents have the opportunity to return and review patients they have discharged at scene, this would usually be within the remit of the practitioner, although a majority would be comfortable with leaving a patient at scene following referral to another health professional.

**Table 12 – Percentage agreement with individual DMASC items**

DMASC subscale	Item	% Strongly Agreed	% Agreed
Experience	Knowledge of patients I attend regularly influences my decision to convey	5%	52.1%
	My past experience has little to do with how I make a decision not to convey	1.7%	10.7%
	I am confident that my clinical education supports me in my decision making	16.5%	54.5%
Support	I make non-conveyance decisions autonomously using the information available to me	29.8%	62.8%
	I seek clinical support from operational colleagues when making a decision not to convey a patient	1.7%	16.5%
	I seek clinical support from other Health Care Professionals when making a decision not to convey a patient	3.3%	26.4%
Patient Characteristics	A patient's reluctance to go to hospital would not influence my clinical decision to leave them at home	9.1%	57%
	I consider leaving patients at home when they have social needs, even if there is no responsible adult to sit with them	2.5%	31.4%
	I would only leave a patient at home if they consent to be left	14%	42.1%
Safety netting	I am able to return and review patients I have left at home	2.5%	9.9%
	I am prepared to leave a patient on scene until another HCP attends	25.6%	55.4%
	Appropriate safety netting is difficult in practice	4.1%	24.8%

#### 4.4.3 Statistical analysis of DMASC

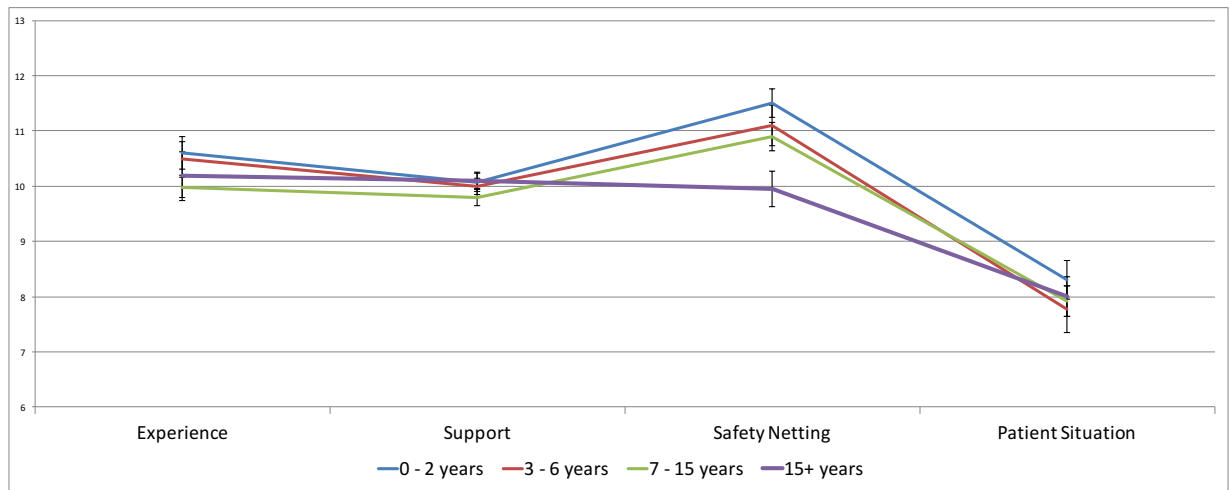
There were no overall significant differences between the clinical grades in DMASC scores,  $F(2,118) = 2.67$ , ns. However, as Figure 3 indicates, there was a significant interaction between clinical grade and individual DMASC subscales,  $F(6,354) = 7.48$ ,  $p < 0.001$ . Post hoc Tukey's Honest Significant Difference tests revealed that Emergency Care Practitioners scored significantly higher than the other two groups on the Experience [ $F(2, 118) = 4.56$ ,  $p < 0.05$ ] and Patient Situation [ $F(2,118) = 4.05$ ,  $p < 0.05$ ] subscales.



**Figure 3:** Total (standard error) DMASC subscale score by clinical grade

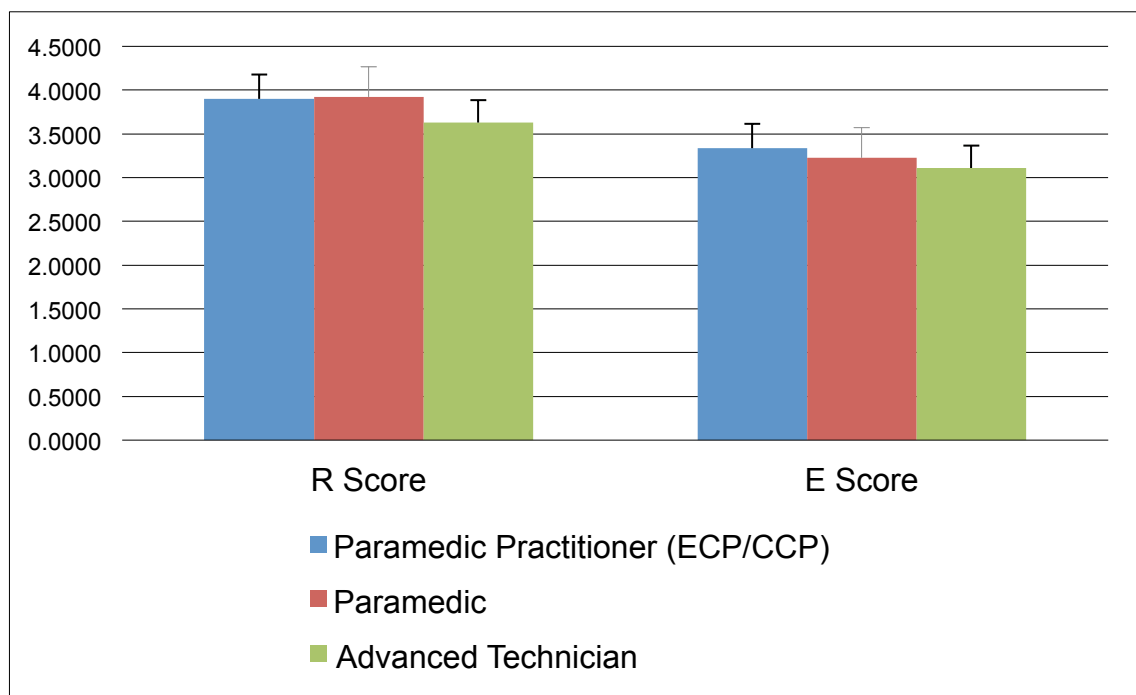
Similarly, there were no overall significant differences between length of experience in current role and DMASC subscale scores,  $F(3,109) = 0.48$ , ns. However, as Figure 4 indicates, there was a significant interaction between time in current role and individual DMASC subscales,  $F(9,351) = 7.96$ ,  $p < 0.001$ . Post hoc Tukey's Honest Significance Difference tests revealed that staff with

less than two years in role scored significantly higher on Safety Netting than those with more than 15 years. [F (3, 117) = 3.71, p < 0.05].



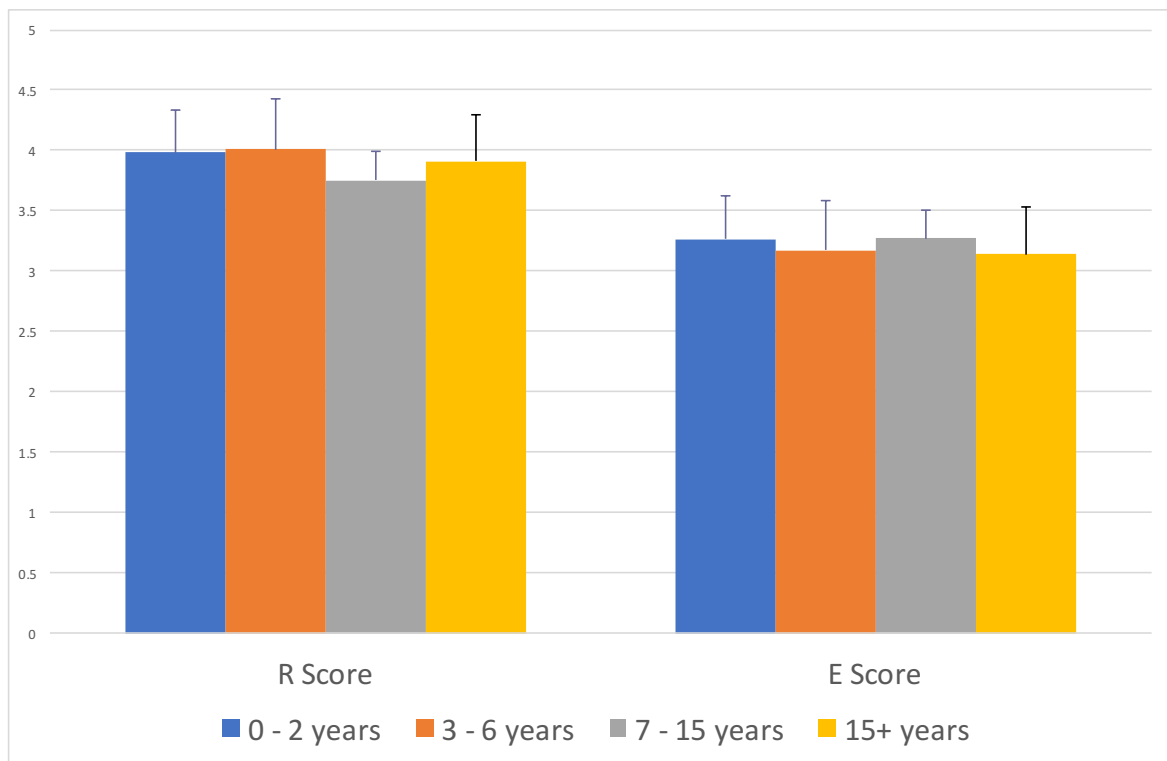
**Figure 4:** Total (standard error) DMASC subscale score by time in current role

#### 4.4.3 Statistical analysis of REI-40



**Figure 5:** Mean (Standard Error) Rational (R) and Experiential (E) scores on the REI-40 by clinical grade.

As Figure 5 indicates, there were no overall significant differences between clinical grades on Mean R Score [ $F(2,118) = 2.81, ns$ ] or Mean E Score [ $F(2,118) = 0.85, ns$ ].



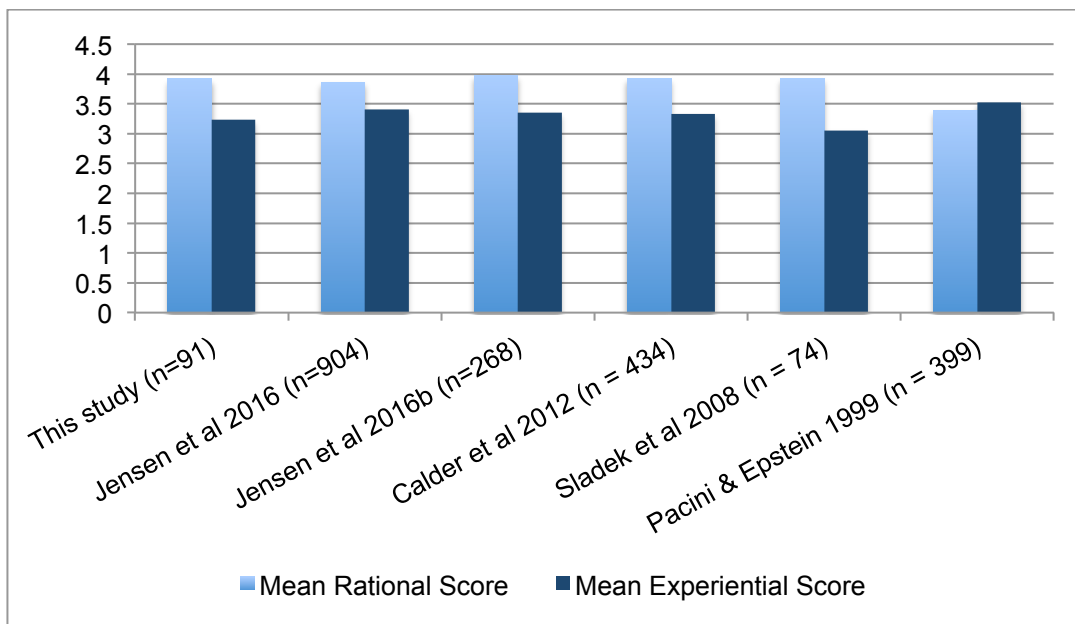
**Figure 6:** Mean (Standard Error) Rational (R) and Experiential (E) scores on the REI-40 by time in current grade.

Conversely, there were overall significant differences between groups based on length of experience in current role [ $F(3,117) = 2.71, p < 0.05$ ] on mean Rational scale scores. Post hoc Tukey's Honest Significant Difference tests indicate that crew with between 3 – 6 years' experience scored significantly higher on the Rational scale than those with between 7 and 15 years' experience; see Figure 6.

The mean rational and experiential scores are compared in Figure 7 to published results from other study groups where the REI-40 has been used. Jensen et al (2016) found that both qualified paramedics and students in Canada showed a preference for rational thinking styles. Similar results were



found in a sample of Canadian Emergency Care Physicians (Calder et al, 2011), and Cardiologists based in New Zealand (Sladek, Bond, Huynh, Chew and Phillips, 2008). The published results are compared with the original work from Pacini and Epstein (1999) who used the REI-40 in a population of USA college students.



**Figure 7: Mean Rational and Experiential scores**

#### 4.5 Discussion

This study aimed to explore the utility of the DMASC survey in establishing differences in the factors that ambulance clinicians identified as influencing their decisions to leave patients at home following a 999 call. One hundred and twenty one complete responses were obtained, a response rate of 34.6%. Individual item responses indicated that respondents considered they made autonomous decisions to leave patients at home, rarely seeking support from others. This has resonance with the findings from Jensen et al (2016) who identified that are very few resources available to support paramedic decision-making at scene when deciding not to transfer a patient, but it also raises the

question whether ambulance clinicians feel they have to be autonomous because of a potential lack of accessible support. Experience did not appear to be a factor that influenced respondents' decisions, although knowledge of patients they attended frequently might.

When examining the composite scores of the DMASC subscales, Emergency Care Practitioners (ECPs) had higher scores on the 'Experience' and 'Patient Characteristics' subscales, with a significant interaction found compared to other clinical grades. This suggests that the influence of their extended patient assessment skills means they are more likely to take a wider, holistic view of the patients they attend. Indeed the study by Snooks et al (2005), suggested that intuition and experience are important factors in decision-making, specifically in relation to non-conveyance, and results from the ECP cohort seem to support this position. All of the ECPs had been in clinical practice for a considerable length of time, most over ten years, and while the results from the REI-40 suggest a preference for rational thinking styles, it can be argued that the impact of experience on reasoning is significant but unconscious to the decision-maker.

These findings could also be viewed with reference to the concept of 'unconscious incompetence'. Kruger and Dunning (1999) highlight evidence that experts appear to rate their ability lower than novices, with individuals who are at an early stage in their career exhibiting higher degrees of confidence that are not reflective of their competence.

