

University of Nottingham

**A Study of Leadership and
Implementing a Regional Trauma Care
Network in the East Midlands**

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MRes in Business Management

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Implementing a Regional Trauma Care
Network in the East Midlands**

by

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Contents

Literature Review	6
Introduction	6
Specialisation in medicine	6
Restructuring healthcare	15
Leadership and innovation	21
The case for trauma care in the UK	30
Methodology	39
Analysis	53
Introduction	53
Network management and leadership	54
Network structure and operations	70
Network leadership ideology	88
Conclusion	106
References	110

This dissertation focuses on issues of innovation and leadership in healthcare. It examines these issues in the context of the reorganisation of trauma care services in the East Midlands into a regionalised trauma network. It is a qualitative study using a general inductive theoretical approach to examine interview data from a sample of 6 members of the network as they discuss issues of management and leadership. Leadership in healthcare presents a complex field of study with controversy surrounding the level of clinical involvement and the political profile of the success of healthcare services in the UK.

Trauma care services are a significant area of study, because the long term effects of poor trauma care include disability and death, and affecting people less than forty years old more severely. This places a burden on society that could be prevented (Albert and Phillips, 2003). Leadership has been shown to present an opportunity for providing better quality of healthcare. This can be through helping implement new healthcare initiatives, improving teamwork in a healthcare environment and reducing fragmentation of care (Millward and Bryan, 2005).

This study begins with a literature review which helps frame and contextualise the issue. It covers the specialisation of trauma services, theories of leadership and innovation and shows how this research contributes to existing literature on this subject. Following this, there is an assessment of methodological approaches to studying trauma services as well as conducting qualitative research, which culminates in a study design. Finally, the analysis section summarises and discusses the concepts created during data analysis and synthesises them with literature from the review to produce the research findings.

The argument I present is that the reorganisation of trauma services in the East Midlands presents evidence clarifying the role of leadership in healthcare restructuring. Specifically, this dissertation identifies evidence for leaders facilitating the implementation of healthcare innovations, the redefinition of trauma care as a profession, and the inclusion of outcome concerns beyond acute

care and mortality statistics. Most significantly, this dissertation combines these theoretical considerations in an area lacking in qualitative studies; trauma care.

LITERATURE REVIEW

1. Introduction

In order to study the recent foundation of a trauma network in the East Midlands, I have used secondary literature to provide a theoretical context for this process of healthcare reorganisation. I begin by looking at specialisation in medicine and how it is linked to ideas of increased professionalization of trauma care. I then examine causes and trends of specialisation and what effect it can have in medicine. I then discuss the nature of reconfiguring healthcare in light of specialisation of medicine. I then discuss how specialist restructuring of services is linked to innovation, which in turn is introduced through competent leadership. I discuss the nature of leadership in medicine and how leadership and innovation are managed increasingly often through medical networks. Finally, I outline the case of the implementation of healthcare networks within modern trauma care and how my study fits into this discussion.

2. Specialisation in Medicine

In this section, I explore the link between specialisation and the reconfiguration of trauma care. I discuss what specialisation is, and where it comes from, and how it ties in to theories of professionalism in medicine. I will then examine how these motivations for specialisation are linked to those of professionalization and look at overarching trends in specialisation in medicine to illustrate the controversy surrounding specialisation. I then look at the process of specialisation within specific examples to understand how demanding the process is. I will then use the evidence results of specialisation in specific medical disciplines to evaluate whether the benefits justify the motivations for specialisation and whether they outweigh the controversy and drawbacks. Finally I focus this argument onto accounts of specialisation of trauma care.

2.a. Emerging Professions and Specialisation

In order to understand specialisation in medicine it is necessary to define it and link it to the context of emerging professions. Modern professions reasserted their statuses after the Second World War as occupational groups that policed themselves for the greater good of society. Professionalization was a process of occupations vying to gain status and power and was typified by a body of expert knowledge and service improvement ideology, as well as control over practice. In medicine, this professionalization was boosted by the increase of the welfare state and its investment in healthcare. These ties with welfare allowed the altruistic and expert status of medicine to blossom. In recent years however, medical autonomy is being challenged as funding is restricted, governance is shifting away from practitioners, and paramedical professions look for equal status (Armstrong, 2000).

Comparatively, Stitzenberg and Sheldon (2005) describe specialisation in healthcare as a process of narrowing medical practice and expertise from the preceding broader scope found within basic medical training. They identify it as becoming increasing the norm within medicine and that it is the result of the growth of medical knowledge leading up to modern healthcare. They note that specialist care is especially characterised as not interchangeable with other medical practices. So as professional knowledge becomes specialised, the ability to restrict entry to a profession increases.

There is evidence that professionalism and specialisation in American healthcare are closely linked through professional control. Specialist knowledge and status allow medical professionals to occupy strong positions in the market. Market control can be defined by mediation of the scope of work of similar professionals but also by limiting professional competition. Limited professional competition can benefit practitioners but can also harm consumers. In answer to this, the state may attempt to regulate professional practices to ensure value through consumer choice (Freidson, 1984).

In this vein, the health care service in the UK has become increasingly privatised in order to promote competition and cost-effectiveness. As a result, specialisation is being used by medical professionals to reassert market control. This has led to a loss of the ethical, service-improvement aspects of professionalism which have been substituted with financial concerns. This loss of holistic professionalism is tied in with the appeal of specialist disciplines where technical practice replaces patient or case focus (Relman, 2007).

Part of this change to the medical profession within a competitive market is the managerial slant being introduced to medical practitioner roles. Elites within a medical field may be chosen to take on managerial roles within their field (Waring and Currie, 2009). This effect results in hybridisation of professional and managerial duties. Professional culture which was previously independent is now becoming subject to managerial dictate. This can lead to significant changes in professional identity (Waring, 2014).

2.b. Factors driving specialisation in healthcare

It becomes increasingly clear that specialisation in medicine complements the process of professionalization when you examine the factors driving it. One aspect of specialisation that appears to be especially desirable is the increase in status and greater level of control over a profession it allows. In the first half of the 20th century, an increased number of medical specialisms such as ophthalmology, dermatology, obstetrics and gynaecology and otolaryngology (ABMS, 2015) began to found boards of assessment. These were intended to restrict unqualified practitioners from claiming specialist status. Furthermore, the authors identify 'professional image' as being the main motivation for medical disciplines to seek renewed certification with these boards (Cassel and Reuben, 2011).

Specialisation appears to help further this professional image when you consider that specialist practice comes from practice legitimised by extra training beyond core medical education.

With the need to dedicate time to expert practice, expert medical professionals can justify offloading less appealing tasks to other professionals or non-professional staff. This process of delegation of less skilled work to those of lesser professional status is part of what motivates a group of professional to consistently seek status improvement (Nancarrow and Bothwick, 2005).

In conjunction with this, there appears to be a link between service improvement and specialisation, as improving medical technologies necessitate specialist care before and after treatment. Although certain disciplines rely less on specialist technical knowledge, they may still require specialised systems of service delivery (Cassel and Reuben, 2011). Likewise, there are concerns that doctors practising outside their area of expertise will result in a lower quality of care. If specialisation does contribute to service improvement, then it will complement the process of professionalization (Leslie *et al*, 2001).

Following this, motivation to improve patient outcomes can be a driving factor in specialisation. In order to improve patient outcomes, a discipline may focus on specialist education and training. In conjunction with a growing body of academic evidence, this specialist education can help a medical discipline achieve specialist status. Concurrently, passionate expert leadership can be a catalyst for specialisation in medicine and so it appears that specialisation can facilitate service improvement under the right circumstances (Shepherd, 1990).

Service improvement is not the only impetus for specialisation. Because of the social phenomenon of a medical emergency, accident and emergency care is an entry point for patients' access to services. This means there is an increased focus on patient considerations over practitioners'. Similarly, emergency medicine has an increased political profile of 'life-saving care' allowing it to gain specialist status despite being less acclaimed than intensive care medicine. Here it is clear that perceptions of a discipline can promote specialist status, which in turn provides a professional edge in the market (Timmons and Nairn, 2015).

It is apparent that specialist development of a medical discipline stems from a need for professional status and practice, and a need to build care around specialist treatments. The link between service improvement and specialisation leads to more complex treatments and more complex training to carry out these treatments. As a result, those who control this training control entry into the profession meaning greater professionalization.

2.c. Previous examples of medical specialisation

Historical examples of specialisation in medicine help demonstrate the effect it can have. The emergence of genetics as a medical discipline in the UK in the 70s shows that understanding of genetics shifted from heredity to genes and chromosomes, and new technologies relating to genetic screening, counselling and public health emerged. These changes were necessitated by demands from medicine for understanding of the genetic basis of blood donation and hereditary disease in paediatrics. Overall, these changes resulted in reconfiguration of genetic healthcare in Manchester (Coventry and Pickstone, 1999).

Similarly, Shepherd (1990) discusses the process of anaesthesia emerging as a specialist medical discipline in Canada during the 19th and 20th centuries. Beginning with a focus of reducing patient mortality, anaesthesia evolved from a craft to a medical discipline through improved training and recognition in the form of a Society of Anaesthetists. Even so, it was not fully accepted as a specialist discipline until the discipline achieved the foundation of multiple medical departments and a full professorship in anaesthetics.

Likewise, Timmons and Nairn (2015) explore the development of emergency medicine as a specialism in the UK via a literature review. They note that the foundation of a specialist college in emergency medicine in 2008 cemented its formal recognition as a specialism. The authors discuss how the term emergency is not a biological term but a social one and, in the process of specialising

emergency care, the term emergency has been medicalised. In all three examples specialisation involved gaining professional recognition and restructuring medical services.

Specialism can also emerge within a generalist medical environment. While general practitioners are expected to take a holistic approach to primary care treatment of their patients, sub-specialities do emerge in a number of areas of medical interest. An example of this is the emergence of the 'breast physician' in Australia who specialises in mammograms and other diagnostics for breast related medical issues. Introducing these subspecialties within generalist medicine means challenging traditional approaches and requires clarifying the role and gaining recognition and acceptance (Brennan and Spillane, 2007).

From these examples, it is evident that the process of specialisation may be linked to technical advances, formal recognition and regulation, and the reduction of generalist care. It is clear the process is complex and can require restructuring care, the drive to become recognised as a specialism, and the 'blessing' of the wider medical community. This prompts the question of 'how best to do this when managing specialisation?'

2.d. Wider trends of specialisation in healthcare

As well as a number of specific driving factors, specialisation in medicine is also linked to ongoing shifts in medical paradigms. Cassel and Reuben (2011) propose that, with more and more subspecialties emerging in medicine, disciplines are becoming increasingly multidisciplinary as the new specialities tend to draw upon expertise from a number of preceding medical specialisms. However, Leslie *et al* (2001) disagree, arguing that healthcare is leaning increasingly towards generalised medicine and away from specialisation.

Increased specialisation has been emerging in American medical training, but there is little structure or planning brought in to regulate it. This process has been as much from increased investment, and enrolment into specialised professions, as from an emergence of new specialist

disciplines. As a result, there are concerns that increased and unregulated specialisation has threatened the holistic aspects of medicine in the USA. From this we can conclude that specialisation can be self-perpetuating and while some medical professionals embrace it, others see it as a threat to traditional medical values (Donini-Lenhoff and Hendrick, 2000).

Concurrently, primary care specialities have also moved from general practice to primary care specialisms. They explain this development makes sense in the modern, competitive, pro-specialisation medical environment, but express that it has left patients and practitioners confused about the nature and role of primary care. Most importantly, preserving the broad scope of primary care is seen as essential, due to the closeness of the discipline to patients as a means of accessing healthcare. So if specialisation in medicine is inevitable, then it needs to be understood and regulated for the sake of patients and practitioners (Moore and Showstack, 2003).

From these arguments, it appears that the increased specialisation of medical disciplines is underpinned by a debate as to the holistic nature of medicine. While some feel that holistic medicine is something to be preserved, it is clear from the previous section that specialisation offers a number of benefits and in fact, specialisation is inevitable. The question to ask of a discipline undergoing specialisation is how the necessary holistic functions of medicine can be preserved. This is especially true if the discipline is linked to patients' access to healthcare, as is the case with trauma care.

2.e. The effects of specialisation in medicine

Literature on the effects of specialisation will help to address the debate of the worth of specialising within medicine. One concern regarding the effect of specialisation in medicine is presented, which is that over-specialisation creates too narrow a scope for a discipline, as well as making it unappealing to potential recruits (Cassel and Reuben, 2011). It can also affect professional status both from external society and intra-professional status which differs between generalists and

specialist (Abbotts, 1981). There are also fears that over-specialisation leads to fragmentation of care and these fears have given rise to the 'generalist' specialisation of medicine (Cassel and Reuben, 2011). Alternatively, it can be argued that sub-specialists could improve communication between primary care generalists and secondary care specialists and overall augment generalist care (Brenne and Spillane, 2007).

In contrast to the difficult balancing act of general and specialist care, there are proven benefits to specialist care. Compared to cardiologists, generalist doctors have been found to be less likely to prescribe medication proven to increase survivability in MI patients. Moreover, mortality rates were lower for those patients treated by cardiologists. Similarly, cardiologists were better at estimating risk in patients with other cardiovascular disorders and again were more likely to prescribe the most effective drugs as supported by literature (Leslie *et al*, 2001). In addition, stroke care also shows decreased mortality and length of hospital stay across multiple locations in the UK (Fulop *et al*, 2014).

Despite these benefits, members of the trauma care community are speaking against over-specialisation and expressing a desire to remain in a general surgery environment. This suggests that shifting the focus of critical care surgery to wider, more holistic, trauma care has been met with the stigma of other non-surgical roles, because of the poor reimbursement of effort in non-surgical care. This conflict and resistance is a fundamental aspect of introducing specialisation within a discipline (Spain and Miller, 2005).

In contrast to the risks of overspecialisation, resistance to specialisation, and the demanding process of specialisation, there are examples above that show its benefits. If specialisation does lead to more efficient and effective healthcare, then it could be argued that the net worth of specialisation offsets the potential negatives. Moreover, improved care as a result of specialisation shows that service improvement is a major factor in specialising medicine and that it does represent ongoing professionalization of medicine.

2.f. Specialisation within Trauma Care

Finally, to show how this debate is relevant to my research topic, I explore existing accounts of trauma care specialisation. For example, due to current specialisation of trauma care, there is a lack of surgical opportunities within the profession and this has been linked to decreased job satisfaction by Kim *et al* (2003). Moreover, this lack of surgery opportunities was reported by staff as being detrimental to trauma surgeons' skill level. However, it was also reported that inclusion of emergency general surgery workload in trauma care helps maintain and even improve skill levels.