Respondents who had been in their role for less than two years scored significantly higher on the 'Safety netting' subscale than others. This result is

perhaps unsurprising as newer clinicians lack experience and may therefore be more likely to take actions to ensure that their clinical decision-making is safe by ensuring there are systems in place for monitoring and follow up.

The REI-40 instrument was used to examine the preferred thinking styles of respondents, and found that these were comparable to results from other published studies, with ambulance clinicians at the study site reporting a preference for rational thinking. There was no significant overall difference in the mean rational or experiential scores between clinical grades, although there was significant effect of the length of time clinicians had been in their current role. Those who had been in practice between 3 and 6 years scored significantly higher on the Rational scale than those with between 7 and 15 years' experience.

Implications for practice arising from these results are that support and clinical mentorship of newly qualified paramedics should be formalised to support safe decision-making when leaving patients at home. It also suggests that ECPs may be using different decision-making heuristics than other grades to inform their confidence in leaving patients at the scene. Further exploration of the factors influencing such decisions could have a profound effect on training and practice in pre-hospital care.

Interpreting the results it must be acknowledged that this study has limitations. The response rate was disappointing, despite the perceived saliency of the topic, and the study is underpowered. The number of clinical staff with less than seven years experience was small ( $n = 13$ ), so conclusions about the

differences between this group and their more experienced colleagues should be viewed with caution. In addition the study site has the highest rate of non-conveyance of all English ambulance services, and it is possible that this this outlying position may have affected the results.

While respondent's were invited to participate using a random, stratified sampling approach, their choice to complete the study was their own, and there are limitations arising from the self-selecting nature of participants that contribute to a voluntary response bias. When survey respondents are free to opt in, or out, of participation it is impossible to identify the characteristics of those who did not respond, thereby limiting the representativeness of the final sample compared to the population of interest.

In addition respondents may have differed in characteristics that were unmeasured, and the small sample size may have inflated the impact of this.

Nevertheless, this study suggests that the DMASC has potential utility in exploring decision-making in pre-hospital care. Future studies using the DMASC would benefit from a larger sample size, across a range of ambulance services, to provide more confidence in the results and improve the generalisability of the current findings.





## **Discharge at scene. Paramedic perceptions on non-conveyance following an emergency call.**

**Target journal: Qualitative Health Research**

### **5.1 Introduction**

A 2008 United Kingdom (UK) wide review of research priorities in pre-hospital care identified managing the increased demand for emergency care by safely reducing transportation to Emergency Department (ED) as a key theme. Half of the top twenty priorities were linked with reducing conveyance through the identification and provision of safe alternatives to hospital transfer. In a system where transfer to ED has historically been the default, it is perhaps unsurprising that concerns have been raised regarding the ability of ambulance crews to discharge patients at scene safely (Cooke, Fisher, Dale, McLeod, Szczepura et al 2004).

There is some evidence that in older people who have fallen there is an increased risk of subsequent hospitalisation and even death (Snooks, Halter, Close, Cheung, Moore et al 2006). For other clinical conditions there is a lack of consensus regarding the risks associated with decisions not to convey. United States (US) studies of hypoglycaemic emergencies indicated that pre-hospital clinicians can make safe decisions (Strote, Simmons & Eisenberg, 2008, Lerner, Billitier, Lane, Janicke, Teuscher 2003). However a UK study indicated that the safety of decisions to treat and leave this patient group is unknown (Fitzpatrick & Duncan 2009).

The views of paramedics regarding non-conveyance have been sought in one ambulance service to evaluate an intervention aiming to support decision-

making (Snooks, Kearsley, Dale, Halter, Redhead et al 2005). Identifying that transport to the ED was the pragmatic option, participants reported that they used their intuition and were guided by their experience, but welcomed support in making a non-conveyance decision (Snooks et al 2005). It has been suggested that emergency service crews are concerned about the outcomes for themselves professionally if they make an incorrect decision; reporting a need to 'cover their backs' when documenting a patient encounter and taking a risk averse perspective to non-conveyance (Porter, Snooks, Youren, Gaze, Whitfield, et al 2007). An exploratory mixed method study in three UK ambulance services identified a range of system influences that impact on decision-making during transitions of care, and also highlighted a low level of risk tolerance attributed to a perceived 'blame' culture (O'Hara, Johnson, Hirst, Weyman, Shaw et al 2014).

This study builds on the Decision Making in Ambulance Service non-Conveyance (DMASC) survey (Chapter 4, this volume), which found a significant interaction between the clinical grade of ambulance staff and their scores on subscales relating to 'Experience' and 'Patient characteristics'. The DMASC tool also identified a link between the length of time clinical staff had been in their role and 'safety netting' behaviours. This current study used qualitative analyses of focus groups to investigate the factors paramedics identified as influencing their decision to discharge patients at scene following a 999 call. This method was utilised to explore themes arising from the DMASC study, with the aim of gaining deeper understanding and insight into



paramedics' perceptions of the barriers, facilitators and influences on their clinical decision-making in this context.

## **5.2 Method**

### *5.2.1 Recruitment*

All respondents to the DMASC survey were invited to submit their contact details if they wished to participate in the focus group study; of the one hundred and twenty one respondents, twenty-three expressed an interest. However, due to the challenges of the diverse geography of the study site, the widely dispersed locations of the interested individuals, and the impact of their shift patterns, only two were able to take part, one at each focus group location. The two survey respondents acted as local collaborators and were instrumental in sharing information about the focus group within their sector to publicise the opportunity to participate. Participant contributions were not funded, although refreshments were made available at each site.

### *5.2.2 Study setting*

Two focus groups were held in separate counties of the study catchment area. Focus groups were held at ambulance service sites, one at an ambulance station, one at a training centre, and were moderated by the researcher. Each group generated a set of ground rules by consensus, and written consent was obtained once information relating to the aims and method of administration of the group was explained (see Appendix E).

Focus groups lasted between one to two hours and were audio-recorded. Audiotapes were transcribed verbatim and participants were given the opportunity to view the transcript, although none sought to do so. Within the transcript speakers are identified by a code: the letters represent the two different focus groups, while the number is used to distinguish between speakers in each group.

### *5.2.3 Analytical approach*

Thematic analysis was used to interpret the results, using a deductive theoretical approach at a semantic, explicit level (Boyatzis, 1998). This approach, described by Braun and Clarke (2006) is one where the analysis is driven by the specific research question of interest, which in turn influences the method of coding undertaken. A well-established, iterative approach to the thematic analysis was employed (Braun and Clarke 2006) which encompassed the following steps:

- Familiarisation with the data, reading and re-reading the verbatim transcripts
- Noting interesting and pertinent, ideas to generate initial codes
- Searching for themes by systematically organising initial code ideas with extracts from the transcript
- Reviewing themes to ensure they relate to the original text and are meaningful
- Summarising the narrative with clear definitions by defining and naming themes

The moderator topic guide was developed from the DMASC constructs and informed by a review of the relevant literature.

#### 5.2.4 Participants

Eleven paramedics consented to participate, with eight participants in focus group one, and three in the second group. The characteristics of participants are summarised in table 13. All participants in focus group two were Emergency Care Practitioners (ECPs), each with a considerable length of service, and this homogeneity is reflected in the analysis.

Focus group one comprised of participants with a broader range of experience and educational routes to their paramedic qualification. It should be noted that although all of the ECPs across both groups gained their paramedic registration through the vocational IHCD route, they all had to complete a BSc to gain their ECP award.

**Table 13:** *Characteristics of participants*

Participant ID*	Focus Group	Clinical Grade	Paramedic qualification route	Length of service in years	Time in current role in years
A, P1	1	Paramedic	IHCD	10	8
A, P2	1	Paramedic	IHCD	6	6
A, P3	1	ECP	IHCD	23	9
A, P4	1	Paramedic	HEI	9	0.5
A, P5	1	Paramedic	IHCD	9	6
A, P6	1	Paramedic	IHCD	14	9
A, P7	1	Paramedic	IHCD	14	9
A, P8	1	Paramedic	HEI	1.5	1.5
B, P1	2	ECP	IHCD	30	10
B, P2	2	ECP	IHCD	38	10
B, P3	2	ECP	IHCD	20	6

\*A refers to focus group 1; B refers to focus group 2. P denotes participant

### 5.3 Results

Five broad domains were identified before data saturation was considered to have been reached. These were formed from over twenty-five initial codes, which were collapsed into twelve overarching themes. The domains reflected both the individual and collective voices and experiences of the groups (see figure 8). The domains each include a number of related themes, which were Communication; The '3 E's' (Education, Exposure and Experience); Professionalism; Patient Characteristics, and System Influencers. The domains are inter-related and reflect the complex nature of clinical decision making undertaken by pre-hospital clinicians.



**Figure 8:** Five domains influencing paramedics' decisions to discharge at scene

### 5.3.1 Domain 1: Communication

This domain represents the range of communication skills that can be both a barrier and a facilitator in the decision to leave patients at scene without conveying them after a 999 call. Participants across both groups shared anecdotes to support their views, and supported each other with humour and general camaraderie when discussing this domain. The relative importance placed upon the ability to communicate effectively may be summed up by the following quote:

*“If you had carte blanche to select staff I always think you’d go for the natural communicators, the ones with the people skills, we can usually teach the science, but you can’t always do it the other way round” (B, P1)*

This domain includes a theme around negotiation, with the confidence to use language appropriate for the receiver to support the decision to leave patients at home. Sensitively managing expectations, both of other health professionals and parents and carers, also sits within this domain.

#### 5.3.1.1 Negotiation

Negotiation skills, whether done formally, with other health professionals, or more informally with patients and often their carers, were seen as a key attribute to successfully discharging a patient at scene. The following extract of a conversation in focus group one illustrates negotiation with relatives and patients, and how communication might be used to resolve potential conflict. It also illustrates how the group used humour to describe their experiences. Participant 7 often took the lead in breaking any group discomfort about the subject matter with a droll anecdote.

A, P8: *"It can be a difficult environment sometimes..."*

A, P1: *"It can be..."*

A, P8: *"...if the relatives want one thing and the patient wants another, there's numerous times you know, you get to a job and you almost feel like the relatives want you to take them away because it's just easier you know, they can't be bothered to ..."*

A, P7: *"Yes because they're off on holiday the next day!"* [Gentle laughter in the room]

A, P8: *"...yeah well y'know it's not always the right decision for the patient but, and that's a difficult situation but..."*

A, P5: *"Also when the patient really wants to go and you're like, you really don't need to go"*

A, P7: *"...you know when they've got their bag packed!"*

A, P4: *"Yes!"*

A, P5: *"You're convincing them that it's nothing that can't wait 'til morning, do you know what I mean?"*

The ECPs in focus group two described how they sometimes negotiated with ambulance control to enable them to return and review patients that they, or crews who have referred the patient to them, have discharged at scene. They highlighted benefits to the wider system by suggesting the likelihood of undesirable impacts downstream for both the service and the patient if their request is not complied with.

B, P1: *"I'm in the plan, but I can self allocate, so I call them, if somebody calls me I'll ask them, [Control] to allocate me to the job, I'll say call sign xxx wants me to go and see a job, and then I'll go and assess that patient and if I think that patient is going to need a call back as I call clear I'll say [to Control] I'm going to need to do a four hourly on this one, I'm going to need to come back in four hours or one of my colleagues will, so can I leave that with you or shall I task in four hours?"*

### 5.3.1.2 Managing expectations

Participants across both groups expressed frustration at the perceived lack of understanding regarding the role of the ambulance service. This was discussed with reference to patients and the public and also other health professionals.

There was a commonly expressed view that a patient's expectation, when told by the call taker that 'an ambulance is on its way', is heard by the receiver of the information as 'you will be conveyed to hospital'. There was acknowledgement that this was not an unreasonable expectation, given that historically this would have been the case. However it was noted that there was potential for conflict to arise when patients' expectations were not met.

A, P2: *"Still quite often you turn up and find that when they find out you're not taking them in, they can be like..."*

A, P8: *"They turn on you a little."*

A, P2: *"Yeah"*.

Using the appropriate language, specifically in relation to communication with other health professionals who may be able to facilitate a safe decision to leave a patient at scene, is also important. Participants in focus group two described how they are able to converse with General Practitioners (GPs) and ED Consultants using language that was less familiar to them when they were working in a paramedic role.

Being able to provide succinct information, relayed in a manner that is recognisable to the receiver was considered to be a factor in facilitating both access to alternative care pathways, or supporting and providing a safety net for patients who were left at scene.

B, P3: *"If I were ringing Out of Hours it will be to get a Dr to do something whereas if they're ringing [a crew] it could be to get one of them to come out"*

B, P1: *"You have to emphasise that you know, hang on I'm an ECP calling..."*

A, P2: *"yeah yeah"*

B, P1: *"...not a crew..."* [inaudible]

A, P2: *"Because you talk to them in their language"*

B, P1: *"...you have to bang it through the call taker that you're an ECP calling not a paramedic"*

B, P2 *"I have to say though some of the newer paramedics are up there, they can talk the talk some of them..."*

### 5.3.2 Domain 2: The three 'Es': Education, Exposure and Experience

The interdependence between Education, Exposure, and Experience (the '3 E's') was a common thread throughout both group discussions. The ECPs described the way in which their higher education had impacted on their clinical skills and knowledge base. However it was widely accepted that without exposure to a variety of patients, borne out of experience, education alone did not influence decision-making. The following extract from focus group two illustrates this.

B, P3: *"It's experience, it's 80%"*

B, P2: *"Yes of course, you get better with exposure"*

B, P1: *"Absolutely and I'll give you an example of that, if people, a lot of people have done the minor injury modules but all the experience is virtually worthless if they don't consolidate it"*

Similarly, in focus group one, a paramedic who qualified through the University route and had been in clinical practice for eighteen months reflected:

*"I think experience counts for everything really, I mean from my point of view when I was at Uni the emphasis was always on alternate care pathways and they really pushed that however without the experience behind you, you might miss certain things that other people pick up."* (A, P8)

There was also recognition from those who had undertaken their ECP training that more educational input might increase their caution about leaving people at home, as this exchange exemplifies:

A, P3: *"I think, the more you know, the more you kind of are aware of what you don't know, so from a graduate perspective, from my perspective, I think I'm more, probably risk averse at times, because there's a whole list of things that it could be that I can't rule out without specific testing 'um whereas historically from an IHCD route it would be you don't know what you don't know ..."*

A, P7: *"Yes I've heard, like [X colleague], said the same thing, I think he's done like modules and things and said the same, the more he found out the less*



*likely he was to leave people at home, so like I say, like you said, what we don't know..."*

Participants in focus group two shared a similar discourse, and their cohesiveness was apparent from the way in which they finished each other's sentences and suggested they knew what others were going to say.

B, P2: *"Learning is a lifelong experience..."*

B, P1: *"Yeah, yeah, yeah,"*

B, P2: *"...and now the more I know the more..."*

B, P1: and B, P3: [together] *"The more I know I don't know!"*

B, P2: *"...the more I know I don't know. So what you've got to do is you've got to give those people what you call the mechanical training, right at the beginning, so you've got to give them, you've got to teach them..."*

B, P1: *"Enough"*

B, P2: *"...you've got to teach them to do the right thing"*

B, P1: *"Can I go? 'Cos I know what you're going to say"*

It is unusual in NHS ambulance services that clinicians are able return to their base station in the course of a shift, except for their protected meal break. Those who had been in the service when demand was not so high reflected on the informal learning opportunities that 'down-time' on station afforded them, and lamented its loss.

Learning from more experienced clinicians in this way was described in both groups as a beneficial encounter, and one which could also be used for resilience and mutual support.

B, P3: *"One of the things we had which the newer paramedics haven't got is a crew room, you know that's where we learned, listening to someone say 'I've had this or this' because we're great at anecdotes so 'what did you do for that?' I learned so much with that, you haven't got that now"*

Moderator: *"So do you think that it was the case that you learnt a lot from those interactions because you hadn't had the experience?"*

B, P2: *"Yes, yes"*

B, P3: *"We're experienced now but a lot of that has come from the crew room and there's a knock on effect of it as well with psychosocial resilience, that actually that's somewhere where that was built up and how we deal with things because if you look at any paramedic who's had a complaint against them, that one thing will affect their decision making so much because..."*

B, P1: *"If they get a call out again for that..."*

*B, P3: “Exactly! And for the next 6 months every patient that that person sees, regardless of whether they’ve got itchy teeth they’re still going into hospital and it’s because there’s a resilience factor to it and it may be because they think what will the trust do what will happen will I lose my mortgage, whatever, but I think all that stems just from not having experienced people sat around just listening and talking and joining in, and being able to access that.”*

Similarly in focus group one participants reflected on the value they place on experience and how it compliments their knowledge base. Participant 8 identified the support that is obtained from more experienced practitioners like Participant 3. Participant 7 expressed how the older IHCD training route was heavily weighted towards resuscitation; but that reflects only a small proportion of the clinical presentations seen in the modern ambulance service, where exposure is central to understanding.

*A, P8: “So for instance someone like [P3] may go like ‘Well actually have you considered that, and I’ll be like well no actually I haven’t so I think experience is a big one definitely”*

*Moderator: “Experience as well as support though because...”*

*A, P8: “yeah potentially because like past experience is more like, actually clinically where you’ve been in that situation before then you, you learn from potential mistakes I guess”*

*Moderator: “ok, what does everyone else think?”*

*A, P7: “It’s funny because, the paramedic course we did there was no, like [P3] said you just did the systems, there was no, well it was like [P3] said, there was nothing in place, you know, its funny I suppose because 80- 90% of training was CPR and ALS (agreement from P8) and really the majority of your work you know that was, like you say, like 5 –10% of it and you didn’t really cover, like you say it was more going out and the exposure to it without that knowledge really”*

### **5.3.3 Domain 3: Professionalism**

This domain encompassed awareness of risk, both to patients and to themselves, and how sharing the responsibility for decision-making can mitigate this. The second theme in this domain relates to the perception of other health colleagues, external to the ambulance service, regarding the paramedic role, and the challenges that may be

experienced from hospital staff when patients are conveyed, in their opinion, inappropriately.

### 5.3.3 1 Mitigating risk

Both groups collectively reflected on the processes they undertook to mitigate risk when leaving patients at home. They displayed awareness of the potential negative impact of preconceived ideas on their decision-making, whether this was through information passed from the Control Centre, or specific information relating to individual patients. There are a small number of patients who frequently call the ambulance service and this can have a significant impact on resources in a local area, but participants discussed the danger of biasing their opinion based on their experience of individuals who may be perceived as 'crying wolf'.

*A, P3: "I can remember a very specific case from years ago where it was a frequent caller that we went to and they would always either have chest pain or fit and, um, we got him in the street fitting, um he'd actually fallen over and got a base of skull fracture and was bleeding so he had a significant um injury but en-route there the guy that I was working with was just like, 'this is rubbish this is the same old thing', so I think kind of frequent flyers is a, an issue."*

Within both groups there was collective agreement that if an ambulance clinician left an incident where they had discharged at scene, but subsequently found themselves wondering about the appropriateness of that action, then they had made the wrong decision. There was, however, an acknowledgement that this was a circumstance many had faced in their career, and that learning from it was important to guide future decision-making.

*A, P8: "From my point of view, I think if you're ever in doubt you'd always either take them in, speak to a Dr, I think if you're thinking about that patient later you've probably made the wrong decision almost"*  
*A, P2: "I think we've probably all been in a situation like that..."*

A, P5: *"Yeah, yeah, I think so"*

A, P2: *"...had an experience like that when you've gone away and thought well actually have I, you know perhaps? [made the right decision]"*

In a similar way participants in the second focus group reflected on the differences between primary care settings and their perception of GP's attitudes to risk being very different from their own.

B, P2 *"GPs average 3 SUI each per year now if an ambulance paramedic or an ECP had 3SUI in any one year he wouldn't have a job."*

B, P1 *"Yes but they're probably seeing 30 people a day while were seeing 5 or 6"*

B, P2 *"But they're, we're much more risk averse"*

B, P3 *"But they carry indemnity"*

B, P1 *"Exactly!"*

The potential risks to the individual of making the wrong decision were also discussed in relation to their standing as registered professionals and their job security. There was a collective acknowledgement that in uncertain situations, the least risky alternative was to convey the patient to hospital.

Moderator: *"Is there anything else around what you feel might be the most important factors that influence your decision making, because I'm not the expert!"*

A, P2: *"Well I think..."*

A, P8: *"My registration"*

[General agreement from the group]

A, P2: *"...yeah my, my mortgage"*

A, P6: *"Your mortgage?"*

A, P2: *"Yeah! But you're right, your registration, your job everything."*

A, P7: *"Its simpler isn't it to go to hospital if you're really unsure"*

Moderator: *"So there's something about covering yourself?"*

A, P7: *"Covering your backside, going to hospital, because you think yeah if I lose my job, and no one wants to go and have a meeting without coffee [a disciplinary hearing] just for the sake of just thinking I should just take that patient in really"*

When discussing patients who have self harmed, and the difficulties in knowing whether it is wise to leave them at scene participants also expressed concern about the impact, not just to the patient but also themselves.

Moderator: *“But if you were to explore that, harking back to the discussion around registration and that kind of thing, do you get the sense that’s, that’s actually what you worry about?”*

A, P8: *“Mmm, probably”*

A, P4: *“Yeah”*

A, P2: *“More so, because it’s your job and your family and everything”*

Moderator: *“But if you’ve done everything that’s within your gift to do in terms of you’ve tried to safety net the patient, they have the capacity, everyone has the right to make an unwise decision do you actually feel like if it all went completely the wrong way that you’d”*

A, P6: *“You’d still be in trouble”*

A, P4: *“I’d still worry”*

The concept of ‘safety netting’ was also a topic that all participants collectively agreed was a central element of professional practice, and doing it properly provided them more confidence in their decision to discharge patients at scene.

Safety netting involves ensuring that systems are in place to provide safe monitoring and follow-up, and this was felt to be especially important given the broader range of more primary care related conditions that have become a routine part of ambulance clinical practice. Ensuring that a thorough assessment is undertaken, even in circumstances where the patient’s initial presentation may not be suggestive of anything serious was considered to be a minimum requirement of safe clinical practice. Signposting patients whose symptoms may worsen and providing and documenting advice was also acknowledged as a way of reducing clinical risk, and the possibility of a complaint.

A, P7: *“I think of one of ours, well it was always chest pain but it was more a case of he’d want to talk for a while, nothing really wrong with him, but then that don’t mean to say that 9 times out of 10 you would leave him, but there’s always going to be that time where actually you know he’s telling the truth, so you still had to do everything with him, it was more the, yeah all the time, a social thing than a medical need so you’ve just got to be, but I think a lot of people would have been ‘ah bloody hell it’s so and so again’ but that doesn’t mean to say you didn’t have to do the 12 lead [ECG] and everything ‘cos you know I think he was, those sort of jobs are going to catch somebody at some point.”*

A, P2: *"You're making sure that if something changes the patient isn't going to suffer, that they can get help when they need it, if their condition was to change that there's somebody there to..."*

A, P8: *"If you can leave them with someone as well..."*

A, P7: *"Yeah that's another thing isn't if they're on their own it's a bit different or if there's someone with them that can monitor them rather than leaving them to be on their own with nobody, so..."*

B, P3: *"For me, with safety netting ... and it's one of the things I actually say to patients, is that, things change, y'know, and because I haven't got every diagnostic bit of kit available to me, so what I'm saying is, at this point in time, I don't think you have 'this' or I don't think you have 'that', I can't categorically say 'you definitely haven't got this'... but what I'm saying is at this point, lets hang on, wait and see."*

### 5.3.3.2 Perception of the paramedic role by other health professionals

There was a common dialogue, across both focus groups, regarding the perception of the paramedic role by other health service colleagues. Participants shared narratives of occasions where they had been challenged in relation to conveying what were described as *"nothing jobs"* (A, P2). Although this terminology sounds derogatory, in context the phrase was used to describe the perception of receiving health professionals that the decision to convey was inappropriate. Professional pride was alluded to in relation to not wishing to be the paramedic who gained a reputation from ED staff about unnecessary conveyance. There was recognition that being challenged by staff within ED might cause paramedics to discharge a patient at scene perhaps incorrectly.

Moderator: *"So do you get the sense that if you took that 'nothing job' into A&E down here that you'd get challenged by the Dr?"*

A, P1: *"Oh yeah."*

A, P2: *"And the nurses definitely"* [agreement in the room]

A, P3: *"I don't think you'd get challenged by the Drs, but by the nurses, you know 'what are you bringing this in for'?"*

A, P2: *"I've been challenged in [X hospital] before."*

A, P8: *"There's a certain amount of reputation I think as well, in regards to that, like personally I don't want to take, I don't want to take everyone to A&E because I don't want the reputation of he just brings everyone in, because then I think you*

*do get questioned whereas if you only go in with sick people they don't tend to question you as much because they'll think, well he's normally pretty good so...lets take his word for it sort of thing"*

Participants also explored differences in the perception of others dependent upon their role, with the ECP in focus group one noting that when he was part of an air ambulance crew he did not feel as though he was as likely to be challenged on his clinical judgement compared to when he was identified as a paramedic.

A, P3: *"I've been challenged in normal work uniform and been asked the square root of everything, but then I could turn up in a flight suit and I wouldn't be asked anything as they would accept what I was saying was right."*

A, P7: *"[X colleague] was the same wasn't he, he worked on the aircraft 8 or 9 years and then when he was on the road literally a few months after they didn't accept..."*

A, P1: *"Yes."*

A, P7: *"...but if he'd been up at the airbase they would."*

Similar issues were raised in the second focus group, with participants noting the differences in diagnostic equipment that are available in hospital in order for more serious conditions to be definitively ruled out.

B, P1: *"[X colleague] was on a course with a load of ED staff and they said 'oh you lot bring us a load of rubbish, and he said 'yeah we do, but you lot don't discharge them without a chest x-ray and a set of bloods do you?'"*

Experience, or lack of it, was also discussed as an area where other health professionals' perceptions of paramedic competence and capability might lead to a situation where they were challenged. Examples from both focus groups reflected this.

A, P3: *"From my perspective I've taken people into A&E and I've said I've got no idea what's wrong with them but I know there is something wrong with them and they take it on face value ... but a newbie rocks up there and has the same patient, same situation, I don't know whether they would get that same kind of response or not."*

B, P1: *"A lot of our younger staff leave people at home 'cos they're afraid to take them to hospital..."*

Moderator: *"Why are they afraid to take them to hospital?"*

B, P1 *“Because they get grilled, and they erm...”*

B, P2: *“They have to justify them...”*

B, P1 *“Yeah, especially if the hospital is full they’re getting an element of ‘what have you brought that here for?’”*

The professional challenges to paramedics about their decision-making are not solely confined to the ED. There are agreed working relationships that allow ambulance staff to call primary care physicians, working in Out of Hours services, for advice. However, some participants had experiences of this being negative, and felt that it was a barrier to safety netting.

B, P3: *‘It’s not just the acute hospitals, its out of hours staff too, they’ll keep score on how many paramedics ring them, and again, that’s not right.’*

#### **5.3.4 Domain 4: System influences**

This domain aims to capture elements of the ambulance service system that participants described as influencing their patient conveyance decisions. The demand theme encompasses organisational initiatives that have been implemented to meet the challenge of rising demand for the ambulance service. In order to safely leave patients at home there is often a need to access alternative pathways of care within health, social and community provision. This theme illustrates some of the areas of contention participants experience when attempting to refer patients. The impact of the culture of the organisation, both within the study site and between different ambulance services is also explored.

##### **5.3.4.1 Demand**

Within the study site a range of initiatives have been implemented to ensure that the organisation maintains its performance trajectory in relation to non-conveyance.



Access to an individual 'performance dashboard', including the proportion of calls attended that did not result in transfer to an ED are reported, alongside other key performance measures.

Both focus groups indicated that this level of scrutiny is not always welcome, and may in fact have undesired effects on individual staff members.

B, P3: *"A lot of the guys have said they feel under pressure by the Trust to meet targets... and my personal take on that is every patient I go and see is an individual and it's my clinical practice is what matters. Targets are nothing to do with patients."*

B, P1: *"I never look at those stats because I will not allow them to influence my clinical decision making."*

Moderator: *"Are the non-conveyance stats used operationally?"*

B, P1: *"Yes, yes, people have been put under pressure because of their conveyance rates."*

Although participants reiterated that they would not let the awareness of conveyance rate statistics influence their decisions, it was also a subject of discussion in focus group one. Members of the group were comfortable to express dismay for an alternate viewpoint, but were also supportive. A consensus was reached that they were "squeezed from both sides" (A, P6). Pressure is felt from their own perspective; as they are aware there are probably other 999 calls stacking waiting for a response; the patient's perspective, and they recognised the organisational collation of information might not reflect these nuances.

A, P7: *"I think in the back of your mind you might be thinking, I mean I'm like [A, P6], you know if I'm on that job I'm on that job, but sometimes in the back of your mind you're thinking y'know there's other jobs you should be sort of dealing with really, but you know like I say you can't just leave and say 'well I've had enough of this now, even though I'm getting nowhere'"*

Moderator: *"You said [P6] that you felt some organisational pressure?"*

A, P6: *"Well yes, always at the back of your mind there's the figures"*

A, P4: *"Yep, yep"*

A, P6: *"Figures – collating those... [inaudible]"*

[Laughter in the room at this]

A, P5: *"Seriously?" [incredulous]*

A, P8: *"That's fair enough" [supportive]*

A, P6: *"You're squeezed from both sides really"*  
[Group agreement]

At times of peak demand, both for the ambulance service and receiving hospitals, another initiative is that operational managers and senior ambulance service clinicians are deployed to ED to question arriving ambulance crews on whether they have considered alternatives.

B, P3: *"We had an ECP based in ED and in the queue, who was going along asking people, have you tried an ECP and stuff like that. I don't like the idea of that, 'cos a lot of the guys have said they feel a bit under pressure by the Trust to meet targets and that."*

Participants in both group expressed a concern about the strategic message around non-conveyance and the need to balance this with concerns around the safety of care, as typified by these two extracts. There was recognition that although a patient's condition might deteriorate naturally, this might also be due to a potentially unsafe decision to leave them at home. There was also a dialogue about how much further it is safe to 'push the envelope' of non-conveyance.