There is even more evidence that specialisation in trauma care can be problematic. In the USA, where specialist trauma care is already established, enlistment into specialist trauma training is low. Although trainees feel they are capable of handling trauma cases, few expect them to be a regular component in their professional careers and fewer still express an interest in specialising in it (Spain and Miller, 2005).

Moreover, it seems that problematic specialist hospital trauma services are not the only option as there are alternate routes of trauma care management. In France, they compensate for a lack of specialist trauma services with a highly developed pre-hospital care system, triage system and referrals to surgical specialities. When an incident is reported, either a medical or non-medical response team is dispatched. The medical team consists of a multidisciplinary team of practitioners equipped with a mobile hospital unit (Masméjean *et al*, 2003).

Despite these arguments, there are also advantages to specialised trauma services such as significantly improved processes of care as well as patient outcomes. Specialist trauma services brought together under a regional system of service delivery can greatly improve outcomes for major trauma cases. Moreover, specialist service improvements are perceived as necessary, given the unacceptably high rate of mortality in trauma care (Davenport *et al*, 2009).

Although with trauma care there are yet more concerns, the benefits of specialisation seem overwhelmingly evident. In summary, the driving factors for specialisation vary, but a common theme is the need for service improvement which ties specialisation into ongoing medical professionalization. This need for service improvement, and specialist services being able to provide it, makes for an easy argument for specialising. Even so, specialist medical professions need to address concerns and resistance from practitioners within the discipline and in the wider medical community.

3. Restructuring Healthcare

In this section, I will explore the role of the restructuring of healthcare in the professional development of medicine. Firstly, I will identify how specialist innovations in healthcare require restructuring to accommodate them. Then I will explain what restructuring of healthcare involves. Finally, I will explain the barriers that cause healthcare restructuring to be problematic and what implications this has for any current attempts to restructure healthcare.

Duckett (2005) explains that specialisation comes at the cost of efficiency and coordination of services. Specialist care is cost and resource intensive as specialists will more readily utilise newer treatments and diagnostic tools and are less likely to take the wait and see approach of generalist medicine (Harold, Field and Gurwitz, 2001). In order to maintain expertise in specialist care, specialist disciplines also need a high volume of patient cases (Cassel and Reuben, 2011). It appears that service organisation is an important consideration for specialist health services.

Although the treatment of trauma patients has improved in recent years, this has been due to technological advances, and only the highest quality of trauma care organisation would be sufficient to meet current healthcare needs in trauma. So, with the case of trauma care specialisation, reorganisation is necessary in order to achieve the desired improvements to patient outcomes (Albert and Phillips, 2003). Not only is restructuring of care important for specialist care,

but it also important for innovation in medicine. Compared with other organisations that may have teams focused on product development, innovation in healthcare is often a secondary consideration (Fay *et al*, 2006).

3.a. What does healthcare reorganisation entail?

An article by Robertson-Steel (2003) on Reforming Emergency Care (REC) recognises a number of issues in out-of-hours health services, like poor service integration, planning and prioritisation of patients, which can be improved by reconfiguration. If done to maximise efficiency, reconfiguring care can mean ascribing new values to staff and responsibilities. This can lead practitioners to construct professional hierarchies which influence professional identities within healthcare (Charles-Jones, Latimer and May, 2003).

Professional hierarchies are being affected by a growing international trend of substituting doctors' roles with nurses. These substitutions also happen between lower and higher grade nurses and so can be applied to wider healthcare staff. The main focus for these substitutions is cost efficiency. Where substitutions are viable, they must also be more cost efficient, in order to justify the resources spent during reconfiguration, although this may be lessened if made in conjunction with other health services restructuring (Richardson and Maynard, 1995).

An alternative to substitutions is the restructuring of emergency department workforces like in the USA in the early 2000s. With increased economic pressure to downsize, USA emergency departments had to focus on reducing labour costs, as they contribute the high proportion of cost. A solution to this is using algorithms and models, and calculated workforce shift scheduling, based on staggering, which can decrease staff hours without sacrificing efficiency, whilst simultaneously reducing patient wait times for treatments and tests (Sinreich and Jabali, 2007).

Education and changes to skilling are factors affecting workforce reconfiguration but are not the full extent of the considerations. Health workforce reconfiguration is a value-based process, and

should reflect the objectives of policy makers instigating the change. Not only this, but it should also cater to stakeholders and make a profession more appealing. So it is clear that reconfiguration is not only functional but also meets less tangible conceptual aims, like the increased professionalization of medicine (Gilles *et al*, 2010).

This section reveals that reconfiguration is a complicated process with many considerations. While many practical changes are necessary, the most significant changes appear to be those to professional identity and, as mentioned in the previous section, an increase in collaboration. With this in mind, the following sections will discuss these themes in more detail.

3.b. Redefining professional boundaries

Evetts (2006) defines a profession as an occupation where professionals share a level of workplace socialisation and they have common experiences, knowledge and problem-solving methods. This professional identity is reproduced through training, both educational and vocational, and results in shared work culture. One feature of a professional is the level of control they have over their elite positions, and the extent to which they will try and defend them.

When a health profession is required to adjust to new health policy, the way they view task allocations, medical and non-medical peers, and hierarchies of skill is required to change. For general practice, changing the type of work practitioners do requires consideration of the health paradigm they are working within. Following high levels of professional autonomy, general practice has had to accommodate chronic disease management, and public health management, and as a result has been pressured into a more efficient and transparent model of primary care provision (Charles-Jones, Latimer and May, 2003).

As well as incorporating other professional responsibilities, professional identities in medicine can be affected by skill substitutions. In the past, medical professionals have closely guarded unique values, methods of care, and interactions with patients and other professionals.

Now professions are relaxing, and these qualities are being transferred to other hospital staff, like nurses, as job substitutions occur. This process requires skill transfer strategies alongside education improvements (Duckett, 2005). These skill substitutions can work both ways as some medical professionals attempt to reclaim these delegated tasks to preserve market control (Nancarrow and Borthwick, 2005).

As well as internal changes to professions, the introduction of newly specialised medical professions can affect existing inter-professional boundaries. With the siphoning away of political power from medical professional groups in recent history, the ability to define and control professional boundaries has been reduced. Even so, through steady collaborative work, midwifery and obstetrics in Australia managed to establish new professional boundaries that resulted in new specialisations for the midwifery rather than deskilling (Lane, 2014).

Likewise, the emergence of a new role, the emergency care practitioner (ECP), falls somewhere between nursing and paramedical services. By transgressing traditional professional boundaries, ECPs are able to provide more treatment and perform more patient discharges. They also enabled fewer subsequent referrals for patients being treated. Building inter-professional relationships has been important for introducing the role, as well as the need for healthcare managers to recognise the role. These factors are crucial in insuring appropriate leadership and utilisation of the role, which in turn determines its sustainability (Mason *et al*, 2006).

With general practice as an example, Currie, Finn and Martin identify a growth in specialisation and professional competition, linked to resource allocation on the basis of achievement. They argue that power and status given to general practitioners has actually increased in recent years. They identify the cause of this as the siphoning of clinical responsibilities from hospital consultants, and the overlapping of professional responsibility. This process has led general practitioners with specialist interests to act as 'champions' for transgressing professional boundaries and redefining the role of general practice in medicine (Currie, Finn and Martin, 2009).

Overall it appears that changes to healthcare organisation, especially in regards to newly specialised professions, can affect previous established professional boundaries. This is usually due to responsibilities being shifted between different medical and non-medical healthcare staff, which requires changes to medical education, creating lasting changes to professional jurisdiction. Alongside this is the increase of inter-disciplinary collaboration, which is discussed in more detail below.

3.c. *Barriers to restructuring healthcare*

While restructuring care and redrawing professional boundaries can facilitate specialisation and improve care it is not always successful. This can be because of simple factors, for example the restructuring of UK trauma care services has been slow, because of the associated costs, which resulted in a lack of government support for the changes, and attempts to appeal for support have been met with indifference (Albert and Phillips, 2003).

Moreover, reorganisation can be avoided because of uncertainty. In the case of the Reforming Emergency Care, it was perceived that if the workforce is not reorganised effectively, then changes could lead to fragmentation of healthcare under the NHS (Robertson-Steel, 2003). While reliable theoretical methods for restructuring exist, like Sinreich and Jabali's (2007) system of workforce shift management, it may be difficult to convince hospital management or practitioners to adopt it. Having to convince staff to accept changes, particularly when it requires adjusting their personal lives or management styles, makes workforce reconfiguration problematic.

Even when successful there can be negative effects of specialist restructuring of care. Increased specialisation for general practitioners may lead to deskilling, loss of status, loss of a holistic approach to medicine, increased substitution of routine aspects of care, monopolisation of leadership roles, and professional segmentation. Despite this, the blurring of specialist and

generalist care might lead to more holistic care within medical specialisms (Currie, Finn and Martin, 2009).

Because of the importance of professional jurisdiction to medical practitioners, it is unsurprising that most of the barriers to restructuring are linked to changing professional boundaries. Professional status is highly valued, and it can be abused. Understanding professions in this way highlights why transgressing professional boundaries is often met with resistance and anxiety (Evetts, 2006).

Moreover, restructuring care to be more interdisciplinary and collaborative adds strain to existing boundaries. These boundaries largely exist as contests about dominance over a professional field typified by conflict over responsibilities, tasks, and decision making held or carried out during service provision (Lane, 2014). Concurrently, a major issue with job substitutions is that many doctors could be made redundant, as their workload can be done by fewer individuals. There is also the issue that nurses might feel pressured to take on roles they are not comfortable with or interested in and, equally, nurse substitutions with healthcare assistants may lead to parallel redundancies (Richardson and Maynard, 1995).

There is an increased prevalence of the emergency nurse practitioner (ENP) in UK A&E departments. The role's introduction was initially met with opposition outside A&E departments and there were also concerns of over-medicalisation of nursing, and blurring of boundaries between doctors and nurses. Because of this, and fears of doctors being substituted, there was an effort made to emphasise the nursing aspects of the role. One of the major barriers to the introduction of the ENP was uncertainty about the role, and professional ambivalence in the wider healthcare context (Tye and Ross, 2000).

It is clear that healthcare reorganisation is not without risk and can be problematic. With the case of introducing new specialist disciplines, negotiating professional jurisdiction is an important

step in the process. If the new specialism is well defined, and existing practitioners are engaged effectively, then the risk is lessened. Lane (2014) also suggests these barriers disintegrate when they appear to be restricting progression in the healthcare market. In order to introduce healthcare restructuring, these factors need to be understood and handled correctly by experienced leaders.

4. Leadership and innovation

Specialisation and innovation are closely linked (Harold, Field and Gurwitz, 2001) but there is debate as to whether they are complimentary (Feldmann and Audretsch, 1999; Krogh, Spaeth and Lakhani, 2003; Fritsch and Slavtchev, 2010). Either way, the kinds of changes they entail require adequate leadership (Collins-Nakai, 2006). This is because change in a professional environment is always met with resistance that needs to be managed (Waring and Currie, 2009). This section explores how changes occurring under specialisation can be managed. It focusses on how specialisation as a series of innovations in medicine requires a novel form of management which is the implementation of health care networks; a type of leadership innovation.

4.a. Innovation in healthcare

Bacon and Borthwick (2012) describe innovation in medicine as a typical response to threats to status and the result of boundary disputes rather than a 'natural progression'. Extending and maintaining professional boundaries is a common response to the increase of workforce flexibility and redesign in healthcare today. The modern healthcare environment facilitates change and the development of professional clinical roles. By cementing new boundaries, medical professionalisms can achieve new levels of specialisation.

Modern healthcare is not lacking in evidence-based innovations (Gross *et al*, 2009), but rather it fails to implement them successfully or promptly (Chassin and Galvin, 1998). There is often a gap between knowledge and practice that costs money to bridge, but also limits the potential quality of care, and ultimately patient outcomes. This applies to process innovations as well as

technological ones. Acceptance of a technology, minimising its risk and its relative trustworthiness are seen as vital components of its success (Gross et al, 2009, Coleman, Katz and Menzel, 1957).

The perception of an innovation heavily influences its adoption rates and there are different types of adopter, based on the difference in these rates. In order to lead innovation, a leadership should understand how to exploit early adopters, by increasing their visibility, and preparing to face the resistance in later adoption categories (Berwick, 2003). The spread of new technology can also be social, beginning first via close professional links, then wider social links, then to more isolated practitioners and finally, to others independent of any social network through secondary means like media, pharmaceutical marketing or journals (Coleman, Katz and Menzel, 1957).

Other factors affecting an innovation's adoption include perceived advantages; how compatible they are with the environment they are intended to be adopted into; whether they are simple or at least perceived as reasonably simple; if they can be trialled before being adopted; if the benefits are obvious; if they can be adapted; what risk is involved; and how much support is available for adoptees. Similarly there are factors attributed to adoptees, rather than innovations that facilitate adoption, which include motivation to adopt; how much an innovation means to an individual; how the decision to adopt is made; and how well the adoptees are engaged with the adoption process before, during and after adoption (Greenhalgh *et al*, 2004).

It is understood that innovation works best as an active process. Diffusion of innovation can involve simple physical technologies or more process-based innovations across healthcare organisations. True diffusion is a passive process, whereas often there is active dissemination during implementation. Service provision organisations can use management networks to actively spread innovation (Greenhalgh *et al*, 2004).

Due to the nature of specialisation of a discipline affecting professional boundaries, innovation in healthcare is often a way of reasserting professional jurisdiction. Leadership seems to

be a crucial aspect for innovation in lieu of specialisation. Pre-existing literature on innovation shows that adoption of innovation could be made more efficient if healthcare leaders can apply knowledge of the factors affecting adoption of innovation. The following section elaborates on the effect of leadership on innovation.

4.b. *Why is leadership important in innovation?*

Leadership is distinct from management in that, rather than ensuring an organisation continues to function, leadership aims to progress and change for the better (Collins-Nakai, 2006). Elite members of a profession may be selected to facilitate change within an organisation. The process of reconstructing healthcare around specific innovations consists of the interplay between managerial drive for change and ground-level resistance, which illustrates the need for effective leadership (Waring and Currie, 2009).

In particular, this dissertation focusses on healthcare networks as innovation policy, but also as a means for subsequent innovations. Networks have developed as a response to this greater need for collaboration, in order to solve more complex problems within organisations. In particular, Hoppe and Reinelt (2010) highlight the role of organisational leadership networks in promoting growth and innovation. They suggest that it needs formal high-level support, but also an informal method of communication and information flow.

Networks are perceived as an efficient way to foster innovation and amalgamate expertise but can have varied success and can be expensive to run (Greenhalgh et al, 2004). In spite of this are expected to produce results without inputting many additional resources, due to the 'greater than the sum of its parts' mentality (Lamontagne *et al*, 2011). When introducing new health policies like networks, it is common for them to fail, due to poor decision making and policy resistance. Disconnectedness can exacerbate these problems, but long-term, comprehensive management of

policies can help them succeed, particularly if care is given to building relationships and predicting behaviours (Willis *et al*, 2012).

Networks rely on teamwork and collaboration. There is a link between leadership clarity and successful team function, which is especially important if innovation is the goal. Diversity in expertise within senior staff can assist in fostering creativity and innovation potential within clinical teams. Conflict management, as well as clarity, is associated with clear objectives, good participation and quality of care. These factors in turn are good at predicting levels of innovation in teams (West *et al*, 2003).

Considering the implementation of networks, Bero *et al* (1998) conducted an overview of systematic reviews of implementation strategies focussed around changing clinical behaviour. This study shows that, across the reviews, interventions were shown to have modest improvement effects on behaviour whereas, regardless of how important the implementation issue was, passive diffusion of innovation is widely ineffective. Multifaceted implementation strategies do work more effectively, but it is unclear how effective it is to utilise local opinion leaders to help spread innovations. Similarly, auditing and consensus-based management have been shown to have varied effects on implementation strategies.

Buijs (2007) discusses the various demands on managers taking on the innovation process, because so much of the process is difficult to control. The author describes these uncertainties and the need to work between organisations, which is even less comfortable, leading to a role that is extremely challenging and requiring a specific type of person to fill it. In addition to this, credible leaders who can encourage acceptance on opinion supporting innovations are crucial to successful innovation in healthcare (Fitzgerald, Ferlie and Hawkins, 2003).

It seems reasonably clear that leadership has a large role to play in healthcare innovation. Moreover, implementation seems to be just as important as innovations themselves, in terms of

improving healthcare. This implementation requires diverse, expert leaders who can foster teamwork and who can utilise good implementation strategy. The most effective way to do this appears to be through healthcare networks. The following sections explore what makes good healthcare leadership and how the network organisation format works for leading specialist service implementation.

4.c. Leadership in healthcare

Clinical leadership within medicine has been identified as an important organisational consideration. Although doctors are found in leadership roles, there is usually a lack of intent or adequate preparation as these roles are filled through organisational requests rather than individual motivation. Doctors have identified a lack of preparation for leadership roles within medical education, so in order to fill these positions there is a need for candidates to acquire appropriate skills outside basic medical training. Even so, qualities like a desire to promote patient care, and a social responsibility to speak out for public health, do lend themselves to leadership (Collins-Nakai, 2006).

Recent medical history has seen an increase in managerial controls over clinical professions. Market and public opinion changes have been part of the ethos behind tighter management of healthcare and increased demand for accountability and transparency. There is substantial friction between clinical and managerial staff, stemming from contrasting cultures and value systems. Often there is professional resistance as a reaction to management imposition (Nemerato, Salvatore and Fattore, 2011). The blurring of management and professional roles in a medical discipline is linked to issues of professional autonomy. Leaders with expert knowledge and experiences allow retention of autonomy within a profession like medicine and ensure proper representation within management (Waring and Currie, 2009).

As well as preserving autonomy through leadership, it has been observed that medical professionals can internalise management culture and begin to self-monitor as part of their identity. Doctors can also use managerial logic to minimise their relationship with managers to the bare minimum of reporting, and they can appear to adhere to managerial practices, while internally rejecting its value system. Medical professional norms can be reinforced in the face of imposed managerial practices, as the professions are prone to resistance. This is usually as a result of fears that over-management will threaten their professional autonomy and trainee skill acquisition, and will reduced competency (Nemerato, Salvatore and Fattore, 2011).

As well as preserving professional culture, leadership has often been identified as a crucial element of team-based working in organisations. For example, failure to establish leadership in a critical care environment results in poor communication and underachievement in clinical teams leading to poor patient outcomes. As Künzle, Kolbe and Grote (2010) explain, a number of factors affecting the quality of team leadership, such as experience, training, and personality attributes like extraversion, openness and conscientiousness. Leadership is most required when workload is high, and leadership can take a number of roles such as facilitating task-oriented behaviours, cultivating relationships with teams, or supporting team members emotionally.

Leadership styles can be categorised. One categorisation is informal, charismatic leadership that inspires others to embrace change and can involve deviation from standard practice or formal organisation. In order to effectively lead innovation, the leader's authority must be maintained voluntarily by those being led. The authority of a leader is maintained by ongoing belief in their cause and so it is important for them to be able to engage professionals with, and defend, this cause. This is apparent in the case of charismatic leadership in podiatric diabetes healthcare (Bacon and Borthwick, 2012).

There are a few other different styles of leadership, such as reward-based or empowering leadership, where a leader cultivates self-leadership qualities in their staff. Leaders in a trauma care

environment have been shown to adapt their leadership approach based on situational factors, otherwise known as situational leadership. A leadership style like this is comprised of a group of leadership behaviours. Because different leadership styles are more appropriate to deal with different situations, it is important for managers to be able to identify the best fit-for-purpose leadership style to use (Sims, Faraj and Yun, 2009).

Additionally, Xaio *et al* (2004) explore the difference between expert leaders and formal leaders, where the former has the knowledge and experience to guide a team and the second has the presence and cohesive capabilities to control behaviour. Despite these categories, the authors explained that anyone within a team can perform a leadership function during the course of a clinical intervention. Similarly, Künzle, Kolbe and Grote (2010) note that within critical care, two opposing types of leadership exist; one localised in an authority figure and another where leadership is shared among team members.

So, leadership can affect quality of care, both through direct organisational improvement and through facilitating change and innovation. Clinical leadership has advantages and disadvantages, with clinical staff possessing some qualities that allow them to lead, but also possessing a culture that can be at odds with managerial ideologies. Good leadership is not a universal process and needs to be tailored for specific situations or disciplines and collaborative leadership is identified as the ideal including fluid leadership roles.

4.d. *The role of network leadership in modern healthcare*

Modern leadership in organisations is primarily collaborative and so intra-organisational relationships are useful for medical leaders (Collins-Nakai, 2006). A network is primarily a means of bringing people and ideas together. Networks allow members to share information quickly and allow the coordination of complex and broad operations. As a virtual organisation, a network needs to be organised and managed carefully through defined objectives and member self-appraisal and self-

reflection. They can be founded with a strict agenda or be more loosely organised, allowing members to improvise their direction, although this can result in less predictable outcomes (Thomas et al, 2001). Networks can also be based on consensus decision making and voluntary membership, and not on direct authority over members (Vander Laan *et al*, 2001).

In the instance of traumatic brain injury (TBI) service delivery, network management allows the reduction of service inconsistencies through standardisation of practices. This is partly achieved through encouraging continuity of services across multiple providers in a long-term care pathway by improving communication and resource sharing as well as discouraging hierarchical competition. This way, networks provide an environment where the majority of constituents can expect a positive outcome, rather than a select few (Lamontagne *et al*, 2011, Vander Laan *et al*, 2001).

Innovation is seen as most successful in an environment based on collaboration within a network (West et al, 2003), but there needs to be the groundwork laid down for efficient, easy knowledge sharing. Because a single professional group will likely have similar views and perceptions, encouraging knowledge sharing between diverse professional groups is most useful. However multidisciplinary collaboration can be limited by the perceived loss of autonomy associated with joining a network as well as a fear of dependency. Likewise, the need to accommodate other participating groups' levels of understanding and capability requires a certain level of professional altruism (Kimble, Grenier and Goglio-Primard, 2010). This risk is exemplified by the participants of Lamontagne *et al*'s (2011) study, who became very unenthusiastic about network collaboration.

Another way of understanding network cooperation is as a set of small closely bonded units of members, with a community-like feel, that are connected by 'bridges' that allow information sharing and collaboration. Hoppe and Reinelt (2010) discuss the density of these connections, and particular 'hub' individuals who tend to form the greatest number of connections and influence. They state that describing the model and structure of a healthcare network can provide useful insights into how these networks should be organised.

Network structures can involve a variety of hierarchies. Some work from the ground up, some are top-down, and others work as a whole without centralised leadership. Each model has advantages based on the intended outcome for the network. A top-down approach allows expert-led intensive research, a ground-up model allows engagement of practitioners and works well for generating ideas, and a whole system leadership model is a trade-off between the two, working well for multidisciplinary teams. Supporting members through problems and allowing them to focus on their interests can help maintain motivation in a network, which is vital (Thomas *et al*, 2001).

Networks, as a relationship-based model of business, are characterised by simultaneously creating knowledge and managing resources in order to meet goals. In order to ensure networks are consistently useful in a health context, it is necessary to measure their effectiveness. This requires a solid system of data generation, feedback and accountability. Some non-hierarchical networks do not allow for traditional top-down mechanisms of accountability. Because of this, the data generated for feedback for networks needs to be done by members in a way that allows them to utilise it effectively (Willis *et al*, 2012).

Healthcare networks appear to be increasingly popular as a means of organising clinical practice. While they are useful for basic management purposes, it seems that their main advantage is in connecting professional bodies, facilitating knowledge sharing, and fostering innovation. The main disadvantage of the formation of networks is that they can be in opposition to the goals of professionalization, which are to increase market control and professional autonomy. Care needs to be taken in the way networks are structured, so as to allow innovation and collaboration while avoiding threatening or disenfranchising individual professional groups.

Overall, it seems that specialist medicine is intrinsically linked to technological and process innovations. Because of the role of leadership in successful innovation, it becomes apparent that leadership is also an important consideration for specialising medical disciplines. Founding healthcare networks can provide the appropriate environment for effective leadership for the

purpose of innovation. Because of this, the next section will explore the process of reorganising trauma care and the potential benefits of using network management to do it.

5. The case of trauma care in the UK

In this section I will apply the themes outlined so far to the example of the foundation of a trauma network in the East Midlands region of the UK. I will begin with a brief history of trauma services, which will help contextualise the discipline. I will then identify the direction in which trauma care has been developing as a profession, by examining some international and national trends. I will then explore why trauma networks have become the standard organisation of trauma services. Finally, I will illustrate the role my research will have in contributing to the understanding of this discipline and the themes above.

5.a. *A brief history of trauma care*

Trauma based medical care has been historically linked to war. There is evidence of tribal healers attempting to perform surgery on blunt force head trauma as far back as 10,000 BC. There is more evidence of crude surgical care for wounded soldiers throughout history, with consistently high mortality rates. Even so, trauma care has historically been recognised as important by various cultures, with the Greeks and Romans organising barracks and centres for trauma care respectively. These types of treatments were based on the understanding of death via haemorrhaging. Later, during the 1500s, developments to trauma care included follow-up that involved proper nutrition for recovery, and even prosthetic limbs for amputees. Not surprisingly, the greatest advances in trauma care followed the first and second world wars, as well as subsequent wars in the 20th century, with mortality falling for bodily wounds (Trunkey, 2007).

Part of the development of trauma care in the early 20th century was the treatment of patients on the battlefield, and then subsequent evacuation to hospitals as part of an early triage system. Prior to this, however, was the resuscitation of patients in designated tents, which was

aimed at reducing shock. Developments in medical technologies resulted in the treatment of internal organs becoming more complex, raising questions of treatment priorities (Mullins, 1999). In 1966 the United States National Academy of Sciences identified death by accidental traumas as being a neglected disease. This idea was taken up by the American military, who invested in trauma care development. Initial focus was geared towards improvements in surgery and treating shock, but, over time, more thought was given to preventability, and improving outcomes beyond mortality (Evans, 2007).

The 1970s in the United States brought the introduction of trauma centres and trauma registries. These registries helped produce epidemiological evidence for trauma patients, which informed academic bodies of trauma medicine. This, in turn, led to standardisation of care, and quality assurance control in hospitals and trauma registries emerging in other countries (Zehtabchi *et al*, 2011). By the 1980s, although preventative measures such as workplace safety and road safety had reduce trauma rates, it was still the leading cause of early death. There were perceived inadequacies in the way that trauma patients were being managed in the UK. Solutions to solve this problem included improved auditing, training, and reorganisation of services. Overall improvements to hospital care did improve trauma mortality rates (Lecky, Woodford and Yates, 2000).

More changes occurred in trauma care during the 1990s, for both the USA and UK, and revolved around tackling pre-existing problems, rather than implementing evidence-based practice. Even so, some advances were made in triage and post-injury care. Moreover, where previously the discipline of trauma care lacked senior staff validation, an increasing amount of consultant participation on cases for the most severely injured helped increased its professional esteem. Furthermore, increased consultant participation improved patient outcomes but also improved the function of the entire trauma system (Lecky *et al*, 2002).

From this account, it appears that trauma care has come from a solely military system of care to one that incorporates accidental injury through occupational or road hazards. Better

understanding of the causes of mortality from trauma has led to improvements in care, but also broadened the scope of the discipline. With official recognition of the potential for reduced mortality, and the need to improve neglected services, trauma care has continued to show improvement, and the importance of holistic care that extends beyond immediately injury has also been recognised. Finally, leading up to the present it seems that training, evidence based improvements, and mostly importantly senior staff involvement, has allowed trauma care to begin to specialise and increase its professionalism.

5.b. *International and national trends of recent trauma development*

Centralisation of healthcare services is a growing trend. In the UK there is ongoing debate as to how much patient needs are being traded off for service provision needs. As pressure to decrease costs increases, centralisation becomes a more appealing solution. This centralisation goes hand in hand with medical specialisation and is shown to improve patient outcomes. The flip side of these is that some members of the medical community are concerned that this effect will disadvantage rural patients. Even so, it is a common theme in modern healthcare (Mungall, 2005).

Prior to a regional trauma system in California being implemented, patients were taken to the nearest hospital without consideration for what interventions would be available. The new system involved two levels of trauma care facilities. Statistical analysis of cases before and after implementation showed a reduction in patient mortality, particularly preventable mortality. Moreover, there was no significant deterioration of patients' conditions due to increased transport times, and transport times did not increase as much as expected, due to more efficient field interventions prior to transport. The availability and timeliness of surgical interventions also increased under the new model (Cales, 1984).

Another study on the North-West Trauma Network in Germany examines the introduction of the use of mobile phone GPS capabilities to coordinate care with the trauma network. The study

found that the existence of a trauma network wide communication system allowed for the sharing of expert knowledge equally across the network. This innovation takes advantage of pre-existing technologies for a relatively low cost. This process reduced the level of misdiagnosis and mortality by facilitating the initial admission of patients, and at a later date could be applied to patient transfer within the network (Spitzer *et al*, 2009).