B, P2 *"And I think [the study site] have been guilty of overemphasising the fact of keeping people at home, y'know it should be appropriately keeping at home shouldn't it, or appropriate other care pathway..."*

A, P3: *"I do think in a way ... we are at a point where how many people can we leave safely, or are we going to expect our number of complaints or adverse incidents to go up because in some of the guys who have done ECP training or whatever it's now called, now they know all these things about minor stuff you seem to forget all the major stuff, locked into what you've learnt and therefore you make it fit the box but also there is an element of hospitals wouldn't exist if there weren't sick people so there is an element of society who are sick and we are leaving over half of them at home, that is a lot of people that don't need to go, or, potentially do need to go because we've got a call back because they're very sick and we've missed it or they weren't the first time but 24 hours later things have worsened"*

#### 5.3.4.2 Access to alternative pathways

Participants in focus group one described how non-conveyance often takes longer than a transfer to hospital, because of the time required to access alternative pathways of care. They demonstrated awareness of the impact of this on the service, but described how they try not to let it unduly influence their assessment and treatment of the patient.

A, P5: *"Because as a, maybe from a Trust point of view the amount of times, sometimes you're tied up with these patients as in going around and around and around and like I said before you know its an hour or more and you've got nowhere."*

Moderator: *"I'm quite interested to know whether or not anybody feels any organisational pressure to move on, you know if you've been there for an hour with somebody and you're trying to sort stuff out?"*

A, P1: *"Yeah"*

A, P8: *"I do"*

A, P5: *"I just think once you're on that job, they've made that decision for you to be on that job and if it takes an hour or two that's as long as it takes isn't it."*

There was recognition that accessing an alternative, more appropriate pathway for a patient was challenging. The issue is complicated, with participants' narratives indicating access issues dependent upon the patient's condition, the geography of the service, and temporal factors such as the time of day.

Moderator: *"So do you think, um, accessing alternatives is that always accessible?"*

A, P2: *"No"*

A, P1: *"No, no"*

A, P8: *"I dunno, I think it is quite a lot of the time..."*

A, P6: *"It's not too bad"*

A, P8: *"In my experience whenever I phone them it's ok"*

A, P2: *"I think in hours it is accessible, but Out of Hours..."*

There was recognition that taking a patient to hospital might be an acceptable default position if the ambulance crew was working in an unfamiliar location.

A, P3: *"If you're out of area I think you've got a line of least resistance then you go straight to the hospital because you don't know what else is available"*

[General agreement in the room]

Moderator: *"Right ok, ok"*

A, P3: *“But I think there would still be a reasonable shout of it’s easier to go to the hospital and then get back into your own area, (agreement - yeah) rather than ‘lets explore all the various different types of options’, it maybe alright within the county that you’re working in because you’ll have a rough idea of how the out of hours Dr provider works but if you were moving into more specialist kind of things like palliative care or something like that then you’d probably just do the easier option”*

#### 5.3.4.3 Culture

The organisational culture of the study site, both within different localities and compared to other ambulance services, was described as a factor influencing decisions not to convey. A participant in focus group one, who had previously worked in a large urban NHS ambulance service reflected:

A, P5: *“When I worked in [X ambulance service] we didn’t leave anybody at home”*

A, P8: *“But then you were only ever 10 mins away from A&E I guess”*

A, P5: *“Yeah it was easy, the thing is you were so busy that was you’re down time was taking someone to hospital”*

A, P5: *“I couldn’t believe when I moved down here how many people we leave at home, coming from like [X ambulance service]”*

Moderator: *“So coming from [X ambulance service], when you came down here did you think, “Oh my God, what they’re doing is not very appropriate?”*

A, P5: *“I just think in [X ambulance service] you just took everyone in because everyone else just did do you know what I mean, it’s just ‘that’s how its done, that’s how it is” and I think because you’re so busy, or were so busy you didn’t get breaks your down time was taking someone to hospital where as down here you’re further from hospital, so you’d probably think is it fair dragging this old dear to hospital for no reason when I could phone a doctor”*

The group also recognised that even within the service there can be differences in conveyance behaviour, in focus group one participants shared experiences where clinicians working at different stations would choose options based on the culture of the station.

A, P7: *“It’s a regional thing, I’ve talked to a few paramedics in [X station] – that have worked in this area then gone to [X station] and they take just said ‘oh they take everybody in’...”*

A, P7: *"...it came from one girl saying she could do the skill, had ECP training in [X station]"*

In focus group two, the ECPs recognised that their situation was unusual. The geography, and the fact that there is only one hospital in the county lead them to express that in their sector they have always had a culture of leaving patients at home and finding alternatives. They compared the practice in the wider Trust and suggested that in other services, if there were a major incident or a significant increase in operational demand, ambulance Trusts with neighbouring services can call on others. The Peninsular geography of the study site does not facilitate this.

Moderator: *"Do you think it's different in other divisions?"*

B, P3: *"We get anecdotal stuff like that all the time from crews"*

B, P1 *"Yes, yes"*

B, P3: *"And more and more even with the ECPs it's exactly the same because our scope of practice I think, looking at other Trusts is, is huge"*

B, P1: *"Massive"*

B, P3: *"I think part of it, seeing other parts of the Trust I think [X county] it's a big geographical thing as well because we have one District General Hospital in our patch and there's nobody else we can call in; if something goes wrong in in [X ambulance service] they draw in [Y ambulance service] or [Z ambulance service], we have no-one"*

B, P1: *"A lot of that, it's geographically driven as much as anything"*

B, P3: *"It's a huge impact because there is literally nobody else and its what the guys are saying we don't have 24 hour District Nurses, I think we've got one on call District Nurse for the whole county!"*

### **5.3.5 Domain 5: Patient characteristics**

Considerable uncertainty was expressed in relation to the clinical management of patients calling 999 with mental ill health. This was felt to be a growing issue, with increasing numbers of calls, and the perception of a lack of training and paramedic education relevant to this patient group. Patient safety concerns were acknowledged alongside a sense of frustration that appropriate alternatives were hard to access.

Participants also highlighted that a patient's social circumstances would be an important factor in their decision-making.

#### 5.3.5.1 Mental health

Moderator: *"So do you think accessing others to safety net is relatively easy?"*

A, P7: *"Unless it's anybody Psyche, getting hold of the crisis team is probably the worst"*

A, P1: *"Oh yes that's difficult"* [quietly]

A, P6: *"I think GP was mentioned and that's ok isn't it"*

[Lots of talking over each other]

A, P7: *"Just as my personal, whenever I've contacted the crisis team I just well..."*

A, P8: *"Well, I don't think I'd bother anymore"*

A, P7: *"No, exactly yes"*

A, P6: *"Yes, mental health is..."*

Moderator: *"So mental health is a special cause really?"*

[General agreement]

A, P8: *"Mental health is a massive problem"*

A, P7: *"And it's quite yeah, like I say, like [P8] said I'd probably, in the end..."*

Moderator: *"So are you more likely then to take those patients in..."*

A, P4: *"Yes, yes"*

Moderator: *"Even though you know it's not appropriate?"*

[Definitive agreement]

A, P5: *"I think you don't have any other option though really do you, a lot of the time there isn't anything else you can do, especially at night"*

Participants in focus group one also acknowledged that the symptoms of patients with known mental health problems are often unknown to them. Other professionals involved in the care of this patient group are more familiar with the level of risk that may be attributed to certain behaviours so would be more equipped to make a judgement about how appropriate it was to leave the patient at home. Group members recognised the vulnerability of this patient group, and the conversation was at times uncomfortable, but Participant 7 again changed the mood in the room with black humour.

Moderator: *“So what are the biggest areas of uncertainty when you’re leaving patients at home?”*

A, P5: *“Mental health I think”*

Moderator: *“Mental health?”*

A, P5: *“Defiantly yeah, because we just don’t know anything about it do we, and if you phone the crisis team they know that person, they know the risk, you know if that person is saying to us they’re going to kill themselves we’re like, well should we...”*

A, P6: *“I don’t think there are as many answers really with mental health.”*

A, P5: *“If you do leave someone with mental health at home and they do kill themselves, do you know what I mean, that’s quite...big thing isn’t it.”*

[Laughter in the room, but uncomfortable]

A, P5: *“And then it falls back on you doesn’t it as you’re the last person to see them really...”*

A, P7: *“Especially if you’ve handed them the rope from the shed that they’ve asked for!”*

[Laughter in the room]

#### 5.3.5.2 Social setting

Participants in focus group two frequently referred to the impact of a patient’s social setting on their non-conveyance decisions.

Due to their familiarity with the locations in which they work, they might form an early impression of the likely social circumstances in which a patient may reside.

Participants provided a clinical scenario relating to an older patient who had been referred to them by an ambulance crew with a suspected urinary tract infection (UTI).

They discussed how their potential treatment plan would be influenced by the living conditions of the patient.

B, P2: *“So you’re – well, my ability to help that man is going to be very limited particularly if it’s overnight when you can’t get the Early Intervention Service out or anything like that but it is variable isn’t it [P1] ‘cos...”*

B, P1: *“Yes if it’s a social need, obviously if they are unable to self care then regardless of what you’re going to do for them they are going to have to be admitted if other services aren’t available. Social surroundings are an awful, awful lot to do with the people you’re leaving at home because if they’ve got a good community support network you could have the same person that’s got that UTI and we’re going to give them [an antibiotic] and the chances are that within 48 hours that person will be greatly improved, now if they had a great social support network and their surroundings, you know if they had a downstairs*

*bathroom, they didn't have to go upstairs to go to the bathroom, they had people looking after them that could read and write, um you know the house was warm then you could probably get away with leaving that person at home with a bit of extra support, but if you then went to a person that lived in one room, the bathroom etc. was surrounded by newspapers and magazines, they're using a bowl as a toilet sat on chair, the main toilet was upstairs, they had no relatives, the house was cold, with no electric and there was no food in, then it's a no brainer before you even start because of the social, the social conditions."*

## **5.4 Discussion**

The focus group participants enjoyed lively discussions about the factors which influenced and impacted on their decision-making. They were comfortable to express differing opinions, and were ready to step in with words of support and encouragement. When the discussion became slightly uncomfortable, as it did when patients with mental health needs were explored, they readily used black humour to diffuse any awkwardness.

The five themes identified here are inter-related; there is no predominant theme. Participants' narratives showed they are aware of, and account for the impact the system can have on their clinical judgement, but they expressed how their focus is always on the patient first. Whilst they might feel pressure from the service they do not let this impact on their behaviour in a clinical setting, in fact some suggested they actually consciously ignore any organisational missives relating to performance targets.

All groups identified the benefit of good communication skills, and how they might use this to negotiate with patients, their relatives, other health professionals, and the ambulance control room. They discussed a range of techniques that they have adapted to ensure that they bring others along to their way of thinking, and



explored how this was helpful in making sure they could access alternative pathways of care.

The interplay between their education, experience and exposure to a range of clinical symptoms and conditions was evident. They expressed how they value the knowledge that experience brings, and were happy to seek this out.

Participants identified areas of uncertainty, but described having the confidence to put in place adequate systems to mitigate risk. They did not hold back from discussing their concerns about risk, both to patients and themselves, personally and professionally.

There was a high level of agreement across both groups that there was an organisational culture that encouraged non-conveyance, although participants did not necessarily consider that this was driven from a managerial hierarchy. Indeed there was some agreement that the culture largely existed already, formed as much from the constraints of the geography as any organisational position statement.

There are limitations to the methodology employed in this study. Focus groups can be successfully utilised to explore a topic in depth, and the aim of including this work package within the current study was to elaborate on some of the quantitative findings. However, whilst contributing to a wider understanding of the research enquiry, the participant numbers were small, reducing the likelihood that all relevant themes and issues were identified. Additionally, there may be some bias in the findings as the participants are self-selecting, and their views may not be typical of those held by a wider cohort.

Both groups varied considerably in their size and composition. Focus group 1 was more representative of a range of clinical grades, length of experience and qualification route, although it did not include any Advanced Technicians, who are skilled members clinical staff although they do not hold professional registration. Participants in focus group 2 were more homogenous, both in their clinical role, their extensive experience and of their geographical location, so may be less representative of the wider workforce. There was variation within both groups in the proportionate contributions made by participants. This is a recognised problem with focus group methods, and although constructive facilitation of the discussion may mitigate this, due to the participative nature of the method it cannot control it completely. In the first focus group there were two members who contributed less, and were more likely to agree with the dominant view being expressed, and in the second there was one participant who, at times, directed the conversation.

The decision to leave a patient at the scene can be straightforward, but is often complex, and a range of factors may impact upon this. This study has identified five inter-related domains which ambulance clinicians identify influence their decision-making regarding non-conveyance.





## **Convey or not convey? Does crew skill level predict hospital admission rate in a UK regional NHS Ambulance Service Trust?**

**Target journal:** BMC Emergency Medicine

### **6.1 Introduction**

The UK's National Health Service (NHS) continues to be under sustained pressure from increasing demand; and this is perhaps felt most keenly within the Emergency Department (ED), which has come to be seen as the 'front door' to the NHS. In 2016 there was an increase of 5.5% in patients attending the ED compared to 2015, an extra 2,210 patients each day. Of those who attended an ED in 2016, official statistics for England state that 16.2% spent more than four hours in the department, an increase of 4.8% on 2011 figures. Rising admissions and growing delays in the ability of hospitals to discharge patients, means that flow through the system is compromised, a situation which has been referred to as 'Exit Block' (RCEM 2016).

These system pressures have a direct impact on the ability of ambulance services to handover the care of their patients. A recent Freedom of Information request (Monitor 2016) highlighted that between March and November 2015 there were 92,645 ambulance handovers greater than 30 minutes, with 14% taking between one to two hours and 1.5% taking more than two hours. When an ambulance is queuing outside the ED it remains unavailable for other 999 tasking, reducing the capacity of the ambulance service to be responsive to new incidents. A National Audit Office report suggests that since 2011 there

were 12,500,000 operational ambulance hours lost due to delayed transfers of care at hospitals (NAO 2017).

The picture of rising demand on ambulance services is also significant, with 10.7 million calls in 2015-16, an annual growth rate of 5.2% since 2011-12 (NAO 2017). Other studies have shown a 25.7% increase in overall demand reported by English ambulance services between 2006-2103 (Edwards, 2014).

A variety of factors have been associated with these increases, including demographic changes, such as population growth, and a rise in the proportion of older people (Kings Fund 2016). Blunt, Bardsley, and Dixon (2010) have suggested that the availability and ease of access to other providers may also be a factor, compounded by public confusion relating to changes in service specification (Benger & Jones, 2008).

When considering ambulance service demand, previous work undertaken at the study site has suggested that an increase in both the number of older people who fall, and those who call 999 with mental health concerns are significant contributors to demand, with many of these groups being conveyed when no alternative community or social care pathway is available (Chalk, Black, and Pitt, 2016).