Similarly, novel multidisciplinary trauma training in a teaching hospital in Hawaii supports a trend of trauma innovation. By comparing efficiency of real trauma resuscitations over the course of a six month training programme, the authors were able to evaluate the change in quality of care as a result of the training. The authors identified a marked improvement in teamwork during resuscitations, both in simulations and more importantly, in real resuscitation scenarios. Not only did the training improve teamwork but also task performance (Steinemann *et al*, 2011).

The above experiential evidence for the types of changes to trauma care succeeding internationally would point towards the UK following suit. Despite this, there has been slow uptake of regional trauma systems in the UK, from their inception in the 80s to the early 90s, which could have been due to a lack of evaluation of their efficacy (Nathens *et al*, 2000). At a time when the NHS was subject to great public demand and receiving more funding, the Reforming Emergency Care (REC) initiative provided an opportunity for much needed restructuring of trauma services. The REC discusses the removal of emergency care work from elective care hospitals, leaving only minor injury and illness, and the creation of emergency care hospitals (Robertson-Steel, 2003).

Motivation to reconfigure trauma care in the UK has surfaced relatively recently. In the UK, prior to the current reorganisation in trauma care, there were comparisons to the regional trauma systems being developed in the States, following literature illustrating the importance of fast and effective resuscitation and triage of emergency patients. Ongoing studies illustrating the shortcomings of UK trauma care facilities and the volume of preventable deaths led to a recognised need for unified systems of trauma care to be developed (Albert and Phillips, 2003).

In response to a report in 2007 by the National Confidential Enquiry into Patients Outcomes and Deaths, that illustrated how much trauma patient outcome was lagging behind best practice in the UK, the government decided to go ahead with introducing trauma networks in the UK. Through a process of gathering evidence and consulting with stakeholders, support and strategies were garnered for founding a number of trauma networks in the East midlands. The changes were based solely around reducing mortality, despite rehabilitation services being an important aspect of trauma care. A number of networks have already been founded, but there is more to be done until the UK has a fully inclusive system of trauma care (Sleat and Willett, 2011).

The trauma care system in the UK is undergoing major changes with the reorganisation of trauma care services. Recent studies investigate the new major trauma centres and their ability to provide care to the most complex of patient cases. Comparisons of mortality statistics show that the new systems can work, but there is call for more studies to reveal the full effects of these changes. So these changes to trauma care services are still the subject of a current and ongoing academic investigation (Morrissey *et al*, 2015).

It appears that regionalised trauma networks are the next major development in the history of trauma care. They have been gaining popularity since their inception in the States, and the international evidence has prompted the UK to adopt trauma networks as well. While the decision has been made and the first steps have been taken, there is still the need to examine each network foundation individually, as the process is unlikely to be uniform, and, more importantly, we need to understand the evidence behind the trend. In the next section, I will look at the evidence for founding trauma networks in the UK.

5.c. Why trauma networks?

There is evidence of the importance of team performance in a trauma care environment. Errors can occur in fast-paced stressful environment like trauma care, and increased team training in

awareness and identification of problems can facilitate good quality care. This is the case where teams include trauma nurses, critical care fellows, paediatric resident doctors, and surgeons. Because these teams are interdisciplinary and often unfamiliar, training is necessary to ensure cohesive teamwork. Through simulations, these teams can improve the quality of care provided, especially when attention is paid to team communication skills (Falcone *et al*, 2008).

Studying the effects of motor vehicle crash mortality in the USA brings the effectiveness of regional trauma systems into question. It shows that mortality can be decreased, but slowly, over time, due to gradual developments in triage, transfer protocols and general organisation of care. Statistical analysis of mortality data shows a decline in motor crash mortality after ten years, increasing after fifteen years to 8%. This remains true after accounting for extraneous variable like traffic laws and safety protocols. Although mortality is reduced in a regionalised system of care, the effect appears to be ambiguous. Despite the result, the author found compliance with trauma system protocols was not absolute and more evidence is ideal (Nathens *et al*, 2000).

Despite this, there is plenty of evidence showing that regionalised trauma care does reduce mortality, and improves outcomes. The major trauma centre within the regional trauma system provides the most appropriate facility for care. The Royal London Hospital Major Trauma Centre is an academic hospital with multiple specialities providing care together and was also the pilot trauma centre for the UK. Recent clinical governance measures introduced in the hospital show that overall it was able to provide a service exceeding national standards in outcomes and quality of care (Davenport *et al*, 2009).

The ideology behind trauma networks in the UK is an inclusive service that covers prehospital care through to rehabilitation. The Department of Health has been pushing for regional trauma centres to be implemented nationally, so that optimal management of treatment can be achieved through the best use of resources. Part of the challenge is adapting the international model to UK geography. The advantages to this system will be improving the currently poor provision of

trauma services, through engagement of specialist trauma practitioners with a high caseload of complex cases that provide the experience for generating skilled practitioners. This will be coupled with good resources allocation, and ongoing care through trauma prescription systems (Kanakaris and Giannoudis, 2011).

It appears that the decision to established trauma networks in the UK is backed by reasonable evidence and ideology. The need for effective trauma care teams to reduce the unnecessarily high rate of trauma mortality in the UK seems clear. Despite the literature implying an improvement to ongoing care, the majority of studies revolve around mortality statistics, and there is little evidence for improvement of quality of life outcomes (Sleat, Ardonlino and Willett, 2011). Even so, outcomes are still the main focus, and there is a lack of studies of the process of establishing these networks. In the next section, I will explain how my study of the newly founded East Midlands Trauma Network can contribute to existing accounts.

5.d. *How can my study contribute to this discussion?*

Current literature is mostly concerned with outcomes. However, there are a number of other complicated aspects of trauma reorganisation that need to be understood. UK trauma networks are expected to require appropriate leadership and planning, clinical teamwork within the Major Trauma centre, and good communication and information systems. The Major Trauma Centres themselves will require collaboration between sites, and between departmental services, which alludes to multidisciplinary care. Additionally, the inclusion of consultants and specialist trauma surgeons illustrates the level of specialisation this reorganisation will allow (Kanakaris and Giannoudis, 2011).

Leadership is the most important non-technical skill within a trauma care environment and lack of leadership is the leading cause of dysfunction in trauma care teams. Authoritative, confident,

and patient-focused team leaders were identified as the most desirable. In a trauma care setting, optimised patient care would result in only experienced surgeons treating patients, but this must be balanced with training so that junior doctors can develop their skills (Hjortdahl *et al*, 2009). In addition leaders within a trauma centre setting are able to adjust their leadership styles in the light of multiple leadership goals (Sims, Faraj and Yun, 2009).

There are varying levels of collaboration between specialities within modern trauma care systems. This involves leaders of trauma teams determining what levels of involvement are required from specialisms for specific cases at certain phases in treatment. This can relate to both acute hospital care and community-based trauma care. Specialist practitioners may be called upon to consult, diagnose or devise treatment plans. Problematic areas for specialist management of trauma care include appropriate training programmes, reimbursement, and issues of malpractice. These practicalities need to be controlled through proper protocols, in order to create an efficient, cost-effective service (Blackwell, Kellam and Thomason, 2003).

6. Research Question

It seems that issues of leadership are present in modern trauma care and, because of the link between leadership and innovation, with the implementation of the new system of care, leadership will likely be an influential factor during its discourse. This has been stated repeatedly in the literature. Also, because of the dynamic between acute specialist trauma surgery and ongoing holistic rehabilitation services, there will likely be disparity in the way these two aspects of the system will be managed. This is already apparent, due to the over-emphasis on reduced mortality over quality of life outcomes.

Based on the literature discussed here I will be using a study of the East Midlands trauma network, as the second pilot network after London (Kanakaris and Giannoudis, 2011), as the subject of my research question. The implementation of a regionalised trauma centre is going to require a

certain calibre of leadership in order for it to be successful. So in order to evaluate the new network I will need to focus on generating data that can illustrate the nature of the leadership present. As such, my research questions will be 'what role does leadership play in the foundation of a trauma network?'

METHODOLOGY

Introduction

In light of my literature review, I will be conducting a study of the role of leadership in implementing innovations - namely the foundation of a trauma network approach to managing trauma care in the East Midlands. In order to conduct this study, it is important to explore suitable methodological approaches, and then use this knowledge to design a study that is suitable to address my research questions. I take into account the resource limitations that constrain my study design, such as needing to use an existing secondary data set, which I will then offset through theoretical consideration.

In this section, I will first identify the best theoretical approach to this topic. This will have implications for the methodologies I need to employ. I will then examine the best approach to sampling participants, and gathering and analysing data. This will be determined by how suitable it is for both practical and theoretical reasons. Finally, I will outline ethical and validity issues and then outline my final study design.

Pre-existing studies in trauma care included studies involving mortality statistics (Gregory and Charles, 1999) which can be limited due to the lack of standardised trauma registry data. There are plenty of mortality statistics in general (Sleat, Ardonlino and Willett, 2011) and there are ongoing attempts to build national databases of trauma outcomes (Champion et al, 1990). There are also examples of quantitative studies that don't use mortality statistics such as a questionnaire study of trauma care communication (Polack *et al*, 2009).

There are also a few examples of qualitative studies into trauma care for example, a longitudinal study using interview data to study service standards (Beckett *et al*, 2014), a study using of grounded theory on video data to observe leadership behaviour (Xiao *et al*, 2004) and a case study of community-based trauma services in the United States. Even so, in their interview study of

trauma nurses, Catlette (2005) explains there are minimal experiential studies of trauma medicine. Much of the existing literature is quantitative and there is a case to be made for conducting a qualitative study of the organisation of trauma services.

Qualitative Research

It may be that qualitative research is not as common in medicine because practitioners view it as unscientific. With an emphasis on evidence-based medicine, medical practitioners may not see a place for qualitative research in medicine, but much of the experience of medical services provision is independent of scientific practice. There is a place for qualitative research within evidence-based medicine and this type of research is able to assist implementation of evidence-based innovation as well (Green and Britten, 1998).

Green and Ruff (2005) also show the usefulness of qualitative studies in supporting evidence-based medicine. The authors were able to illustrate that poor information technology and medical technologies were negatively affecting practice. Moreover, qualitative analysis showed that frustration with existing technologies led to unwillingness to adopt subsequent ones. Qualitative data in medicine can also be used to understand behaviours through examining participant perspectives. Through synthesis of pre-existing qualitative literature Pound *et al* (2005) showed that research is capable of exploring identity and changes to identity in the context of medicines-taking behaviour.

Qualitative research can complement the quantitative studies existing in medicine. Interpretive accounts can be part of the body of medical knowledge used to inform practice. More importantly, qualitative research can make up for the shortcomings of quantitative studies such as less valid data. Some academics propose completely unique criteria for qualitative knowledge and that qualitative research can aim to be transferable and subject to external validities (Malterud, 2001).

Alternatively, some feel that the imposition of scientific standards of evidence based medicine on qualitative research is unwelcome. They believe that the interpretive community should be setting their own standards for creating evidence bases in research. Unfortunately, qualitative research is rarely given credibility, unless it is embedded in a form of traditional evidence-based study design like a randomised control trial. Moreover, qualitative research can be denied funding or may not be utilised by policy makers unless it mimics quantitative methods (Denzin, 2014).

Most importantly, qualitative methodology is invaluable in research contextually rich areas such as organisational leadership. Particularly, the ability to study leadership in depth and experience it first hand is what makes qualitative studies of leadership so useful. Leadership as a phenomenon is very complex needing additional extensive research to build an academic base. Qualitative methodology is still underutilised despite quantitative research being viewed as not able to access the various levels of leadership phenomena (Conger, 1998).

With the seemingly overwhelming presence of quantitative evidence-based medicine it appears that there is a place for qualitative methods to provide a more balanced evidence base. Qualitative methods allow a style of insight and understanding that quantitative methods are incapable of, but qualitative methods in medicine are being made to assimilate into pre-existing quantitative guidelines. Because of this, and because of the lack of qualitative studies into trauma care networks, it makes sense to conduct a qualitative study into the East Midlands trauma network.

Theoretical Approach

When using large amounts of textual data, like in qualitative studies, it is typically appropriate to use a system of obtaining and analysing data to inductively produce a hypothesis, known as a grounded theory approach (Pope, Ziebland and Mays, 2000). Bhandari *et al* (2003) highlight its usefulness in studying medicine. This approach implies a set of demands for data collection and comparison, namely that initial analysis is then used to refine data collection

techniques. This method also requires revisiting data in order to continually generate new insights until thematic saturation is achieved (Boeijs, 2002).

More than this, grounded theory approach implies that there will be a degree of interrelatedness in the themes identified in the data. As well as this, grounded theory assumes that an area of study is constantly changing and should not be viewed as static. Grounded theory also has a balanced view of determinism when it comes to the actions of its participants. While participants do have some degree of autonomy, their actions are also affected by the conditions around them (Corbin and Strauss, 1990).

There are a number of theoretical approaches to qualitative research and each has implications for data collection and analytical methods. This is because the methods need to be tailored to match the theoretical aims of the study. For grounded theory, this means a study which is designed to produce an overall theory that explains the themes presented in the data. Alternative theoretical approaches can be focused around identifying the most important themes, accounting for meaning in the data, or producing a narrative from the data (Thomas, 2006).

In addition to this, alternative qualitative research theories differ in their philosophies, as well as their approach to data. For example, where grounded theory relies on data analysis to produce a set of concepts, phenomenology assumes a perceivable reality that is reflected in data and can be described through theoretical concepts. This approach assumes participant accounts show their shared experience of tangible phenomena. On the other hand, discourse analysis focuses on participant language and the shared meaning participants create through interaction (Starks and Trinidad, 2007).

The grounded method approach has some obvious advantages, but it also has specific requirements for methodology, in particular for data collection, so it is best suited when a researcher has complete control over all aspects of a study. Using a more general inductive approach

would allow me to draw from the philosophies of pre-existing theoretical approaches to qualitative research without a strict study design.

Sampling Participants

Compared to quantitative methodologies, sampling for qualitative research is not rigidly prescribed. There are a number of approaches to qualitative sampling. One is theoretical sampling, where the participant sample is made to support the application of a methodological theory and is flexible and subject to change. Second, there is purposive sampling, which aims to select participants who typify perspectives on a topic. This approach can be argued to be indistinct from theoretical sampling, as they are both fit for purpose. Finally, selective sampling involves participant selection before the inclusion of any theory or prior knowledge (Coyne, 1997).

Concurrently, where random samples provide the ability to generalise from quantitative findings, qualitative studies have smaller, harder to reach populations to sample from. Samples sizes in qualitative research generally reflect study design and focus on data saturation, where new theories no longer become apparent with more data. Alternatively, there is another sampling method known as convenience sampling which involves including the participants most easily accessed. Although this might lack academic rigour, sampling the most accessible participants is very resource efficient. Other methods may claim theoretical superiority, but there is an element of convenience sampling in all research (Marshall, 1996).

It can be argued that methodological approaches do not need to be mutually exclusive, and using the method that best fits the situation is more effective than strictly adhering to one approach. Moreover, sampling methods like purposive sampling can be split into a number of subcategories that apply in different circumstances. These include sampling for examples of deviant cases, snowball sampling, and others. Another highly useful method is maximum variation sampling, where

participants are selected for having the least common attributes, so that any common themes occurring in the data must be generalizable (Hoepfl, 1997).

As much as a study requires internal validity, which is assurance that the study measures what it intends to, it is important to have external validity, which means the study can be shown to be true under a different context. This idea of transferable findings is dependent on the method of participant sampling used in a study. Where large random sampling is needed for statistically valid findings, purposive sampling is often required in qualitative research to meet study aims. Because of this, it is important that participant backgrounds are made explicit, so that readers can determine the level of external validity present (Malterud, 2001).

Another factor to consider for sampling that is relevant to healthcare research is the geography of participants. While geography can affect the feasibility of a study, it can reveal insights into disease and health service provision that wouldn't be possible otherwise (Curtis *et al*, 2000). Onwuegbuzie and Leech (2007) highlight another set of issues in qualitative participant sampling. They explain that sampling considerations are often lacking, and that it can lead to sloppy research and reduced legitimacy of research. Principally, the authors emphasise transparency in sampling methodology and prioritising descriptive over comparative potential.

With a subject matter like trauma networks, a wide range of perspectives will be available for study and necessary to consider for good validity. While purposive sampling may be most appropriate, issues of access in healthcare will likely lead to an aspect of convenience sampling as well. When selecting participants, it will be important to aim for a good variation of perspectives as a homogenous group will produce limited insights. Also, because the trauma network is regional, it will be important to have geographic variation as well.

Data Collection

While qualitative interviews can be used to investigate subjective participant experience and complex subject matter, they are costly and can be executed ineffectively by amateurs. Moreover, lack of critical approach, and the assumption that interview research is 'common sense', leads many investigators to employ sloppy study designs. However, when conducted effectively, qualitative interviews allow a researcher to explore participant perspectives and, in particular, how participants construct their realities and generate meaning through dialogue (Broom, 2005).

Interviews in healthcare are often perceived by practitioners as a reflection of the consultations they perform with service users. The reality is it is a complex research technique with a number of considerations. Interviews can have varying levels of structure, from fully structured ones that are standardised with fixed responses, to fully open interviews with no structure or prompts for questions. The level of structuring in interviews is scale-like, rather than being a dichotomy. For example, semi-structured interviews have open-ended questions to guide a dialogue between participant and researcher (Britten, 1995).

It is generally understood that interviewing participants means the researcher will get to build a greater level of rapport, but the importance of this process is not always recognised. Firstly it is necessary to understand that, as a researcher, you are asking a participant to share experiences that can be very personal. In order to access these personal insights, a researcher needs to rapidly develop a rapport with their participants initiated by the researcher. Using a comfortable setting and allowing for the natural progression of the stages of rapport can help facilitate the process (DiCicco-Bloom and Crabtree, 2006).

When conducting qualitative interviews, there are more considerations than just the level of structured-ness. The questions themselves need to be designed so that the researcher is able to glean as much relevant information from participants as possible. In order to do this, a researcher

needs to design their questions to incorporate theoretical considerations, like the level of neutrality in the questions, and practical considerations like whether they are asked simultaneously, how open-ended they are, and how they are worded. Researchers also need to be able to steer conversation away from tangents, prompt effectively, and know when to ask follow-up questions (Turner, 2010).

Reflexivity is important in conducting qualitative interviews because rather than being simply a research tool, interviewing is a social practice. Because of this, it is important to accept that a researcher has to estimate the reality of a situation through the participant's subjective experience. During the interview process, this requires a researcher to actively engage the participant with interpreting their own responses, rather than allowing them to passively provide information in the form of answers (Talmy, 2010).

During the interview process, there is likely to be some level of structuring, as the interviewer will have to steer a conversation back towards topics at times, in order to make the best use of time with participants. Even so, a looser structure is better for exploratory studies. Good practice and academic rigour need to be used by the interviewer during design, data collection and transcription. Most importantly, it is important to see an interviewer as a participant, and account for the context and perspective they bring.

As well as conducting interviews, there is also an important and often over-looked step in data collection which is the transcription of data to prepare it for analysis. Firstly, researchers may decide to transcribe audio fully and naturally with all pauses, involuntary sounds and even sometimes body language included. If researchers go the denaturalised route and remove these notes it can prevent the context of the data from affecting its interpretation, which is only ideal for a study aiming to be objective. Either way, transcription is still part of the research process, prompting analysis by the transcriber and adding another step in data translation (Mero-Jaffe, 2011).

Coding

Analysis of qualitative data is not about quantifying it or looking for statistic relationships. Often, analysing qualitative data means organising it into categories that lend themselves to theoretical examination. These categories or 'codes' can be either deductively created using a pre-existing framework outlined in previous literature, or inductively created from the data. The codes are constantly revised during the analytical process, to ensure they best reflect the data (Pope, Ziebland and Mays, 2000).

In qualitative research, data is taken out of the context and collected under its coding category, but it must also be preserved so that the data isn't reduced or its validity lost. This means making sure the data stays relevant to the context of the participant accounts, and the wider context of the field being studied (Malterud, 2001).

Codes can be derived inductively through data immersion. In these instances, there is a need to control the size of codes so that they are broad enough to sort data under. Decisions to collapse or separate codes may continually change as a researcher becomes more familiar with the data and understands where themes are most concentrated. It is especially useful to illustrate exemplary data for specific codes to best illustrate the themes present in them (Hsieh and Shannon, 2015).

Bhandari *et al* (2003) discuss the process of open coding, where data is broken down and categorised into key groups. These groups are revised as subsequent data is analysed, so that the coding structure remains fluid and best represents all the data within a set. Examining similarities between categories can further assist this fluidity; this is known as axial coding.

Open coding is best used initially to identify the core message from a piece of qualitative data. This allows identification of a respondent's core narrative and lets a researcher begin to tease out contradictions or data fragments that are in agreement. This initial coding also helps create a

prototype code tree that can then be adapted. Following this, the coding tree can then be revised until it is able to cover all relevant data that meets the aims of the research (Boeije, 2002).

One advantage of open coding is that it helps a researcher avoid typical ways of thinking and conceptual clichés. It also presents opportunities to refine research questions and this in turn helps improve the specificity of codes and helps reduce ambiguity. Moreover, this approach to coding can help reduce research bias (Corbin and Strauss, 1990).

Coding is an important first step in the analysis process. Although it appears to be just rearranging data, it is done in a critical way. Open coding is a reliable starting point, and reassessing codes and drawing comparisons helps to focus data analysis. The desired end product will be a refined coding structure, and examples of data that exemplify individual codes.

Analysing qualitative data

Qualitative research can provide insights into concepts and behaviours, and can help generate theories about phenomena being studied. There are a number of analytical techniques to draw these findings from qualitative data. Some academics argue that there should not be a uniform method of qualitative data analysis, as it benefits from diversity. Due to the complex nature of health services phenomena, classification and identification of themes are important components in qualitative research (Bradley, Curry and Devers, 2007).

There are a number of systematic approaches to take for analysing qualitative data. One is based on deduction, which involves fitting data to a pre-existing theoretical template, by describing new examples of previously described phenomena. Another is reorganising data so that the meaning becomes apparent to the reader. The third is an intuitive approach that allows the crystallising of meaning through the researcher immersing themselves in the data and reorganising it until new, significant meanings are presented (Malterud, 2001).

While there are many traditional approaches to analysing qualitative data, there are more generic approaches that are simply based on inductive reasoning. This approach still uses raw data to produce themes and theoretical conclusions, but it lacks the restrictions of a strict methodology. The principles of this method are to effectively summarise data, link it in to the aims of the research study and then develop theories to explain the themes within the data (Thomas, 2006).

Whether an inductive or deductive approach is used to analyse data depends on the study aims. In a study where the topic area is mostly unexplored, there are likely to be limited comparisons to existing literature. In this case, an intuitive and conventional approach to content analysis would be best. While more challenging, content analysis provides the opportunity for validity in qualitative analysis. Here, literature is most useful to contextualise summarised findings.

Bias and Ethics

Reflexivity in qualitative research is crucial if it is to maintain credibility. Qualitative researchers can only claim to have academic rigour if they question their findings and critically assess their own work. A researcher's background and personal perspective can affect their interpretation of data. Accepting the subjective nature of a researcher allows one to account for bias and attempt to offset it. Where quantitative researchers test hypotheses through data analysis, qualitative researchers draw their hypotheses from their data, and so reflexivity gives them an opportunity to test their hypotheses against scrutiny (Malterud, 2001).

If we understand the researcher to be an active participant then research findings are unique to individual researchers which has implications for the repeatability of qualitative studies. More than this, because of the effect an interview has on a participant's experience of the phenomenon being measured, there is an element of epistemic feedback. So an interview becomes part of a participant's experience of the subject matter being studied. In addition to this, participants

bring their own personal contexts into research with them, so accounting for these is important to generate reliable data (Finlay, 2002).

While reflexivity is normally associated with concerns of academic rigour, it can lend itself to the ethical considerations of a study. Because reflexivity is less about producing data and more about studying the process of conducting research, it leads to a greater level of alertness. As a result, a researcher may be more likely to pick up on instances of vulnerability or stress for participants. In a broader sense, it can also enlighten a researcher as to the ethical consequences of their research findings (Guillemin and Gillam, 2015).

There are multiple forms of ethics that affect the conduct of academic research. The first is procedural ethics, which applies to properly gaining ethical approval to conduct a study. This usually involves issues like gaining access to organisations, consent from participants, and assessing risk to both participants and researchers. The second is ethics in practice, which refers to ethically challenging situations that arise during the course of research. This can even mean resolving ethical dilemmas such as choosing to breach confidentiality to ensure patient safety. There is also the ongoing balancing act between ethical obligations and preserving the integrity of the research (Guillemin and Gillam, 2015).

Preventing harm to participants is the core principal for ethical practice. This stems from academic inquiry developing alongside a history of violating participants' rights and deceiving them. While ethical failures are less common in qualitative work, researchers need to be vigilant due to the unpredictable nature of qualitative studies. Researchers need to recognise that issues of patient harm can stem from conflict in the participants' environment, but also as a result of the researcher's interactions with them (Orb, Eisenhauer and Wynaden, 2004).

While qualitative studies do have methods to try and control the level of bias in their research, the nature of qualitative research makes real objectivity impossible. Moreover, subjectivity

is what makes qualitative research so insightful and useful. While good, clear study design can give the opportunity to repeat research, it is impossible to replicate the same conditions. Reflexivity is a tool that helps improve validity, given the restrictions of qualitative research. Moreover, it helps a researcher's awareness of ethical issues. Ethical concerns cannot be overlooked, as participant safety is an obligation for researchers.

Study Design

Having already conducted a literature review to identify the field of my research, and having explored methodological theory through existing literature, I am able to generate an informed study design. Because the topic of innovation and leadership in trauma care is relatively new territory, the nature of my study will be primarily exploratory. Moreover, because the literature is based mostly on quantitative statistical studies, a qualitative approach would be able to contribute the most unique findings and help augment evidence-based practice.

I will use the general inductive theoretical approach to my research. This allows me to draw theoretical conclusions about an unexplored topic through data analysis. This is also possible through the grounded theory approach, but a generalist approach allows me to use a more relaxed methodology. This is important because of the time and resources restrictions my study is subject to. Despite this, I will still borrow philosophies from grounded theory methodology during my research.

Because of the resources available to me, I will be analysing in depth interview data collected and transcribed prior to this study. This data is part of a larger study of trauma services in the East Midlands being conducted under the Centre for Health Innovation, Leadership and Learning. These are 6 interviews conducted with a variety of managers working as part of the East Midlands trauma network. These interviews have been conducted with a minimum level of structured-ness, because of the need for exploratory research. The questions asked during the

interview are loose, but geared around prompting the participants to discuss their roles in, and perspectives of, the trauma network.

I will use coding to organise the data within these interviews for analysis. I will use an open style of coding to allow identification of major themes in the data and then aggregate similar data under these themed codes. This will allow me to discuss themes that span the perspectives of multiple participants and summarise data relevant to these themes, in order to draw reliable conclusions from it. This approach to analysis will allow intuitive production of theoretical concepts, and the inclusion of evidence from my literature review to support these concepts. Despite the data being collected separately, all the analysis in this dissertation was conducted by the author.

Throughout the duration of this study, I will attempt to think reflexively about my role as a researcher, and account for my own personal context and its effect on my findings. As a novice researcher who has not worked within the field of healthcare management, I will be able to bring some objectivity, but I will also be unable to empathise with the positions of my participants. By acknowledging my role as a novice, I can accept the need for extra vigilance in conducting my study to avoid typical pitfalls.

My study will be subject to a number of limitations. Analysis begins during data collection and can allow a researcher to refine their data collection technique (Pope, Ziebland and Mays, 2000). Using secondary data sacrifices this step in the analysis process. Similarly, Malterud (2001) states that if multiple researchers are involved in a study then it can help offset personal bias, but I am conducting this solo and so I will not be able to gain this advantage.

Other limitations to my study present opportunities for further research. Bhandari *et al* (2000) explain that triangulation of data through multiple data collection methods is the best way to strengthen validity. Because of this, future studies investigating leadership in trauma networks could use data triangulation to generate additional findings.

ANALYSIS

1. Introduction

In this analysis section, I use the coded data from the interview transcripts to help answer the research questions outlined earlier. The sections below reflect the final coding structured used during data analysis. I explore the management of the East Midlands trauma network by combining interviewee responses linked to other medical networks, collaboration through communication and knowledge sharing, network strategies, management of workforce and funding resources and also innovation within the network.

I then discuss the new network structure, its hub and spoke model, transport, transfer and geographical factors and issues of capacity. I also explore the multidisciplinary of the network, and changes to trauma service workflow. Finally I examine the network ideology expressed by the interviewees. I explore the clinical approach to leadership, the managers' commitment to service improvement, and their approach to stakeholder engagement through culture, building an evidence base, and responding to perspectives of the networks. This then links to managing conflict and maintaining a neutral status.

The interview data used in this analysis consists of 6 interviews conducted with a number of management staff involved in the East Midlands trauma network. The participants consist of the following; an intensive care consultant; an emergency department and a rehabilitation doctor working in a minor trauma centre; an emergency department consultant; a consultant orthopaedic surgeon working in another minor trauma centre and a non-clinical healthcare manager who is acting as director for the network.