The Urgent and Emergency Care review (Keogh, 2013) identified that there are as many as one million avoidable ED admissions, and 40% of patients who attend are discharged home with no treatment. Furthermore a 2013 National Audit Office report suggests community providers could manage one fifth of admissions to ED effectively. Ambulance services have been at the forefront of

developing innovative ways of working to meet this challenge, although there is no consensus regarding the most effective model, and several studies have questioned the ability of paramedics to safely identify patients who do not require treatment in an ED (Brown, Hubble, Cone, Mullin, Schwartz et al, 2009, Silvestri, Rothrock, Kennedy, Ladde, Bryant, et al (2002), Hauswald (2002), Hale & Sipperrell (2000)).

Surprisingly little is known about the factors influencing conveyance rates. A systematic review of patient safety in ambulance services considered a number of studies on the issue of non-conveyance, but concluded that many were either of poor quality, and related to small samples or to one individual service (Fisher, Freeman, Clarke, Spurgeon, Smyth, et al 2015). Whilst a range of work has been undertaken examining the safety of decisions to leave patients at home, the review by Fisher et al (2015) identified these have been focused on specific patient groups, such as older individuals who have fallen (Snooks, Anthony, Chatters, Dale, Fothergill, et al 2017), or specific conditions such as hypoglycaemia (Fitzpatrick & Duncan, 2009, Cain, Ackroyd-Stolarz, Alexiadis & Murray, 2003, Lerner, Billittier, Lance, Janicke & Teuscher, 2003, Anderson, Hogskilde, Wetterslev, Bredgaard , Moller et al, 2002).

The clinical skills that the ambulance crew bring to the scene may be an important factor in non-conveyance decisions. Early work on the impact of a new role within the Paramedic profession, the Emergency Care Practitioner (ECP) (Cooper, Barrett, Black, Evans, Real, et al 2004) highlighted that compared to their Paramedic colleagues ECPs treated a significantly higher

proportion of patients on scene (28% compared to 18% by paramedics  $p = 0.007$ ). Mason, O’Keeffe, Coleman, Edlin, and Nicholl (2005) undertook a UK wide review of the impact of ECPs, also citing the potential for avoiding ambulance journeys, ED attendances and hospital admissions, with no obvious adverse effects on the patient. There has been some UK evidence that the extended training that ECPs receive impacts positively on their ability to treat patients with minor conditions (Mason, Knowles, Freeman & Snooks 2008).

Nevertheless, there is significant variation in the proportion of patients who are left at scene following a 999-call attendance by UK ambulance services. The performance dashboard of the Association of Ambulance Chief Executives (AACE) highlights variation in the proportion of patients attended and discharged at scene: during April 2017 this ranged from 23% to 49% against a national average of 37% (AACE 2017). The study site, since May 2016, has reported non-conveyance rates higher than all other ambulance services, with a range from 49% to 52%. The cause of this variation between services is unknown; although a current UK wide study to examine this disparity is underway (O’Cathain, Knowles, O’Hara, Jaques, Coster, et al forthcoming). Projects such as the current study, involving the retrospective analysis of large datasets, may be able to provide a more representative view of the current pre-hospital experience in relation to non-conveyance.

The aim of this study is therefore to explore the demographic, temporal and patient-related factors that are associated with non-conveyance rates for nearly half a million calls in a large regional NHS Ambulance Service Trust over a 12-month period. These factors are reviewed alongside a measure of crew skill



level to determine whether this variable contributes significantly to the decision whether or not to retrieve the patient to hospital, independently of demographic, temporal and patient-related factors. It is hypothesised that more highly skilled crew would be more willing to give advice and refer patients to local services at the scene, thereby reducing the number conveyed to hospital.

## **6.2 Method**

### *6.2.1 Data Extraction*

In common with other NHS ambulance services, the study site has a structure for managing information generated from the Ambulance Computer Aided Despatch system (CAD) system. Whilst the implementation of electronic patient care records has recently significantly increased, patient level data for the study period (the calendar year 2014) were held in a paper format when an Optical Character Recognition (OCR) system was used to scan paper records. A team of individuals, who were able to edit and amend the OCR output if it differed from the original paper document, verified each data field captured within the OCR template manually. This team forms part of the Clinical Audit and Information function within the study setting and have considerable experience with data verification and clinical coding. All have worked within this role for between 5 and 10 years.

The resultant OCR data string was uploaded into the CAD system and a matching process is undertaken to ensure the unique identifiers used to locate an incident were identical. Once matched, the patient level data can be viewed and extracted from the CAD system. A search of data generated by the CAD system for the calendar year 2014 was conducted to provide the main dataset for this

study. Search parameters included all 999-call incidents that resulted in an ambulance attendance.

A total of 30 variables were included, the majority of which were generated by the CAD system, with one from a data field taken from the scanned ambulance Patient Clinical Record (PCR). A summary of the data fields extracted and the final dataset used can be found in Appendix F.

### *6.2.2 Data cleansing*

Original data were extracted from the CAD and imported into Microsoft Excel, duplicate cases were removed, cases where multiple resources were dispatched were identified, and data rationalised. Pivot tables were used to identify the frequency of data in each information field in order to undertake completeness checks. Once the dataset had been uploaded to SPSS data quality checks were undertaken to ensure that all the observed frequencies in SPSS matched those in the pivot tables previously generated in Excel. Anomalies were checked back to source data from the ambulance control system and amended appropriately. Missing data values were assigned, and variables were recoded as necessary to transform alphanumeric or string outputs to numeric values for further analyses.

### *6.2.3 Defining crew skill level*

The clinical skill level of the attending ambulance crew was taken from the CAD dataset, which records the highest level available on each resource arriving at scene. From 13 separate types, crew skill level was rationalised into five discrete categories (shown in table 14) reflecting a range from those trained in Basic Life Support, through Advanced Technician, to registered Health Professionals

including Paramedics, ECPs and Doctors. Where care providers were assigned as 'External' or their skill level was missing, these were excluded from the analysis.

**Table 14:** *Recoded categories for crew skill level*

<b>Crew skill level (New variable)</b>	<b>Original variable(s)</b>
<b>1 BLS trained</b>	ACA, BLS, ECA,
<b>2 Advanced Technician</b>	Advanced Technician
<b>3 Paramedic</b>	Paramedic, CSO, OLM, Lead Paramedic, Paramedic Supervisor
<b>4 ECP</b>	ECP, ECP CSO
<b>5 Doctor</b>	Doctor

ACA = Ambulance Care Assistant; BLS = Basic Life Support First Responder;  
 ECA = Emergency Care Assistant; CSO = Clinical Support Officer; OLM =  
 Operational Locality Manager; ECP = Emergency Care Practitioner;  
 ECP/CSO = Emergency Care Practitioner Clinical Support Officer

#### *6.2.4 Defining rurality type*

Within the CAD architecture calls are assigned to one of eight rurality categories (from Urban to Hamlet/Isolated Dwelling), based on information held within the system's gazetteer. In the initial data extract this is recorded as string variable, but it was recoded into a numeric variable for the analysis by allocating a number from 1 to 8.

#### *6.2.4 Statistical analyses*

A descriptive review of the data was undertaken, and the characteristics of incidents where patients were either conveyed or left at scene were explored with  $\chi^2$  and the Mantel-Haenszel test for trend. A binomial logistic regression examined the independent effects of time of day, day of the week, provisional diagnosis, rurality and crew skill level on the likelihood that patients would be conveyed.

### **6.3 Results**

#### *6.3.1 Percentage conveyed*

During the study period, 471,060 incidents were recorded; Table 15 shows the demographic and provisional diagnostic characteristics of these calls. Of these, complete datasets were obtained for 452,132 (96% of the total); these records were included in the statistical analyses reported below. Of those included in the analysis, 255,399 were conveyed and 196,733 were not conveyed, giving an overall percentage conveyance rate of 56.5%

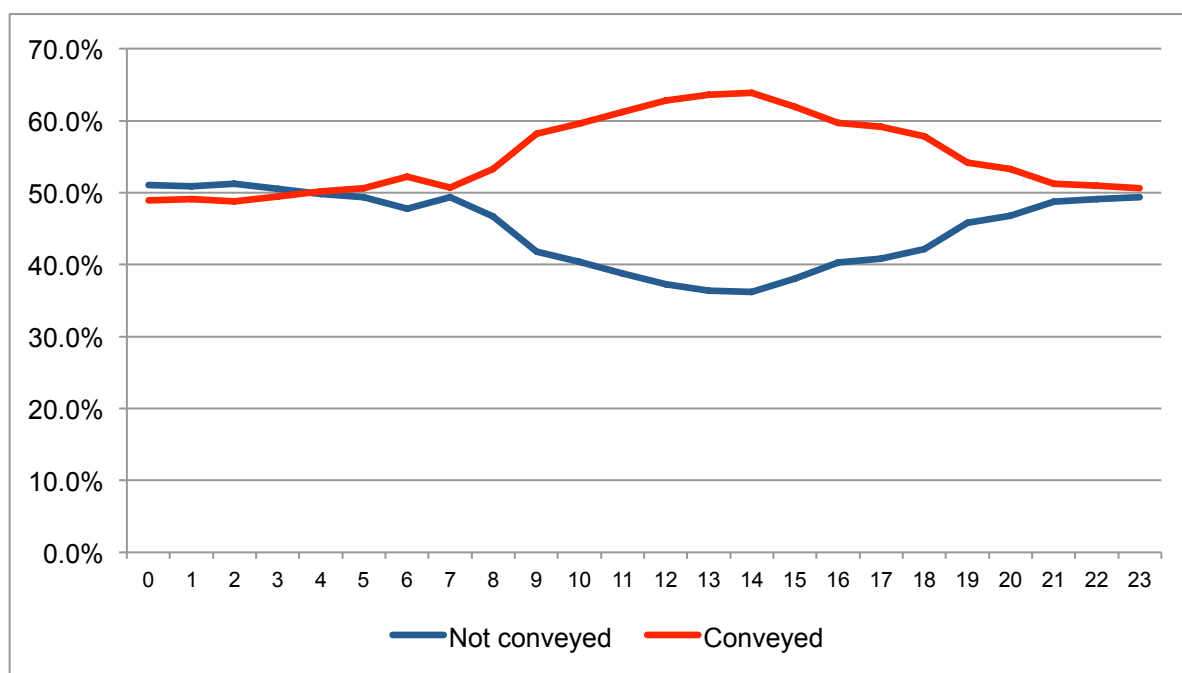
**Table 15: Demographic and provisional diagnostic characteristics of study population (N = 471060).**

		N (%)
<b>Gender</b>		
	<i>Female</i>	237422 (50.4)
	<i>Male</i>	203755 (43.3)
	<i>Unknown</i>	19694 (4.2)
	<i>Not recorded</i>	10189 (2.1)
<b>Provisional diagnosis</b>		
	<i>Respiratory</i>	36615 (7.8)
	<i>Cardiac</i>	30725 (6.5)
	<i>Cardiac Arrest</i>	4727 (1.0)
	<i>Stroke</i>	9618 (2.0)
	<i>Gastro-intestinal</i>	35702 (7.6)
	<i>Psychiatric</i>	7038 (1.5)
	<i>Obstetric/Gynaecological</i>	4385 (0.9)
	<i>Poisoning</i>	3867 (0.8)
	<i>Intoxication</i>	3404 (0.7)
	<i>Diabetic emergency</i>	5398 (1.1)
	<i>Epilepsy</i>	9160 (1.9)
	<i>Social need</i>	37460 (8.0)
	<i>Self harm</i>	9051 (1.9)
	<i>Burns</i>	852 (0.2)
	<i>Trauma</i>	76958 (16.3)
	<i>Other medical</i>	131139 (27.8)
	<i>Miscellaneous</i>	25055 (5.3)
	<i>Not recorded</i>	39906 (8.5)
<b>Ambulance Dispatch Priority</b>		
	<i>Red 1</i>	8927 (1.9)
	<i>Red 2</i>	180007 (38.2)
	<i>Green</i>	282116 (59.9)
	<i>Not recorded</i>	10 (0.0)
<b>Rurality</b>		
	<i>Urban &amp; &gt; 10k less sparse</i>	305954 (65)
	<i>Urban &amp; &gt; 10k sparse</i>	4770 (1.0)
	<i>Town &amp; Fringe less sparse</i>	64886 (13.8)
	<i>Town &amp; Fringe sparse</i>	10632 (2.3)
	<i>Village less sparse</i>	42098 (8.9)
	<i>Village sparse</i>	8417 (1.8)
	<i>Hamlet &amp; Isolated Dwelling less sparse</i>	22647 (4.8)
	<i>Hamlet &amp; Isolated Dwelling sparse</i>	5906 (1.3)
	<i>Not recorded</i>	5750 (1.2)
<b>Outcome of at-scene assessment</b>		
	<i>Conveyed</i>	265382 (56.3)
	<i>Not conveyed*</i>	205678 (43.7)

\*Referred to community setting or left with self-care advice

### 6.3.2 Temporal characteristics

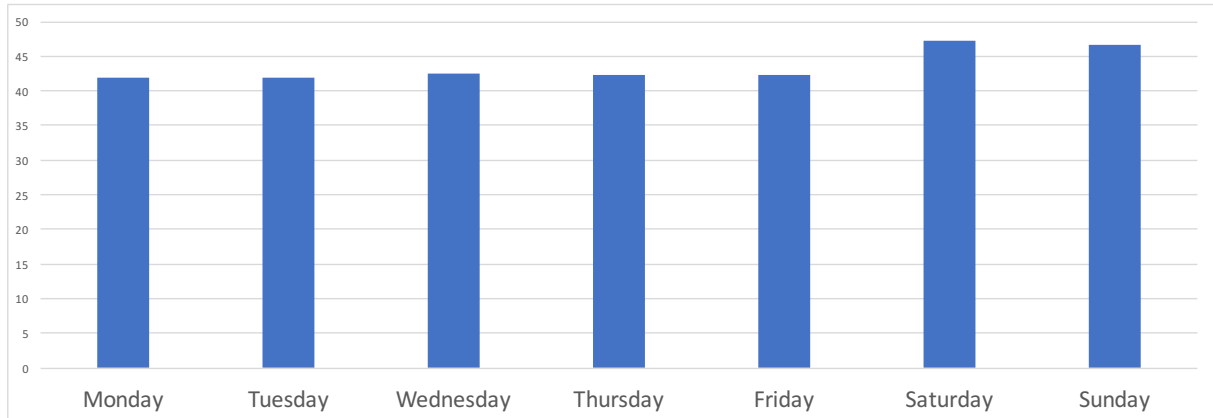
**Time of day:** Figure 9 shows the variability in conveyance rates over a 24-hour period, with demand for ambulance attendance highest between 09:00 and 15:00 (32.4% of incidents). There was another peak between 18:00 and 19:00 with a further 10.1% of attendances during those two hours. Demand tailed off considerably between 01:00 and 07:00, with 13.9% of incidents. Between 22:00 and 07:00 there was little difference in rates of conveyance to non-conveyance.