These participants were chose through a combination of purposive and convenience sampling. The sample includes a good level of geographic and professional variance, and is able to respond to requests for participation in the interviews. They provide the network leadership

demographic that it outlined in the study design. They also show a good level of diversity of opinion and their interview transcripts were coded to produce a framework that is the basis for the analysis section headings in this chapter.

2. Network management and leadership

2.a. Links to networks for other disciplines

In order to illustrate the effect network leadership has on trauma care specialisation, it is important to consider the origin of the East Midlands trauma network. In conjunction with this it is important to contextualise the network in relation to other health networks. This section uses the interview data where the participant narratives highlight links to other networks and show their influence on the leadership style in this study's trauma network.

The director explains she has acted as a consultant for other networks in the UK and although people think the network she's helped create has been purely for Trauma care, it all stems from her work on the Critical Care network.

"I didn't apply for a job that was Critical Care and Trauma, I inherited the trauma bit."

(Director)

The ED doctor's involvement in the Trauma network also stemmed from his involvement in Critical Care. He expected to be drawn into the network either way and his trust approached him because he was already involved from the Critical Care side. This is also the case for the ICU Consultant. From this, it appears that a links between these networks will illuminate what issues the managerial staff expect to arise in the trauma network, what they are prepared to cope with, and what may be challenging based on their previous experience.

While the director says that decisions are made fairly easily within the Critical Care meetings, clinical managers then have to go through the decision making processes in their

individual Trusts which can be comparatively very slow. This is reflected in the way decisions go through the trauma network, which suggests that it could be a product of the organisation of healthcare into networks. So there seems to be a limit to how effective decision making in network management is because individual healthcare organisations are a limiting factor.

According to the director, there is a parallel in the way clinicians are involved in the two health networks. Clinicians who take part in the Critical Care network do so because it is focused on their area of clinical interest. This is also the case for trauma care. Likewise, there is a lack of organisational ties for clinicians within the Trauma Care network which is mirrored in Critical Care. As the interviewee explains, it is undesirable to have the Critical care network tied up in service delivery at one Critical Care unit.

The participants explain that service improvement leadership was carefully tailored for the Critical Care network. In order to address the varied aims and processes of service improvement, the director chose to adapt the service improvement meetings into workshops within critical care. Concurrently, the ICU consultant describes the process of service improvement within the critical care network.

“So for example, the Critical Care Network, hypothermia after cardiac arrest, so there's three or four papers suggesting it's a good idea, so there's the service improvement group then take that and develop a framework which you should follow, and then we audit against that framework.” (ICU Consultant)

It seems that the managerial staff will take a similar leadership approach to service improvement under the trauma network

From these similarities between the networks, it is evident that the trauma care managers are equipped to cope with the barriers to network-based trauma care, but it is possible they may underestimate the differences between the networks which could lead to the under-management of

issues. Additionally, although the critical care infrastructure helped the foundation of the trauma network following its foundation, the price of this has been the critical care network being neglected somewhat. Indeed the director notes she donates a third of the critical care sessions that she holds with a fellow manager to Major Trauma issues,

“I then have three sessions of [colleague] which we've had to reduce to two for Critical Care to give one to Trauma” (Director)

So the relationship between these networks is one of overlapping resources and it appears as though networks may only hold leadership priority at their inception.

The interviewees do reveal some differences between the networks that need to be considered. Where there wasn't time for workforce restructuring during the foundation of the Critical Care network, the director feels that due to having the opportunity to plan in advance, workforce restructuring will be a viable component in building the Major Trauma network. However, this means the managerial staff carried over from critical care will not have experience in workforce restructuring within a network context.

The director suggests a difference between critical care as a wider care pathway and trauma care as an acute pathway from pre-hospital up to the end of care. Likewise, rehab is a huge area of care with a large agenda and the Major Trauma care encompasses only one rehab pathway.

“...not the same as the Trauma pathway where you've... go from pre-hospital to the end”
(Director)

Similarly, the critical care and trauma networks are recognised as being differently distributed, because of the hub and spoke trauma model. Moreover it is understood that there is a greater level of service standardisation in critical care. This is because critical care aims for equality of service across the network, but the new trauma care system focuses on patient access to specialised services.

As there are a number of key differences between the networks, there will be a limit to the extent that previous experience in the critical care network can help trauma care managers. Recognising these differences will be a vital step in the process of transitioning between the networks. Even so, it is clear that previous network experience is a facilitator to network foundations. This process may be repeated as service improvement concerns are brought to long term rehabilitation care.

One of the aims for the future is to establish a rehab network following Critical Care and Trauma. Although they have representatives at the Trauma board meetings, rehab doesn't yet have a clinical director. The rehab doctor explains how rehab is not acute and is much more holistic and community orientated. Because of this, it is difficult to seriously discuss a major rehab centre, particularly because of the family and distance factors. So the foundation of a rehab network would again produce a unique set of issues for managers to tackle.

The rehabilitation doctor explains that, although there are US models of this type of rehab network, these are in large cities with condensed populations. Contrastingly, the East Midlands population is widely dispersed. Moreover, if you imagine people travelling to and from rehab centres, there's the fact that they are physically restricted and may be in chronic pain, which will only be exacerbated. About a decade ago, it looked as if all the different specialities in rehab might unite in one location, but since then the service has been fractured and dispersed.

“Fragmentation, but we need to get back to put(ting) things together.” (Rehabilitation doctor)

The interviewee says ideally all aspects of rehab under one roof and one manager would work best and would make rehab technologies more accessible, but ultimately this is impractical because rehab needs to be community based.

From the data, a number of considerations have been drawn out. We can conclude that subsequent healthcare networks can be informed by previous ones, but there are still novel factors to consider. The extent to which the process of founding networks is improved will correlate to the how much knowledge can be carried over from pre-existing networks. This is applicable not only to the beginning of the trauma network, but also as other aspects of the trauma pathway are addressed. This is supported by Argranoff (2001), who argues that network management works on a paradigm basis, with a previous knowledge base supporting newer networks.

2.b. Collaboration

2.b.i. Communication

One of the challenges of leadership is ensuring effective communication within a network. When leadership is focused around human interaction as it is in the East Midlands trauma network then communication styles are essential. This communication needs to be supportive and expressive without being aggressive (de Vries, Bakker-Pieper and Oostenveld, 2009). Examining the evidence given by this study's participants on communication could help determine the effectiveness of their leadership styles.

The ICU consultant explains that constant communication is required to maintain relationships and ensure trauma unit's voices are heard, particularly during network. This exemplifies how important communication strategies will be in ensuring the trauma network can function adequately, particularly as meetings and discussions are the primary means of sharing information in the network.

According to the ICU Consultant, everyone within trauma and also emergency care were already familiar with each other and because of this familiarity, the language used when talking about patients is often unexpected and shocking to an outsider, but understood and accepted within the context of the meeting,

“... so they've come to the network as say things that outside might seem really inappropriate, use of language. But because it's an understood language they don't have to explain themselves.”

The director admits to acting as a sort of translator between cultures and languages used within the network. This could pose problems when engaging peripheral members of the network in meetings and discussions.

Another difficulty is level of communication within the Major Trauma network. The director hints that people withholding information can be linked to people exercising their power. She explains that sometimes she has only been informed at the last minute of things like events and a conference organised by the Major Trauma Centre. This communication issue is closely linked with engagement issues for the network. With greater trust and respect, the network's managerial staff will be more likely to be kept well informed of the trauma care system's status.

There is a clearly defined model for communication within the network. Trauma leads act as an intermediary between the Trauma network and the Trust, but this role doesn't involving making decisions on behalf of the trust but, rather, returning from Network meetings with topics for discussion. Decisions are contained within trusts:

“My role is to go back to my Trust, communicate that, discuss it with the people who should be actioning it, and then feed it back the other way...”

This intermediary role has not been necessary for Critical Care. This role of a trauma network lead links to ideas about knowledge brokerage and multidisciplinary collaboration.

The rehab doctor discussed his experience as a trauma lead within this model. He takes information back to his trust from trauma meetings and he explains that the 'pushing' for change has to be done locally. For him, this means showing how many patients are on the wrong ward, and

the money his trust could gain from increasing rehab capacity. The emancipation of discussion and action in this model reflects a compromise between efficiency and engagement.

Specific communication issues highlighted in the data include a desire from the ED consultant for virtual trauma conferences within the network that allow better feedback and discussion of trauma cases.

“Say the idea that we could have a weekly trauma conference, so that the various Trauma Units could, I don't know, Skype in, as a system, so that it could, there could be a more generalised discussion of the major trauma that has come in from those units in the last week or the last month.” (ED Consultant)

The consultant orthopaedic surgeon also notes that, when a decision to bypass a peripheral trauma centre is made during prehospital care, the unit that was considered may not be aware of the decision and so this creates a problem when auditing.

The data illustrates how communication is not uniform across the network, and how accounting for members' needs and involvement is considered be essential, even if the process of decision making is slowed down as a result. These issues extend to engagement and collaboration considerations. These findings mirror Petri's (2010) argument that multidisciplinary collaborations are reliant on information sharing and Boon *et al* (2004) also identify high levels of communication as the best approach to network management.

2.b.ii. Knowledge sharing/Cooperation

Leadership plays a vital role in facilitating knowledge sharing. By empowering those they are leading, leaders can help gather and distribute professional knowledge. This effect can be jeopardised if the leader is overconfident as it may inspire uncertainty in employees expressing conflicting knowledge or ideas (de Vries, Bakker-Pieper and Oostenveld, 2009). This study's

participants do discuss knowledge sharing and it does demonstrate their leadership approach and hint at how successful their network collaboration might be.

The link between communication and collaboration is clear as the director explains that the introduction to a trauma network meeting is usually a patient anecdote which is discussed using the clinical expertise gathered in the meeting

“... meetings generally start with a story, somebody comes and tells a story, patient related, but it starts with a story and it sets the scene...” (Director)

There is also a link between uniform language and opinions. The director admits there is a risk of overly homogeneous opinions within any network. Even though communication seems to be readily engaged in, it does have limitations.

Even so, the director sees the network model of trauma care as able to draw in and share expertise, change medical service provision culture, and ultimately improve patient care. She has helped foster collaborative care between health care centres, which she intends to apply to the Trauma network as well

“... the network model absolutely works, you are, bring those people with the expertise and the knowledge around the table, they you foster that sharing, they then willingly and openly share...”(Director).

In conjunction, the ED doctor feels that sharing data like audits within the network could be informative, and the interviewee hopes that it could help to improve Trauma care service delivery across the board and not just that of the Major Trauma centre.

However, currently the data being collected by the rehab department is not being fed into the Trauma network, but just being applied to local service improvement. Despite this the interviewee says they are trying to share the data and he thinks it should be applied to the whole of

the East Midlands. Overall, the rehab doctor would like to see more data sharing and collaboration, joint audits and research and learning.

“I want more collaboration than what it is at present in terms of sharing data supporting each other learning from each other as well to have joint audit to have joint research in the region.” (Rehab Doctor)

Returning to a comparison with critical care, because of the scale of the network, you can rely on interpersonal relationships for collaboration, but this may not be so for Trauma care. The style of representation will be further removed than that of critical care, as you can only represent each site rather than individual disciplines

“So in theory we have representation both for every speciality... but as I said, the attendance tends to be A&E, ITU, anaesthetics, trauma orthopaedics. General surgeon not so good.

Radiology not so good.” (ED Consultant)

On the other hand, the ICU consultant argues that equality of care and collaboration were easily established in the East Midlands, because of the strength of personal relationships; this is compared to other networks where these factors had to be imposed in a top-down fashion (ICU Consultant).

The ED consultant explains that because trauma evidence is usually generated on a case-by-case basis, there is little generalizable information (ED Consultant). This could explain why there has not been as much data sharing going on as expected by certain members. Concurrently, this process may not be centralised. The director expects the smaller trauma centres will begin working together more independently from the Major Trauma centre, following additional transfer training and peer-assessment between centres. (Director)

So while there is evidently the drive and potential for data sharing in the East Midlands trauma network, there are limitations for representation, ensuring diversity of opinion, and fostering data sharing between network units. Even so, Raftery, Ball and Aiken (2001) argue that autonomy is

not necessarily threatened by teamwork and there is evidence that the greater the level of multidisciplinary collaboration, the greater the level of expertise that can be produced (Fay *et al*, 2006).

2.c. Innovation/Implementation

In order to understand the implementation of innovations within the network, it helps to examine the trauma network as an organisational implementation in itself. The ED doctor explains that the Critical Care network has been one of the main drivers for implementing the Trauma Network, due to their experience in network participation, and because a lot of the managers were enlisted to run both networks simultaneously

“... effectively the Network Team whose background is all Critical Care were involved because the two networks were being run essentially side-by-side by the same management team.” (ED Doctor)

The critical care network has also been a facilitating factor that contributed things like transfer auditing systems.

Despite the contributions of the Critical Care network, the Major Trauma centre has been perceived as being slow to bolster capacity, compared to developments in other trusts within the East Midlands trauma system that have rolled out their responsibilities much faster - educational transfer courses, service provision and pre-hospital developments. This may be because the capacity needs were underestimated or not planned for. It may also reflect the attitude that network leadership requires no resource input.

The current pathway for innovations within the network has been identified as follows: new information or innovations come from a service improvement site in one Minor Trauma centre and then pass through the clinical group for dissemination.

“So we give different bits of the Network different roles... [Site name] are doing service improvement.” (ICU Consultant)

There are also a number of standard operating procedures that have been spread across the network, so that patient documentation is uniform within all units. The development of these standing operating procedures is again drawn from the critical care network.

There are a number of clinical or process innovations within the network. The Major Trauma centre is the base for training in off-shore medical provision, which a very specialist form of trauma care. Also, within rehab care, patients are categorised and entered on the system using a tool which measures what a patient is physically capable of coming into rehab

“...whether he can feed, he can swallow, he can use his hands... it's got 18 items and each item has 7 levels.” (Rehab Doctor)

In addition, the ICU consultant notes the need for new transfer skills under the new system, for which new courses are being devised

“... seeing his unit as being at the forefront of developing the transfer course...” (ICU Consultant)

The ED consultant is involved in this Major Trauma transfer course. The course is being designed to give people the ability to make informed decisions about patient transfers.

The transfer course will be rolled out network wide once completed - a decision made by the clinical steering group. Overall, the clinical steering group is mostly static as the ED consultant explains

“I'm not sure if it can be made to function any more efficiently than it is at the moment and I think that's probably because we're still in the implementation phase” (ED Consultant)

The consultant orthopaedic surgeon mentions another specific clinical innovation which has been trialled on the network level and states that network wide trials are the best way to go.