**Figure 9:** Conveyance and non-conveyance rates by hour of day

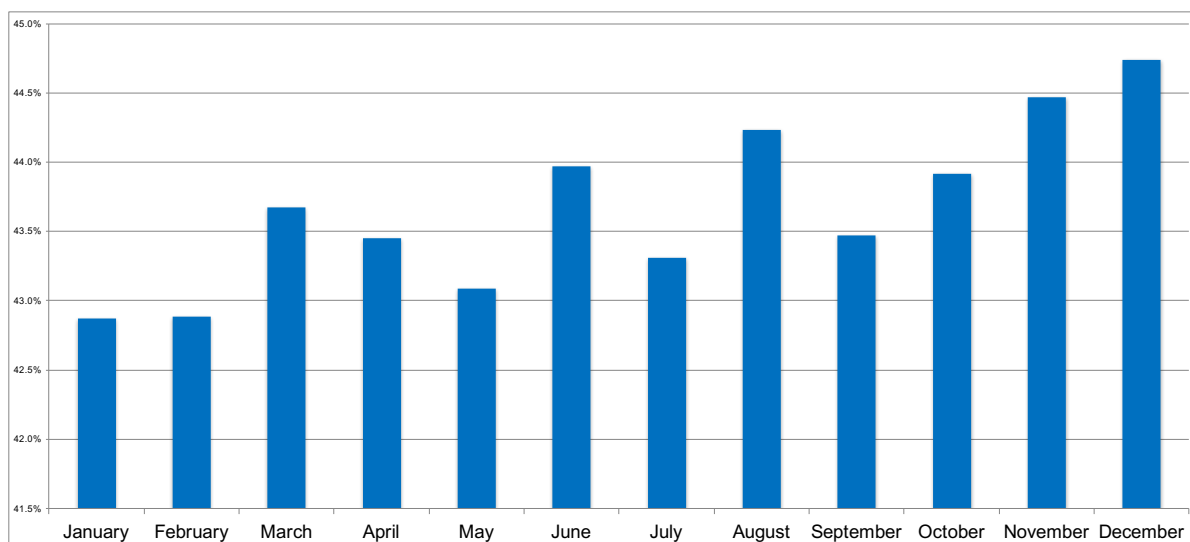
**Day of the Week:** Percentage of cases conveyed varied significantly between days of the week (Pearson  $\chi^2(6) = 925.9$ ,  $p < 0.001$ ). Figure 10 shows that significantly more patients were not conveyed on Saturdays and Sundays (47.3% and 46.6% respectively), compared to weekdays (non-conveyance

rates between 41.8% on Tuesdays and 42.5% on Wednesdays). Attendances to patients who were subsequently not conveyed were also at a peak during the weekend (Figure 10).



**Figure 10:** *Percentage of cases not conveyed by day of the week.*

**Month of the year:** There were significant differences in conveyance rates between months (Pearson  $\chi^2(11) = 60.3, p < 0.01$ ). Attendances to patients who were subsequently not conveyed were highest during November (44.5% left at scene) and December (44.7% left at scene). Conversely, Figure 11 shows that conveyance rates were highest during January and February, with 57.1% of cases resulting in an ambulance conveyance.



**Figure 11:** *Percentage of cases not conveyed by month of the year*

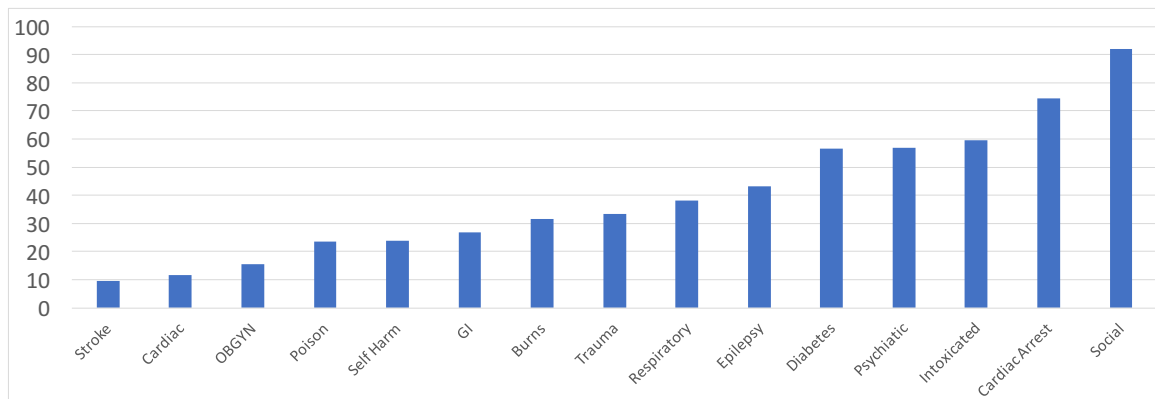
### 6.3.3 Provisional Diagnosis

Cases were assigned to one of the 15 composite provisional diagnosis categories based on the data recorded on scene, as described above. The 33.1% of cases which had ‘other medical’ or ‘miscellaneous’ provisional diagnoses are excluded from figure N.4 as they represent a large heterogeneous sample which were difficult to categorise. These cases were however included in the regression analysis.

As expected, different provisional diagnoses were associated with significantly different conveyance rates (Pearson  $\chi^2(14) = 67376$  ( $p < 0.001$ )). As Figure 12 indicates, less than 10% of initial diagnoses of stroke were not conveyed, compared to more than 90% of initial assessment of a ‘social’ incident. It should be noted that patients in the ‘cardiac arrest’ category who were not conveyed, would have been recognised as deceased at scene by the attending ambulance clinicians. These patients will have been deceased at the time of arrival, so a resuscitation attempt will have been futile, or resuscitation was attempted but



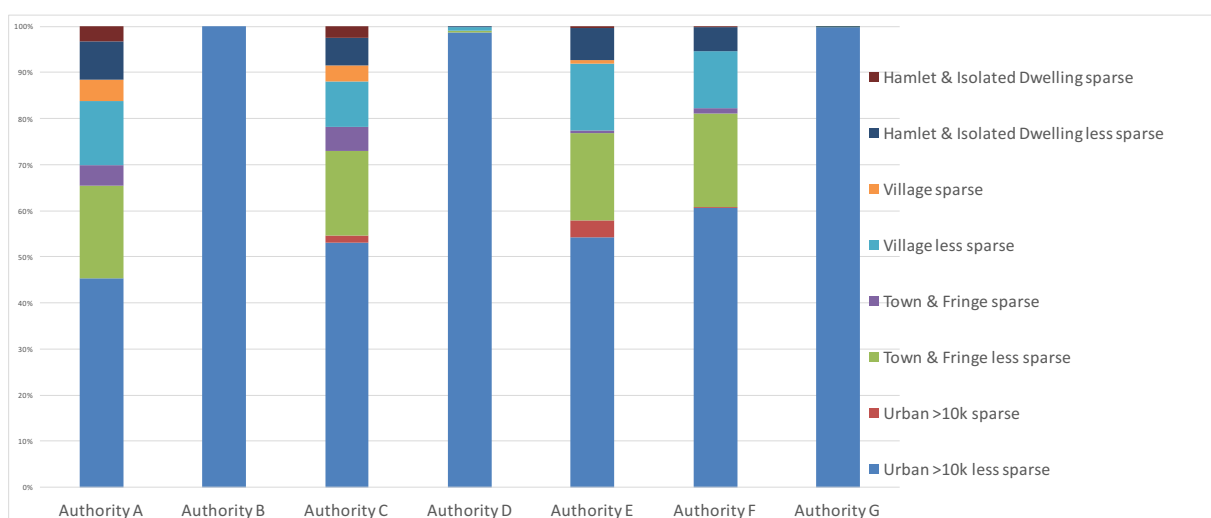
was unsuccessful. The clinical guidelines within the study setting do not require that ambulance clinicians routinely convey deceased patients.



**Figure 12:** Percentage of cases not conveyed by provisional diagnosis.

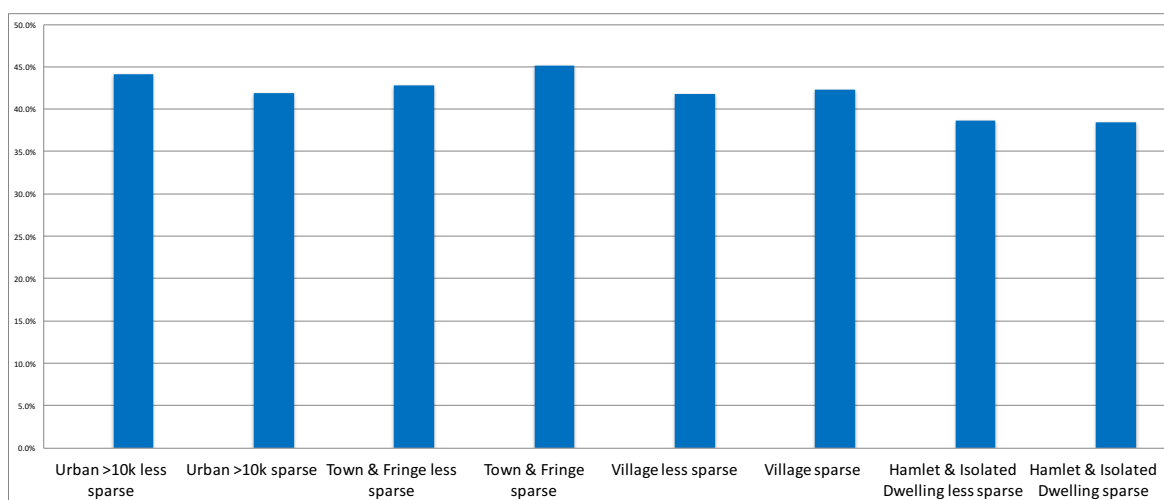
### 6.3.4 Rurality

Calls were assigned to one of eight levels of increasing rurality, as described above. Figure 13 shows the percentage distribution of calls by Unitary Authority, indicating that some areas are entirely urban (such as Authority G, whereas others are much more mixed (such as Authority A and C).



**Figure 13:** Distribution of call rurality type by Unitary Authority

Mantel-Haenszel test for trend  $\chi^2_{MH}=328.6$  (1),  $p<0.001$  revealed that there is a significant overall linear relationship between increasing level of rurality and increased rates of conveyance, with 55.1% of urban calls conveyed, compared with 61.5% of calls to sparse hamlet and isolated locations; see Figure 14.

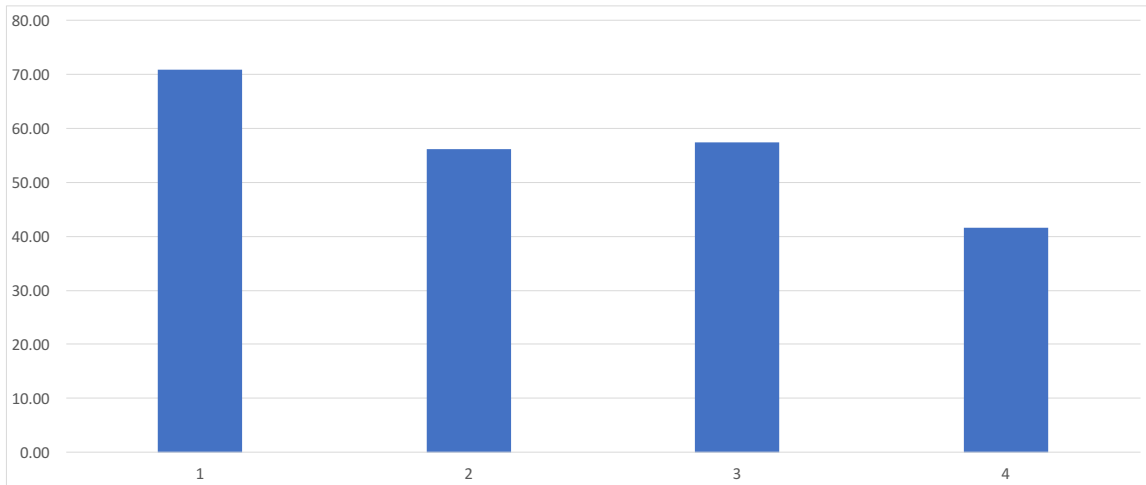


**Figure 14:** Percentage of cases not conveyed by location type.

### 6.3.5 Crew Skill Level

The skill level of the first responder on scene was coded from level 1 to 4 as described above, reflecting increased levels of training from civilian basic life support to specialist Emergency Care Practitioner. Level 5 practitioners (chiefly Doctors) were excluded from the analysis as they represented a very small percentage of the total calls and were typically deployed in specialist contexts such as the Air Ambulance.

Mantel-Haenszel test for trend  $\chi^2_{MH}=5614$  (1),  $p<0.001$  revealed that there is a significant overall linear relationship between increasing first responder skill level and increased rates of non-conveyance, with 70.8% of calls attended in the first instance by a Level 1 responder conveyed, compared to 41.5% of calls attended initially by a Level 4 responder conveyed, see Figure 15.



**Figure 15:** *Percentage of calls conveyed by first responder skill level.*

### 6.3.6 Binomial logistic regression

A binomial logistic regression was performed to ascertain the combined effects of time of day, day of the week, provisional diagnosis, rurality and crew skill level (as defined above) on the likelihood that patients would be conveyed. Data on the month of the call were not included in the regression analysis, despite its significance. The rationale for exclusion was due to the unstable population base rate, attributed to the seasonal influx of tourists to the region, which is seen both in the proportion of non-conveyance figures and in the raw scores.

The logistic regression model was statistically significant,  $\chi^2(21) = 90409$ ,  $p < 0.0005$ . The model explained 24.3% (Nagelkerke  $R^2$ ) of the variance in conveyance and correctly classified 68.2% of cases. Sensitivity was 86.4%, specificity was 44.4%, positive predictive value was 33.1% and negative predictive value was 71.6%. All five predictor variables were statistically significant (as shown in Table 16). Controlling for all the other variables,

increasing crew skill level was independently associated with a significantly reduced likelihood of being conveyed.

**Table 16:** *Logistic regression predicting likelihood of conveyance based on Time, Day, Provisional Diagnosis, Rurality and Crew Skill Level*

	<i>B</i>	SE	Wald	<i>df</i>	<i>p</i>	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Hour of Day	0.003	0.000	38.81	1	0.000	1.003	1.002	1.004
Day of Week	-0.035	0.002	454.99	1	0.000	0.966	0.962	0.969
Rurality	0.008	0.002	23.12	1	0.000	1.008	1.005	1.012
Crew Skill Level	-0.375	0.006	4354.25	1	0.000	0.687	0.680	0.695
Provisional Diagnosis			54946.05	17	0.000			
Constant	1.346	0.019	5176.14	1	0.000	3.842		

## 6.4 Discussion

This study explored how demographic, temporal and patient characteristics influenced the decision to convey in a large dataset of nearly half a million consecutive calls to an NHS Ambulance Service Trust in the course of a single year. Results indicated significant variation in conveyance rates associated with a range of call characteristics, discussed in more detail below.

The main aim of the study was to test the hypothesis that there would be significant differences in conveyance rates associated with crew skill level; that more highly skilled practitioners would be more willing to provide advice and refer patients on to local services at the scene, thereby reducing conveyance rates. Binomial logistic regression showed that crew skill level independently predicted decision to convey; with the most skilled (level 4) Emergency Care Practitioners nearly twice as likely to leave a patient at the scene compared with the least skilled (level 1) first responders, irrespective of other demographic, temporal or

patient characteristics. Even when the first-on-scene was a level 2 Advanced Technician or level 3 Paramedic, eventual conveyance rates were around 15% higher (56.2% and 57.4% respectively), compared with level 4 practitioners (41.5%).