One consideration for these various innovations is how they are approved through the network. Despite the limitations, the consultant orthopaedic surgeon identifies with the network's new triage algorithms, and the interviewee admits it is better to decide on a partially satisfactory set and test them out, than draw out the process through ongoing debates. He impresses that how these algorithms are implemented will be a key factor in their success, as will the level of flexibility staff using the algorithms are given.

The role of non-clinical developments in the network is explored by the ED consultant, who states that there has been little new clinical evidence during the lifespan of the network that has required dissemination.

“Some that are very early stage of they've been discussed for ideas about how they could happen and support but actually haven't started to happen yet (ED Consultant).

This is validated by the ICU consultant who explains that, being removed from practice, he can only identify a few clinical improvements. He is not interested in issues related directly to trauma service management, but he would be interested in conducting research into inter-organisational collaborations, where competition for research is the main barrier to collaboration.

The consultant orthopaedic surgeon also sees the evolving patient flow, and organisational structure of the trauma network, as the biggest unknown. He sees research in this area to be inevitably linked to auditing of the system (Consultant Orthopaedic Surgeon). Auditing ensures that currently existing evidence gets incorporated into practice and it also helps inform clinical commissioning (ICU Consultant).

The consultant orthopaedic surgeon agrees that technological innovations in trauma care are a matter of slow development, and so it's better to focus on how to best time interventions to improve patient outcomes

“... for trauma, with the exceptions of those involving small evolutions in orthopaedic implants that we use, don't really change that rapidly... what's been a lot more important is the, is a greater understanding of physiological responses to trauma and how best to manage people in the early phase after severe trauma...” (Consultant Orthopaedic Surgeon)

The ED consultant provides an example of an organisational innovation. He mentions the role of blood transfusions as a procedure that might be done prior to the major trauma centre. He goes on to say he would be interested in research linking blood product delivery and mortality under the new system. He mentions the radical possibility of blood products in ambulance response.

It should be noted that the new trauma system does not just facilitate innovation. The specifications for the new network have made previous research ideas about decision making for transferring head injury patients redundant. However, this research may be revived through asking about whether head injury outcomes are good enough in the major trauma centre, and whether initial transfers are necessary. (ED Consultant)

Understanding the innovation potential for the trauma network is easier when compared to the military. The ED consultant explains that the military have a good practice of data collecting on injury and their experience is often a driving factor for implementation in trauma care. He also explains that the authoritative leadership style in the military streamlines the innovation process. Despite this, there is a limitation to any innovations borrowed from military learning, because of the difference between the force of impact in military versus civilian trauma. (ED Consultant)

From these examples taken from the data, it is clear that a few clinical innovations are in the pipeline, but while the network is equipped to implement clinical innovations, there are few being

generated. This contradicts what has been said in the literature that there is normally a wealth of unused clinical evidence (Berwick, 2003). The biggest potential here is the implementation of the trauma network as an organisational innovation, which with the right leadership could improve quality of care (Hoppe and Reinelt, 2010).

2.d. Service Delivery/Network Strategy

Using the data to answer questions relating to planning and strategy will help frame the Trauma network leadership in a way that helps understand their motivation and aspirations for the network. The director explains how her network was purpose built around outcomes, and focused on the future and making national links (Director). The trauma network is influenced mainly by the two trauma coordinators. When people began to talk about the trauma network, they initially meant a new trauma system, but referred to it as a network, which the director sees as a separate additional phenomenon that stemmed from talk about the new system (Director).

The director outlines an early draft of the Major Trauma network's agenda,

"... right we've got a requirement to have a board to govern, we've got a requirement to have a clinical group, we think we need a trauma coordinator group, we need a Trauma and Orthopaedic group somewhere in here we've got rehab...". (Director)

She goes on to distinguish managing this clinical network from managing a purely operations-and-delivery network. Concurrently, she outlines the development of more organic networks that evolve through clinician-clinician interactions rather than formalised ones (Director). This is in keeping with the ED doctor's view, as he has been Clinical Director for several years and he appreciates being able to represent his colleagues. (ED Doctor)

The consultant orthopaedic surgeon expressed that he does not consider the network members with dual managerial and practitioner roles as presenting a problem and did not mind where the network was located, as long as dual role members were able to treat their roles

separately (Consultant Orthopaedic Surgeon). The ICU consultant goes on to explain that working in a network as a trauma lead, rather than just within the Major trauma centre, allows him to experience a range of perspectives across the system (ICU Consultant).

The flip side of this situation is that the ED doctor has found himself caught up in the day-to-day practicalities of service provision, rather than the more 'exciting' business of strategic planning. Despite the operational aspects of his clinical director role, he does still get an input into strategic planning (ED Doctor). As a non-clinical manager, the director agrees that impromptu clinical issues that need solving may only take half a day to solve, but it is still time lost (Director). So these clinical preoccupations are not restricted to practitioners.

The interviewees discuss how the network is often focussed on practicalities. The rehab doctor has attended local meetings about the Trauma network in which they discuss preparations for the logistical demands of the new Trauma care system (Rehab Doctor). As trust-wide lead for Major Trauma care, the ED doctor is involved in meeting the standards and specifications for the new model of Trauma care (ED Doctor). The ICU consultant identifies major incident planning as an important concern, which needs to be standardised across the network (ICU Consultant). Finally, the rehab doctor suggests that there are inconsistencies with Trauma care across the region that are being addressed and there is an overall move towards more equal service provision. This in itself will require a lot of research and work (Rehab Doctor).

As expected, the rehab doctor has a number of personal strategies for the network. He is motivated to reconfigure rehab workforce to meet British Society for Rehab Medicine standards, which predates the new Trauma network. The major change he would like to see for the new Trauma network is more resources for rehab and level one rehab service provision. (Rehab Doctor)

So there are multiple slants on how the network should be governed. The ED doctor discusses the various possibilities for management style. He questions whether the professional

groups can cooperate and manage their responsibilities independently, or whether he may need to be more dogmatic and assign roles himself. Even if the groups aren't completely amalgamated, they will still need to work closely. The interviewee admits that because of the scope and diversity of the Trauma network, the more informal approach to clinical governance and steering used in the Critical Care network may not be appropriate (ED Doctor).

He goes on to ask what level of accountability the network has, and uses the example that they are over a year behind their target of a fully functional network being rolled out. In a similar vein, he is not confident how the network would manage if the major trauma centre was compromised due to some incident (ED Consultant). This links back to issues of planning mentioned above.

Overall, from the interviews, it appears as if the members of the trauma board are aware of the extent of the managerial workload placed before them. While they may have strategic plans of their own, much of their time is taken up by practical service provision concerns. In spite of this, it seems accepted that their management style will revolve around a clinically led network. As expected, given the current stage of auditing the network was going through at the time of these interviews, the interviewees talk mostly of planning and standardisation for the network. Effective planning is outlined in the literature as being important for trauma service improvements (Robertson-Steel, 2003), as is facilitation through network design (Lamontagne *et al*, 2011). It is also considered part of good leadership (Xaio *et al*, 2004).

3. Network structure/operations

3.a. Hierarchy

3.a.i. Central Hub

The trauma network is defined by its hub and spoke specification, with the core power dynamic playing out between the Major Trauma centre and peripheral trauma units. The director explains that the foundation of the network led straight into issues of hierarchy. When the network was founded and during the first meetings, there was some vying for power and political gaming:

“And people have done the, a lot of the, stormin and the normin and the political sort of infighting almost, to find position.” (Director).

The nature of this dynamic is not solely specific to the trauma networks meetings. The consultant orthopaedic surgeon gives an example of commissioner interference. He discusses how network members agree that a minor trauma case like minor fractures should be treated outside the Major Trauma centre.

“... if all trauma patients or anybody with more than very minor injury get taken off to the Major Trauma Centre, actually that could damage trauma care in the East Midlands rather than enhance it.” (Consultant Orthopaedic Surgeon).

However, if the commissioners decide to commission the service within the Major Trauma centre, they will force treatment of patients within an already crowded major trauma unit. This could create strong tension between network leaders wanting to adapt the network to best fit and commissioners refusing to stray from the specification.

The director notes that the network does have some degree of leverage over how the network pans out. She anticipates the problem of slow decision making within Trusts that may lead

to network members forgetting the importance of specific issues raised, or even altogether forgetting the issues themselves.

“If we were to go to the Trust and say, we want that decision, you've got to go through so many levels of treacle, that by the time you get a decision, it's either forgotten or gone, not important any more.” (Director)

However, because the network is so respected, it is rare that members will return with the message that a decision is unfeasible. She believes that the hub and spoke trauma network functions as a whole, so questions like ‘how do the Major trauma centre and wider network work together?’ are redundant.

This is not the impression given by other interviewees. Even the director notes that, within meetings, there has been a tendency to talk about the major trauma centre as an ‘other’, separate from the network. The ICU consultant describes how the Major Trauma centre is a gravitational well for influential trauma care players in the UK. He explains that, because it is the biggest network in the UK, it has aggregated a lot of expertise. This shows that leaders in the network differ in how they perceive the effect of specialised trauma services. If they don’t fully acknowledge the risk to peripheral trauma units it may be harder to offset the negative effects.

The ED doctor points out that no other hospital expected to be the Major Trauma centre

“... and I guess with the exception of [Minor Trauma site name] who perhaps could have said, ‘Well we’ve got everything else except neuro’, there was nobody else in the Network who would ever have had any pretence or intention to be a Major Trauma Centre.” (ED Doctor).

The consultant orthopaedic surgeon expands on this by explaining that a Minor Trauma unit’s concerns around the new system were misinterpreted as a bid for Co-Major Trauma centre, when in

fact the message was that they were able to contribute more to patient care and they wanted to preserve the services they provide.

The ED doctor explains that because the Critical Care network is not centralised, all the units in the network can provide equal service. However, the Major Trauma centre is the only hospital capable of providing the Major Trauma unit specification of service provision. The ICU consultant elaborates that part of the reason the Major Trauma centre was able to act as such was because of its neurology specialisation,

“Yes that was the only reason we that QMC made the cut as a Major Trauma Centre because it's the neuro really is the deal breaker for major trauma, because so much so many major trauma patients have got head injuries. (ICU Consultant).

Where Critical Care is more involved in collaboration and support, the Trauma Network involves feeding patients into a more advanced centre that can deliver types of care other centres cannot.

Although the status of the Major Trauma centre is widely accepted, the East Midlands trauma model is not uncontested. The ICU consultant discusses how differences in distribution of specialist trauma services between major hospitals make the hub and spoke model appear problematic to implement, as expertise needs to be relocated. Additionally, the Major Trauma centre focused network leaves some inequality between disciplines. Despite some increased focus on rehab services, the interviewees do not feel they are yet regarded as equally important as Major Trauma care services

“It's not equal, it's not yet.” (Rehab Doctor).

So in addition to geographical disparity, if some disciplines are receiving less attention and resources then there appears to be another axis of hierarchy within the network.

Ultimately the ED doctor states that there is an element of hierarchy.

“I mean the reality is the Trauma Network isn’t a partnership of equals.”

The hub and spoke model does have an element of inequality, but it’s in the interest of patient outcomes, and the Network do their best to play it down. By emphasising the importance of peripheral hospitals, you can keep them engaged. Concurrently, the consultant orthopaedic surgeon explains that the specialists who have been gathered in the Major Trauma centre are colleagues with joint interests in specialist trauma and, although they may be providing improved care for a select few patients, this may detract from the levels of care received by all other trauma patients.

To summarise, there are a number of power plays going on with the introduction of the East Midlands trauma centre, which are linked to the nature of specialisation in a medical discipline as a means of acquiring more status and control (Armstrong, 2000). The most complex power relationship seems to be that between the central hub and peripheral trauma units. While the NUH remains unchallenged for the position as central hub, there are still a wide range of concerns and apprehensions stemming mostly from practitioners in peripheral units. Evidence shows that newly introduced specialities can result in power being syphoned from other professional areas (Lane, 2014). The nature of this inequality is explored in more detail in the section below.

3.a.ii. Spoke units

These interviewee accounts outline the perceived effects of the new hub and spoke model of trauma care on peripheral, East Midlands, trauma units. Firstly, the director describes how the members she encouraged to take on leadership roles were not only multidisciplinary, but also from multiple locations within the network, rather than allowing the network to be over-representative of the central hub. This is mirrored in the ED doctor’s account when asked about other trusts. He states that unless another trust has orthopaedic surgeons who are very interested in trauma care, it is unlikely there will be any problems with down-skilling

“... if they’ve got people who have a particular area of expertise and interest that they’d feel they won’t be able to maintain, but then perhaps the answer for those people is being involved in the Trauma Centre.” (ED Doctor)

Not all interviewees discounted the negative effects of the healthcare network model on smaller trauma units. The ED doctor explains that, since the foundation of the Critical Care network, a Minor Trauma unit had already lost some of its status:

“... Grantham, which did have a very small level three Critical Care Unit, lost its level three beds and then became a level two unit only, and I suspect over the next year or so we’ll cease to even be that...”

As has already been discussed, the Critical Care network is less centralised than the Trauma network, but even so there is deskilling occurring there. With this in mind, it is difficult to imagine the hub and spoke model would not negatively affect skill levels in smaller units. The director notes however that individual centres still have their own ‘empires’, where they lead on particular areas.

Despite this, some interviewees discuss the ways in which smaller trauma units may retain some level of specialisation. The ICU consultant discusses how spreading trauma network development throughout the network helps minimise the risk of disengagement of peripheral units and a ‘black hole’ of expertise forming in the Major Trauma centre.

“Interviewee: Yeah then you disengage the peripheries, that's the risk.

Interviewer: Yeah and what ways is that something that you're trying to stop or manage or...?

Interviewee: By giving the Trauma Units important roles within the Trauma Network.” (ICU Consultant)

The interviewee identifies how useful it can be to create hubs for the secondary aspects of trauma network improvement in the peripheral trauma units. The ED doctor views this has been a noticeable factor in the way the Network structure has played out.

In conjunction with this, it is discussed in the data how, in the context of difficult transfer decisions, some measure of care could be provided by minor trauma units

“... looking at individual clinical interventions which the Trauma Units could provide, I think rather than the Major Trauma Centres. We’re not talking necessarily, operations, we're talking procedures.” (ED Consultant)

This is supported by the Consultant Orthopaedic Surgeon’s argument that roadside triage is problematic, due to the limited information available and because of how accessible smaller units are; it makes more sense to conduct triage within a minor unit. The ED consultant explains how this might work. He explains that, if they can quickly perform a procedure there and then, they will get on with it. If these procedures cannot be performed quickly due to delays, then they will transfer to the major unit instead.