The potential implications of this finding for ambulance services, Emergency Departments and the wider NHS are profound. Investment in community services in more rural areas may reduce ambulance conveyance, resulting in fewer avoidable admissions and easing pressure on the system. A striking difference in conveyance rates due to the time of day the 999 call was made is evident. During the 'in hours' period ambulance clinicians were able to discharge more patients at scene without the requirement for an ED conveyance. Conversely access to alternative health and social care providers is limited 'out of hours'; making these services available over a longer operating period may similarly reduce ambulance conveyance rates during the evening and overnight.

Previous studies at the research site have indicated that the seasonal influx of tourists into the region contributes to higher absolute and relative levels of non-conveyance over the summer (Black, 2012), however findings from the present study indicate that the winter months of November and December had higher rates of discharge at scene. The reason for this is unclear, however it seems reasonable to suggest that the common phenomenon of 'winter pressures' on the NHS may have impacted on ambulance clinicians' desire to seek alternatives to ED conveyance.

Those ambulance clinicians with advanced assessment skills, ECPs, were significantly more likely to assess and discharge patients at scene. Investment in workforce development between the years 2000 to 2010 saw many ambulance services employ these advanced practitioners. However, more recently some UK services have ceased to support the role, and many ECPs have moved to positions in Primary Care. A workforce retention survey within the study site in 2014 identified that of 71 ECP respondents, 88.4% had considered working for another organisation as a practitioner, with the majority citing that investment in their continued professional development (88.4%) and more effective mentorship (72%) would encourage them to stay within the ambulance service (SWASFT 2014). Exploring the potential to utilise these advanced practitioners in face-to-face assessment and treatment, and in remote telephone triage in ambulance control rooms could improve both 'see and treat' and 'hear and treat' performance, with significant decreases in the number of patients conveyed to hospital. Preventing these unnecessary admissions from joining an ever-lengthening queue at the ED would significantly reduce 'downstream' pressures on NHS hospital resources.







## Chapter 7: Main Discussion

### 7.1 Introduction to the chapter

This chapter will re-visit the results of the individual studies and review the findings in relation to the overarching research objectives. Integrating the data from all four studies, this chapter will discuss how the results inform the research question. Strengths and limitations of the work will be explored, and suggestions for further study will be made.

### 7.2 Summary of studies

This work had four key objectives in order to answer the research question: *How do geographic, temporal and ambulance crew skill factors influence the decision to leave a patient on scene after attending a 999 call?*

#### 7.2.1 Study 1

The first study in this series addressed the research objective to develop a novel questionnaire that examined the decision-making of ambulance clinicians when deciding not to convey a patient. Engaging with an expert reference group, who assisted with the item development, the pilot survey was administered to a sample of forty ambulance staff across a wide geographical area. Exploratory factor analysis (Principal Components) was undertaken and a nine item four component structure emerged which explained 71.94% of the variance. These

components were labelled 'experience', 'need for support/autonomy', 'patient characteristics' and 'safety netting'.

### 7.2.2 Study 2

The second study in this series explored how crew skill factors (clinical grade, length of experience and information processing style) influenced non-conveyance decision-making as measured by the DMASC instrument.

The DMASC survey was administered electronically alongside the REI-40 to explore decision-making preferences. There were 121 complete responses, a response rate of 34%.

There were no overall significant differences between the clinical grades in DMASC scores, however there was a significant interaction between clinical grade and individual DMASC subscales. Emergency Care Practitioners scored significantly higher on the 'Experience' and 'Patient Situation' subscales.

There were no overall significant differences between respondents length of time in their current role and the DMASC subscale scores, however, there was a significant interaction between time in current role and individual DMASC subscales. Staff with less than two years in role scored significantly higher on the 'Safety Netting' subscale than those with more than 15 years experience.

The REI-40 instrument was used to examine the preferred thinking styles of respondents, and found that these were comparable to results from other published studies, with ambulance clinicians at the study site reporting a preference for rational thinking. There was no significant overall difference in the

mean rational or experiential scores between clinical grades, although there was significant effect of the length of time clinicians had been in their current role.

### 7.2.3 Study 3

The qualitative component of this series of studies used two focus groups with eleven clinicians to explore their account of the factors that influence their non-conveyance decisions. Thematic analysis of the results identified five inter-related themes, 'Communication', 'Professionalism', 'System influences' 'Patient characteristics, and 'The three E's – education, exposure and experience'. There was no dominant narrative theme; all were given equal weight within the group discussions.

### 7.2.4 Study 4

The final study analysed a large dataset of all ambulance attendances over one year in a single NHS Ambulance Trust identifying how geographic, temporal and crew skill factors influence non-conveyance. Binomial logistic regression examined the influence of time of day, day of the week, rurality, patient diagnosis and crew skill level to predict the likelihood of conveyance. All five predictor variables were statistically significant and increasing crew skill level was independently associated with a significantly reduced likelihood of being conveyed.

### 7.3 Integration of data

The contribution of each of the research methods used in this study allows for a broad understanding of the factors that influence paramedics' decision-making when leaving patients at scene. This section will explore how the results from all work phases link together, and consider these in relation to the findings of other published studies.

#### *Education, experience and decision-making*

More novice staff, with less than two years clinical practice, scored more highly on the 'safety-netting' subscale of the DMASC tool than their experienced colleagues. Given what is already known on the subject of novice vs. expert decision-making this is unsurprising, although this has not been well researched in relation to pre-hospital care.

The lack of experience of new clinicians was an area highlighted in the qualitative section of this study. Participants with a longer length of service highlighted concerns for their less experienced colleagues, specifically in relation to a lack of opportunity to communicate and learn in formal environments. The qualitative work undertaken by O'Hara et al (2014) supports this, highlighting that non-conveyance decisions are linked a degree of confidence that comes from experience. This finding also resonates with results from Snooks et al (2005), who identified the importance of intuition and experience when ambulance clinicians make decisions to leave patients at home. In this current study, focus group participants described that they did have the confidence to seek alternatives to hospital transfer, although there was recognition that this may be supported by the organisational culture that encourages non-conveyance. This

may be unique to the study site, as work from O'Hara et al (2014) across a range of ambulance service setting suggested that a culture of disproportionate risk aversion results in cautious decision-making which may see patients being conveyed unnecessarily.

Study four found that the ECPs, who have received more educational input and were more experienced, were almost twice as likely to leave someone at home as the other staff groups. This is not dependant upon the resource they are allocated to, as the analysis examined all resources that attended, not ECPs in isolation. This contrasts with the ECPs perceptions of themselves. Results from the focus group data highlighted that ECPs actually felt they were more cautious about leaving people at home due to their increased training. This has important correlates with the work of Kruger and Dunning (1999) in that experienced clinicians rate their ability lower than novices, and are more likely to be cautious about the 'unknown unknowns'.

The ECPs scores on the domain of patient characteristics in the DMASC survey were significantly different to other groups. This may be explained by their extended education, as they have often trained alongside nurses and may have assumed a more holistic approach to clinical reasoning. However, in study 2 there was a high level of agreement from all respondents that their clinical education gave them confidence to support their decisions regarding leaving patients at home. The impact of a broader knowledge base is supported by the focus group research, with ECPs routinely referring to the wider elements of the social indicators that may influence their decisions to leave patients at home.

### *Alternative care pathways*

Turner (2010) highlighted that there is little evidence about the type of alternative pathways available for pre-hospital clinicians, and access to alternatives was a key theme in the qualitative study reported here. There are few formal pathways to support non-conveyance and participants discussed how those that are in existence have been locally developed and agreed. In areas of uncertainty there is a default option to convey the patient, as has been identified elsewhere (O'Hara et al, 2014). In a similar finding to Porter et al (2007), participants in this study suggested that where they have previous negative experiences of accessing alternatives, they would be reluctant to attempt to access that pathway in the future. This was especially true in relation to patients with mental health needs. In study 3, focus group participants highlighted that patients with mental health needs present significant challenges to their decision-making, and there was a general consensus that educational and system interventions could mitigate this. Both O'Hara et al (2014), and Porter et al (2007), have identified that when well designed referral systems are in place there can be benefits to patients, who receive the most appropriate care in a timely manner, and to ambulance services who may be able to redeploy resources according to meet demand.

It has previously been established that discharging a patient at scene may take more time (Snooks et al, 2005) but although acknowledging this, participants on this study remained focussed on their patient interaction, the incident would take as long as was required, and if that was protracted, this was accepted.

### *Mitigating risk*

There is some evidence (Porter et al, 2007), which has suggested that paramedics are fearful of the consequences of making an incorrect decision, and have a lack of faith in management support. Focus group participants in this study also acknowledged this, although they took a pragmatic stance and recognised that they could only safety net for the immediate set of circumstances. They understood that a patient's condition may deteriorate but discussed their decision in light of the patient being clinically safe to be left after their attendance. Study 2 in this current work identified that clinical staff with less length of service scored more highly on the safety netting subscale of the survey instrument, suggesting that there is an awareness of the need to mitigate the risks of leaving patients at home, especially when lacking clinical experience.

Safety netting was a common thread through both focus group narratives in this study, and was described as a key element of professional practice. There was also agreement around the risks for paramedics in relation to making the wrong decision. Porter et al (2008) found that ambulance staff in one service report a need to 'cover their backs' when completing a clinical record, but noted that these were often missing for patients who were not conveyed. This study found the opposite, with focus group participants indicating that their documentation in these cases was likely to be thorough.

### *Organisational pressures*

There was an awareness of the organisational pressures of both increased demand and the expectation that non-conveyance should increase. There are implications both for the patient, and for resource utilisation if a subsequent attendance is needed after a non-conveyance decision has been made. Focus group participants identified the somewhat unwelcome strategies that have been adopted at the study site to enhance non-conveyance rates, but discussed their tendency to disregard this. They did however consider the impact of the increased service demand following a non-conveyance decision. Recognising that if a patient's condition deteriorated and they re-contacted the service, they considered that at certain times of day, or in rural locations, they may consider conveying the patient. They discussed this in relation to the likelihood that a patient who re-contacted the service may have to wait a considerable length of time for re-attendance if demand pressure was significant. This links with O'Hara et al's 2014 work, which identified the interplay and balance between increasing demand from a more diverse case mix. The changing population demographic, noted by Shah et al (2003) and Ruger (2006) undoubtedly contributes to the variation in cases now contacting the 999 emergency ambulance service.

### *Geographical location*

Study four showed a significant linear trend towards conveyance in less urban areas, despite the perception of the focus group participants that they may be more likely to look for alternatives if the journey to hospital was a considerable distance. The impact of location was also discussed in relation to differences in



conveyance rates both within the study site and comparing the study site to other ambulance services. There was a common understanding that the service in which the study was set differed nationally in rates of non-conveyance. However some focus group participants proposed this was as a result of the peninsular geography of the service. They also implied a link between geography and patient characteristics, with more rural locations having an older population, who may be less likely to call an ambulance.

#### 7.4 Conclusions

The decisions commonly associated with delivering healthcare in an emergency setting may not be directly applicable to decisions that pre-hospital clinicians make when deciding to discharge patients at scene. Paramedics will already have used the diagnostic equipment they have available to rule out the 'worst case scenario'. They will instead be considering the patient in a more holistic way, considering the patients social needs alongside the medical. This is more aligned to nursing than typical paramedic education has historically been.

The series of studies reported here have shown it is possible to use both qualitative and quantitative approaches in a mixed method design to explore the factors which may influence these types of decisions.

Study one developed a novel scale (the DMASC survey) to test non-conveyance decision making, identifying four factors of interest. These were 'Experience', 'Need for support', 'Patient characteristics' and 'Safety netting'. Reliability in the development of the DMASC was satisfactory and the item-factor correlations

supported the inclusion of each item within each of the four components. Using an expert reference group to develop the scale supported content validity, with the clarity and relevance of items confirmed in the initial stages.

Study two tested the survey tool in a larger sample and identified a significant interaction between the most highly skilled ECPs and the 'Experience' and 'Patient characteristics' subscales of the DMASC. This suggests that the influence of their extended patient assessment skills means they are more likely to take a wider, holistic view of the patients they attend. All of the ECPs had been in clinical practice for a considerable length of time, and while the results from the REI-40 suggest a preference for rational thinking styles, it can be argued that the impact of experience on reasoning is significant but unconscious to the decision-maker. Conversely, respondents who had been in their role for less than two years scored significantly higher on the 'Safety netting' DMASC subscale than others.

Implications for practice arising from these results are that support and clinical mentorship of newly qualified paramedics should be formalised to support safe decision-making when leaving patients at home. It also suggests that ECPs may be using different decision-making heuristics than other grades to inform their confidence in leaving patients at the scene. Further exploration of the factors influencing such decisions could have a profound effect on training and practice in pre-hospital care.

The qualitative element of this study was used to explore in more detail the quantitative results gained in study two. Focus group results highlighted five inter-related domains that influence decision-making in non-conveyance

situations. The link between education, clinical experience and exposure to a range of clinical symptoms and conditions was recognised.

Study four used the findings of the preceding work to inform the retrospective analysis of a large dataset, identifying that temporal, geographic, crew, and patient characteristics are all influential to the non-conveyance decision. Utilising ECPs in face-to-face assessment and treatment, and in remote telephone triage in ambulance control rooms could improve both 'see and treat' and 'hear and treat' performance, with the potential for significant decreases in ambulance attendances and the number of patients conveyed to hospital.

The potential implications of this finding for ambulance services, Emergency Departments and the wider NHS are significant. Investment in community services in more rural areas may reduce ambulance conveyance, resulting in fewer avoidable admissions and easing pressure on the system. These results may also impact on staff retention within ambulance services, if ECPs can be retained and the prospect of joint contracts with urgent care settings explored, a more holistic delivery of service across a range of providers may be achieved. It may be that the current findings can be used to inform a forthcoming NICE consultation regarding the role of 'advanced paramedics', currently being drafted.

## 7.5 Limitations

There are a number of important constraints in these studies. Study one, the DMASC development, was underpowered as the sample size was small for running an exploratory factor analysis. Ferguson and Cox (1993) have suggested that the sample size required should be over one hundred. Additionally, the KMO measure of sampling adequacy (0.453) was lower than 0.5, which is the standard threshold for acceptability, and also indicates that more data would have been useful.

The response rate for the DMASC study itself was disappointing, despite the perceived saliency of the topic, and the study was subsequently underpowered. The final survey instrument included three items that were not incorporated in the final principal components analysis. These were added in to achieve balance across the four subscales; future Confirmatory Factor Analyses using the twelve-item scale in a larger sample would be helpful in determining the psychometric and research utility of the scale.

The participants in the qualitative component of this work were self-selecting, and their views may not have been representative of the wider clinical workforce. Additionally the characteristics of one group were especially homogenous.

The 'big data' used in study four was collected from four counties of the study setting, and may not be representative of the wider footprint that the ambulance service now covers.

## 7.6 Implications for future research

### *7.6.1 Extending the DMASC scale.*

The initial psychometric evaluation of the DMASC scale suggests it has potential utility for exploring decision-making in pre-hospital non-conveyance decision-making.

A future Confirmatory Factor Analyses using the twelve-item scale in a larger sample would be helpful in determining the psychometric and research utility of the DMASC scale. Future studies using the DMASC would benefit from a larger sample size, across a range of ambulance services, to provide more confidence in the results and improve the generalisability of the current findings.

### *7.6.2 Health economic analysis of extended roles and rising demand*

The final study indicates how analysis of 'big data' can reveal hidden patterns in the 'real world' implementation of non-conveyance decision-making that may have important implications for the broader NHS. The impact of ECP responders in reducing conveyance rates in this large sample suggests that further research into the capacity and training of these practitioners would be timely, given the current pressures on hospital-based services. A health economics analysis could explore the costs of extending the paramedic skillset with potential system impacts such as reduced conveyance to ED, ambulance service resource availability and reductions in demand.

### *7.6.3 Feedback to support safe decision-making*

This study did not examine patient outcomes, following the clinical decision to leave a patient at home following a 999 call. Future work could examine the impact of feedback on safe decision-making. Would the knowledge of re-contacts to the ambulance service influence future decision-making?

## 7.7 Recommendations

Providers of emergency ambulance services and Higher Education Institutions should consider the following recommendations, which have been highlighted through undertaking the current research study:

- Consider broadening the educational curriculum to incorporate the impact of decision making in practice, especially in relation to patients who are attended but subsequently left at home.
- Explore the potential for using specialist paramedics (such as ECPs), to support remote triage.
- Examine methods of allocating specialist paramedics (such as ECPs), to incidents which are more likely to have a 'see and treat' outcome, specifically deploying them to incidents where their advanced skill set might enable more efficient resource allocation of other ambulance clinicians.
- Formalise the mentorship available to newly qualified paramedics to support safe decision making when leaving patients at home following a 999-call attendance.

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Appendix A University ethics approval



Psychology Research  
Ethics Committee

Psychology, College of Life  
& Environmental Sciences

Washington Singer Laboratories  
Perry Road  
Exeter  
EX4 4QG

Telephone +44 (0)1392 264626  
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Email Marilyn.evans@exeter.ac.uk

**To: Sarah Black**  
**From: Cris Burgess**  
**CC: Dave Richards**  
**Re: Application 2010/261 Ethics Committee**  
**Date: April 24, 2018**

The School of Psychology Ethics Committee has now discussed your application, **2010/261 - Factors influencing pre hospital decisions not to convey: a mixed method study**. The project has been approved in principle for the duration of your study.

The agreement of the Committee is subject to your compliance with the British Psychological Society Code of Conduct and the University of Exeter procedures for data protection (<http://www.ex.ac.uk/admin/academic/datapro/>). In any correspondence with the Ethics Committee about this application, please quote the reference number above.

I wish you every success with your research.

A handwritten signature in black ink, appearing to read 'Cris Burgess', with a horizontal line underneath.

Cris Burgess  
Chair of Psychology Research Ethics Committee

Appendix B NRES communication

**From:** SouthWest2 (UNIVERSITY HOSPITALS BRISTOL NHS FOUNDATION TRUST) [<mailto:ubh-tr.SouthWest2@nhs.net>] **Sent:** 20 July 2011 14:32 **To:** Sarah Black (Research and Audit) **Subject:** RE: Advice re: requirement for REC approval

Hi Sarah

As far as I am aware if you are interviewing NHS staff from 1 September you will not have to apply for ethics review. If however you have already submitted an application then you would have to follow this through.

Hope this makes sense.

Please do not hesitate to contact me if you think I can help further or give me a ring if you prefer to discuss this.

best wishes.

Kirsten Peck  
Coordinator  
NRES Committee South West - Exeter  
South West REC Centre  
Block B  
Level 3  
Whitefriars  
Lewins Mead  
Bristol  
BS1 2NT

Tele: 0117 342 1332

Fax: 0117 342 0445

**From:** Sarah Black (Research and Audit)  
[[Sarah.Black@swast.nhs.uk](mailto:Sarah.Black@swast.nhs.uk)] **Sent:** 20 July 2011 14:13 **To:** SouthWest2  
(UNIVERSITY HOSPITALS BRISTOL NHS FOUNDATION TRUST) **Subject:**  
FW: Advice re: requirement for REC approval

Hello Kirsten,

I wonder if I could trouble you to approach the Chair with a further query?

I have been advised that from September 2011 the remit of RECs will be changing following implementation of the new governance arrangements for Research Ethics Committees and I am interested to establish if this has any bearing on the decision made concerning the requirement for ethics approval for my project given that I will not be commencing the study in any form until after September 1<sup>st</sup>.

Paragraph 2.3.13 in the document (which can be found using the link below) seems to indicate that where research involves NHS staff who are recruited as part of their professional role (as in my study) this work does not require REC review unless it meets other requirements e.g. involves service users or patients as participants, which my proposed study does not.

I would be very grateful for further clarification of the impact of this new guidance on the earlier decision, as previously stated my project will involve existing NHS staff in a survey and focus groups examining current practice.

[http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_126474](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_126474)

Best wishes

Sarah

Kind regards Sarah Black | Research & Audit Manager South Western Ambulance Service NHS Foundation Trust [www.swast.nhs.uk](http://www.swast.nhs.uk) Abbey Court, Eagle Way, Exeter EX2 7HY

**From:** SouthWest2 (UNIVERSITY HOSPITALS BRISTOL NHS FOUNDATION TRUST) [<mailto:ubh-tr.SouthWest2@nhs.net>] **Sent:** 23 June 2011 10:35 **To:** Sarah Black (Clinical Audit) **Subject:** RE: Advice re: requirement for REC approval

Hi Sarah

I have now heard from the Chair and she has confirmed that your proposed study will have to have a full review by a Research Ethics Committee.

Please do not hesitate to contact me should you think I can help further.

Best wishes.

Kirsten Peck  
Coordinator  
NRES Committee South West - Exeter  
South West REC Centre  
Block B  
Level 3  
Whitefriars  
Lewins Mead  
Bristol  
BS1 2NT

**From:** Sarah Black (Clinical Audit) [[Sarah.Black@swast.nhs.uk](mailto:Sarah.Black@swast.nhs.uk)] **Sent:** 22 June 2011 15:46 **To:** SouthWest2 (UNIVERSITY HOSPITALS BRISTOL NHS FOUNDATION TRUST) **Subject:** Advice re: requirement for REC approval  
Dear Kirsten,

As part of my Professional Doctorate with the University of Exeter I am aiming to undertake a project which is examining the factors which influence paramedic decision making. The methodology will use a questionnaire to understand current practice and be followed with some focus group work. South Western Ambulance Service NHS

Foundation Trust has a strategic aim to assist with the reduction of A&E attendances so understanding the perceived barriers to this will inform the development of the service. There is no plan to alter current practice for this study.

Thank you for taking the time to consider the attached which is a summary of the aims and a process map showing the stages which I plan to use.

I hope you are able to provide me an opinion from the Chair to inform me of the need to seek formal REC approval if this is considered research as opposed to service evaluation.

I look forward to hearing from you

Best wishes

Sarah

Kind regards Sarah Black | Research & Audit Manager South Western Ambulance Service NHS Foundation Trust [www.swast.nhs.uk](http://www.swast.nhs.uk) Abbey Court, Eagle Way, Exeter EX2 7HY



South Western Ambulance Service **NHS**  
NHS Foundation Trust

Trust Headquarters  
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12<sup>th</sup> July 2012

Dear Sarah

Re: **Non conveyance decision making V1**  
Trust Ref: 11-007  
REC Ref: N/A  
CSP Ref: N/A

NHS permission for the above research has been granted on the basis of the information provided in the application form, protocol and supporting documentation. The documents reviewed were:

IRAS form	V1	01/07/2012
Participant invitation and consent sheet	V1	25/3/2011
Protocol including questionnaire themes	V1	25/3/2011

Your attention is drawn to the attached conditions of approval.

We would like to wish you every success with the project and look forward to seeing the results.

Yours sincerely,

**Dr Andy Smith**  
Medical Director

CC – (email) Prof. David Richards,  
University of Exeter



he brings  
to help you

The Prompt Payment Code



Chairman: Heather Strawbridge  
Chief Executive: Ken Wenman

Sign up <https://www.nhs-membership.co.uk/swas> to be a member

## Appendix D DMASC study development items

Item no	Item	Construct	Included in:		
			Ref Group	Pilot	Final
1	I make non-conveyance decisions autonomously using the information available to me	Need for support / autonomy	Yes	Yes, but altered	Yes
2	I seek clinical support from operational colleagues when making a decision not to convey a patient	Need for support / autonomy	Yes	Yes, but altered	Yes
3	I seek clinical support from other Health Care Professionals when making a decision not to convey a patient	Need for support / autonomy	Yes	Yes, but altered	Yes
4	I seek clinical support from Clinical Supervisors in the Hub when making a decision not to convey a patient	Need for support / autonomy	Yes	Yes, but altered	No
5	I make non conveyance decisions based on clinical need	Situational / patient characteristic	Yes	Yes	No
6	I make non conveyance decisions based on social need	Situational / patient characteristic	Yes	Yes	No
7	I make decisions based on those I have used in the past in similar circumstances	Experience	Yes	Yes	No
8	Knowledge of patients I attend regularly influences my decision to convey	Experience	Yes	Yes	Yes
9	I lack confidence when making decisions to leave a patient at home	Need for support / autonomy	Yes	Yes	No
10	I am confident in my ability to make a decision to leave a patient at home	Need for support / autonomy	Yes	Yes	No
11	I take the time to consider the 'what ifs' every time I make a decision to leave a patient at home	Decision making style	Yes	Yes	No
12	I regularly reflect on my patient contacts and the decisions I make.	Decision making style	No, added from stake - holders	Yes	No
13	I am prepared to leave a patient on scene until another HCP attends.	Safety netting	No, added from stake - holders	Yes	Yes
14	My decision to leave a patient at home is influenced by ambulance control.	Situational / patient characteristic	No, added from stake - holders	Yes	No
15	The information received on the Mobile Data Screen can influence	Situational / patient	No, added	Yes	No



	my decision to convey.	characteristic	from stake - holders		
16	When considering leaving a patient at home I feel I have to 'cover my back'.	Ambulance specific issues	Yes	Yes	No
17	I consider Trust policy requirements when leaving a patient at home.	Ambulance specific issues	Yes	Yes	No
18	I feel pressure to increase my non conveyance rate.	Ambulance specific issues	Yes	Yes	No
19	I ensure I safety net appropriately	Safety netting	Yes	Yes, but altered	No
20	I mentally list the alternative options available to me before making a decision	Decision making style	Yes	Yes	No
21	I trust my initial instinct when making clinical decisions	Decision making style	Yes	Yes	No
22	I am able to return and review patients I have left at home.	Safety netting	No, added from stake - holders	Yes	Yes
23	I access alternative care pathways when leaving a patient at home.	Safety netting	Yes	Yes, but altered	No
24	Alternative care pathways are not always available when I make a decision not to convey.	Safety netting	Yes	Yes	No
25	I would consider leaving a patient at home when operating outside my usual area.	Safety netting	Yes	Yes	No
26	I consider leaving patients at home when they have social needs, even if there is no responsible adult to sit with them.	Situational / patient characteristic	No, added from stake - holders	Yes	Yes
27	A patient's reluctance to go to hospital would not influence my clinical decision to leave them at home	Situational / patient characteristic	Yes	Yes	Yes
28	I am more confident in my decision to leave a patient at home if there is a responsible adult with the patient.	Situational / patient characteristic	Yes	Yes	No
29	I would only leave a patient at home if they consent to be left	Situational / patient characteristic	Yes	Yes	Yes
30	My past experience has little to do with how I make a decision not to convey	Experience	Yes	Yes	Yes
31	I am confident that my clinical education supports me in my decision making	Experience	No, added from stake -	Yes	Yes

			holders		
32	I am aware of alternative care pathways outside of my local operating area	Safety netting	Yes	Yes, but altered	No
33	Appropriate safety netting is difficult in practice.	Safety netting	Yes	Yes	Yes
34	I understand the concept of safety netting when leaving a patient at home.	Safety netting	Yes	Yes	No
35	I am confident I can make safe non conveyance decisions	Safety netting	No, added from stake - holders	Yes	No

## CONSENT FORM

**Study title:** Factors Influencing Pre Hospital Decisions not to Convey

The DEMASC study: DEcision Making and Ambulance Service Conveyance

**Researcher Name:** Sarah Black

*Please initial the box(es) if you agree with the statement(s):*

I have read and understood the information sheet and have had the opportunity to ask questions about the study

I agree to participate in a focus group as part of this research project and agree for my data to be used for the purpose of this study

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected

I agree for the interview to be tape-recorded

### **Data Protection**

*I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be made anonymous.*

Name of participant (print name).....

Signature of participant.....

Date.....

Appendix F Data fields extracted for Study 4

Data item	Description
<b>Call Number</b>	Unique identifier
<b>Date of Call for Performance ('Clock Start')</b>	e.g. 01/01/2014
<b>Day of Week when Call Taking Commenced</b>	e.g. Tuesday
<b>Time of Call for Performance ('Clock Start')</b>	hh:mm:ss
<b>Time 1</b>	Used to recalculate hour of day
<b>Time 2</b>	Used to recalculate hour of day
<b>Hour of day</b>	New variable
<b>Government Standard at Time of Call</b>	Priority of despatch e.g. RED1
<b>Chief Complaint/Symptom Group</b>	NHS Pathways code
<b>Symptom Discriminator Description</b>	NHS Pathways code
<b>Despatch Code/Disposition</b>	NHS Pathways code
<b>Despatch Code/Disposition Description</b>	NHS Pathways code
<b>Main Patient's Sex</b>	e.g. Male
<b>Main Patient's Age</b>	e.g. 75Y
<b>Postcode</b>	Shoterned for anonymity
<b>Unitary Authority</b>	Relats to CCG area
<b>PRFChiefComplaintCode</b>	Paramedics intial diagnosis
<b>CCC2</b>	With 1+ crew on scene there may be multiple Chief Complaints
<b>CCC3</b>	With 1+ crew on scene there may be multiple Chief Complaints
<b>CCC4</b>	With 1+ crew on scene there may be multiple Chief Complaints
<b>CCC5</b>	With 1+ crew on scene there may be multiple Chief Complaints
<b>CCC6</b>	With 1+ crew on scene there may be multiple Chief Complaints
<b>CCC7</b>	With 1+ crew on scene there may be multiple Chief Complaints
<b>CCC8</b>	With 1+ crew on scene there may be multiple Chief Complaints
<b>Crew'sOverallQualification</b>	e.g. ECP CSO
<b>Crew2</b>	e.g. Paramedic
<b>Crew3</b>	e.g. BLS
<b>Crew4</b>	as above
<b>Crew5</b>	as above
<b>Call Stopped Reason</b>	e.g. Treated at scene
<b>Number of Patients Carried (all Resources)</b>	e.g 1
<b>Hospital Attended by Resource</b>	Name of hospital
<b>Rurality</b>	e.g. Urban >10k