These arguments for greater inclusion of peripheral trauma centres in treatment of major trauma cases are made despite the network specifications that cases should go through the centre of the system. This is partly because it will help reduce deskilling in the minor units. Further evidence for this is that, although only senior trainees in emergency medicine will go through the Major Trauma centre, major trauma cases will go through minor units as they are stabilised and transferred, so there is potential for upskilling (ED Consultant). Contrastingly, the ED doctor notes that patients receive better outcomes when the Major Trauma centre is regularly treating high volumes of similar cases. (ED Doctor)

While the favoured opinion in the data is that the new model of trauma care will not threaten skill levels in peripheral units, this is not completely accepted. Even so, there are a number

of potential service delivery adjustments that could minimise the deskilling effect in spoke trauma units, which revolve around transfers, triage and minor procedures and stabilisation. Adhering as closely to network specifications as possible may be the best way to prevent deskilling. Either way, with the introduction of a new speciality like major trauma care, encouraging inter-professional relationships is the best way to cope with jurisdictional concerns (Mason *et al*, 2006). Moreover, the type of leadership identified by participants appears to reflect a whole-system, non-hierarchical model of network (Thomas *et al*, 2001) which could help minimise disengagement.

3.b. Transfer/Referrals

In the previous section the process of patient transfers has been identified by the interviewees as a key consideration in understanding the new model of East Midlands trauma care and the potential outcomes. After the initial meetings to discuss the new Trauma Network, it was revealed that the rate of referrals for Major Trauma cases would be low;

“So it was certainly less than one patient per week, per site...” (ED Doctor)

The ED consultant expresses that patient transfer is the most important aspect of service provision under the new system, but it is difficult to make general rules, and decisions to transfer happen in the moment without having time to refer to evidence. This is especially relevant when considering interventions that are time-sensitive, and whether to by-pass a minor hospital or admit a patient there for interventions (ED Consultant).

The process is further complicated by the issue of clinical governance of a patient. Governance is transferred when the patient physically enters any trauma unit. If a minor trauma unit transfers a patient, they are clinical responsible during transport between centres.

“Well until the patient physically is handed over they remain the clinical responsibility of the trauma unit.” (ICU Consultant)

The ambulance service only has clinical responsibility before admittance into any trauma unit; though they may transport patients subsequently during transfer, they no longer have clinical responsibility.

Compared to the London model, where all Trauma patients go directly to Major Trauma Centres in the centre of London, the East Midlands model is concerned with actively engaging minor units, in order to preserve the network and facilitate clinical management issues like patient transfer. This shows that the network leadership are prepared to adjust the network specification in order to ensure a cohesive and engaged set of Minor Trauma units. The logic for this leads on from the previous section on spoke trauma units.

Although there is motivation and justification for patient transfers to go via smaller trauma units, there are drawbacks for this. As well as the issue of clinical governance, the ICU consultant explains that some extended, primary transfers to and from minor units are unnecessary, and higher skill sets in paramedics could lead to patients being transferred directly to the Major trauma centre.

The ED doctor expands on this by expressing concerns regarding patients who are not critically ill, but might not benefit from transfer for specialist care because their management is less clear, as is their mode of escort for transfer. Because of the geographic spread, he feels you cannot have a one-size-fits-all model for transfers in a Trauma network

... if you're in A&E in [Minor Trauma unit name] and you're fifteen, maybe twenty, minutes away from [Major Trauma centre name] and we're only going to take you twenty minutes away from home anyway... if you're in [2nd Minor Trauma unit name] where you've got an hour-and-a-half in an ambulance and you're two-and-a-half hours away from your family.”
(ED Doctor).

Concurrently, according to the Consultant Orthopaedic Surgeon there is also the risk of too many unnecessary transfers having an adverse effect applying mainly to minor trauma patients.

Considering it is not accepted that increased transport times reduce quality of care, it is not clear whether these are valid concerns or perhaps an expression of resistance of the new system.

As well as issues regarding primary patient transfers, other themes relating to patient transfer appear in the data. The ED doctor sees one of the tests for the Trauma network's referral system as how to handle patients who need a secondary referral, after it becomes apparent that, while technically not a 'major trauma' case, they might still need specialist treatment in a Major Trauma centre

"... patients may not have major trauma in the sense of an ISS16 and above injury, but they have a specific injury that requires very specialised management that would best be done in a Trauma Centre." (ED Doctor)

Conversely, although some patients will need specialist care, according to the consultant orthopaedic surgeon, transferring all standard trauma cases would just overload the Major Trauma centre.

As well as deciding how to transfer and when to transfer during initial trauma care, there is also the matter of transfers out of acute care. There is an issue with the way patients are transferred out of the Major Trauma centre, as the default is to return them to their local hospital which may not be the best way to ensure high quality rehab care. Moreover, they may end up being sent back to the Major Trauma centre for subsequent treatment.

The rehab doctor explains that when making a patient referral, he makes them via the QMC, and that he does a combination of formal and informal requests as this gets the process moving fastest. He notes that there is a risk of inadequate rehab referral and he uses this as a reason to not focus too intently on one area of rehab, as there is the problem of comorbidities and the risk of under-managing them (Rehab Doctor). This shows current systems of rehab referral need improving.

Issues of patient transfer affect the whole system of trauma care, but they are especially fundamental to the role of the peripheral trauma units. Their main contribution is expected to be transfer based, but some interviewees expected more input, and they justify it by explaining the benefits to their skills levels and to the whole trauma care pathway. Referrals to rehabilitation care are also worth considering, as it has been mentioned that changes to ongoing care are in the pipeline for the network. The literature shows an upcoming innovation in electronic communication for patient transfer systems that could be adopted in the East Midlands (Spitzer *et al*, 2009). Nathens *et al* (2000) express that in part, mortality can be reduced slowly through developments in patient transfers.

In this section, issues of scepticism of the new network are appearing. Issues of jurisdiction and fears of deprofessionalisation are being expressed, either explicitly or through picking apart the service specification. This presents an even greater challenge for leadership as it shows stronger resistance than is perhaps recognised by the director. Moreover, this debate shows that specialisation of trauma care under a network might mean professional disparity across the region.

3.c Geography

Following on from regional professional disparity, there are also geographical considerations for service provision. The leaders of the East Midlands trauma network have to consider how to adapt the network model of trauma care to the layout of trauma units within the network. Discussion of patient triage and transfer inevitably lead to questions of location, service dispersal, and patient population.

The director explains that geographical diversity is intrinsic to the network through the structure of the network meetings - how leads from different locations come together to volunteer projects to tackle within the network. She also explains why the network has no fixed location. She

notes that it would place organisational strain on the Major Trauma centre if the network was located centrally, as there would be conflicts between the best locations for both.

Distance has been a barrier to the mapping of the new Trauma system. This mapping was done using data and expertise from external agencies about four years ago and helped initiate the dialogue of founding an East Midlands Trauma Network. The ED doctor identifies that the geography of the East Midlands limits the possibility for all patients across the region to be transferred directly to the Major Trauma centre,

“... even in [Minor Trauma unit region name], where the idea of going to [Major Trauma centre city name] for your treatment seems like a very long way.” (ED Doctor)

This is due to the necessary response times for certain major trauma cases, and links to the timing of medical interventions and the necessity of triage within peripheral trauma units.

The consultant orthopaedic surgeon explains why specialisation of trauma care revolves around a single Major Trauma hub. He discusses how it is difficult to have trauma specialisms distributed between units, because patients rarely have only a single type of trauma to treat, so it makes sense to have a centre with specialists available who can allow for all major trauma pathways.

Despite this argument, the consultant orthopaedic surgeon also feels that minor multiple trauma patients can still be treated locally

“But the next tier down is a group of patients who say... don't have a major head injury, don't necessarily have a major chest injury, and those are the patients that I think we can quite reasonably treat in [Minor Trauma unit name] to an equivalent standard as they would be treated in [Major Trauma centre name].” (Consultant Orthopaedic Surgeon).

Similarly, the rehab doctor feels that transfers to ongoing care cannot be managed centrally, because patients have a choice and generally want to be as close to home as possible. Because

ongoing trauma care treatment can be life long, and, because of the expense of treating patients out-of-county for rehab, it only makes sense to build the facilities to treat them locally.

Centralising expert care can be difficult in itself, because specialist practitioners and resources may be divided among several large hospitals in a region. Moreover, if the network aims to be patient-centred, then the needs of family members visiting from across the county need to be considered. Some literature shows no patient deterioration as a result of increased transfer distance (Cales, 1984), especially if appropriate transport technologies are in place (Spitzer *et al*, 2009).

Despite this, the Sparkler reports from the East Midlands Academic Health Science Network identify a 1% absolute increase in mortality per 10km but this is a trade-off for the decrease in mortality due to increased quality of care (EMAHSN, 2014)

3.d. Capacity/Scope

While a number of reasons have been identified for location of the Major Trauma centre, capacity has been more problematic. On the one hand, the director explains that members of the network see themselves as having one large stock of hospital beds to utilise, so if there's an epidemic and the Hospital in the city centre is flooded with patients, other less central centres are able to come in and alleviate patients.

On the other hand, the ICU consultant explains that establishing the trauma network was overall very simple, but held back by bed capacity which is still in the process of being improved (ICU Consultant). The ED doctor agrees that establishing the network been a slow process overall, due to the scale of the network and the Major Trauma centre's limited capacity. This has been a limiting factor for the growth of the network. He explains the network was initially ahead of other regions in the planning stage, but has since fallen behind

“... we can't go live until April because of capacity issues”. (ED Consultant)

Because of the capacity issue, not all minor trauma centres have been properly integrated into the network system. This has led to service inequality:

“... so we still had areas of the trauma system that aren't, don't have what we would call an automatic right to send, which is underpinning principle of the Network, so if you get, say if you get there's non-equity of access...” (ICU Consultant)

The consultant orthopaedic surgeon thinks that, because of these capacity issues, forcing all trauma patients via the major unit will destabilise the whole trauma care system, and he states that he would like it to be more like the Critical Care network, with proper considerations for capacity and skill mix across the network.

This capacity issue extends beyond acute care, with a serious lack of beds and capacity for rehab patients as well. This is both within the Major Trauma centre and within spoke centres. Rehab patients are not being managed correctly.

“... so it is a total capacity problem to repatriate people. Unfortunately on they send them in the general ward which is totally inappropriate...” (Rehab Doctor)

Again the rehab doctor sees this capacity issue as a barrier to rehab service provision that needs addressing. He has taken this issue to clinical group meetings, along with the issue of a lack of level one services.

With capacity being discussed across the board, and with it restricting the East Midlands trauma network from meeting specifications, it appears as if it will be resolved quickly with high priority. That being said, the delays to network implementation cannot be undone. This case may provide a good example of what not to do when establishing a healthcare network; not just capacity, but any limiting factor could be debilitating. The ED Consultant even highlights other resources issues the Major Trauma centre has dealt with,

“And [Major Trauma centre name] have obviously had its own problems with financing on top of trying to get any new services up and running.”(ED Consultant)

It would be interesting to explore whether this lesson carries over to subsequent changes made to rehab services. Albert and Phillips (2003) note how restructuring does sometimes fail because of simple factors like lack of resources.

3.e. Comparisons to other networks/organisations

Throughout the data, the interviewees make comparisons to other trauma networks. By bringing these examples together, it becomes clear how the East Midlands trauma network fits into a national framework. The ICU consultant explains that there is a national trend for bolting trauma networks onto the back of critical care ones. It is likely then that the decision to build the East Midlands trauma network on top of the Critical Care network was informed from previous examples.

The ED doctor talks about his knowledge of another potential Trauma network, and how, because there are two large hospitals, it's unclear how many Major Trauma centres it could have; two, one or even none. Because of patient distance and load, he finds it difficult to imagine diverting cases from either hospital in concordance with the new Trauma system.

“It left too much of the population more than forty-five minutes away from a Trauma Unit.”

(ED Doctor)

Comparatively, the West Midlands trauma networks have a combined patient population that equals the East Midlands network, despite being split into three. This is largely due to political or status reasons. The interview notes a potentially competitive or possibly indignant mentality;

“... we're going to be a bloody Major Trauma Centre too.” (ICU Consultant)

It is interesting that although Derby could have insisted on acting as another major trauma centre, this was not the case. This may be because of the relationships between clinicians that

helped them come to the conclusion that one Major Trauma centre would be best for patient outcomes.

This could be the case as the ED doctor feels that even if Manchester, like the West Midlands, also uses a model with three Major Trauma centres, the current model works best for the East Midlands. He notes that it is especially interesting to compare the East Midlands model, where they depend heavily on the spoke units, to the London model where they don't. It is also worth noting that the ICU consultant understands that trauma networks and centres are only co-located in smaller regions. This is possibly because of geographic density, as they need to do fewer secondary transfers.

The consultant orthopaedic surgeon also uses comparisons to other trauma networks to identify improvements to triage practices. Triage algorithms are used to identify patient needs and inform transport decisions for ambulances and are developed separately for each region of trauma care. The interviewee explains he and others had concerns when these algorithms were decided on for the East Midlands network, because physiological factors were not incorporated, whereas they have been in other networks.

“... reservations were expressed by a number of people about the criteria for the triage algorithm and I've always felt that not having physiological parameters on there to really decide if somebody has suffered a major trauma is probably an omission...” (Consultant Orthopaedic Surgeon)

The interviewee uses triage algorithms as an example of how some aspects of service provision need to be compared between trauma networks, in order to be better understood and he ultimately hopes for nationally homogenous standards in trauma care.

As well as other trauma networks, the data shows comparisons between the East Midlands trauma network and other organisations. The ED consultant discusses the merits of military

innovation in trauma care that come from the authoritative style of military leadership, compared to the constant debating of even simple decisions within the NHS.

“... the military model does mean that things happen and happen quickly when they need to happen but the weakness of that model is that it may not necessarily be the best thing that happens...” (ED Consultant)

This illustrates a trade-off between the quality and efficiency of innovations. Likewise, the director is anticipating a need for a research and education strategy which will involve bringing the university into the network as an external organisation.

Through these interviewee comparisons, it becomes clear that the East Midlands trauma network is one of few that have followed specifications for a single Major Trauma hub. As a result, their network has a larger patient population, with all major trauma cases within this population flowing into one Major Trauma centre. The spread of patient population in the East Midlands seems to explain the necessity of peripheral units in supporting the major trauma care pathway as stabilisation and transfer are vital. Because of this, the East Midlands appear to have comparatively strong engagement of peripheral trauma units despite the disillusionment expressed in earlier sections. This is important as Greenhalgh *et al* (2004) show that adopters who engage well with an innovation are influential in how successful an innovation is.

3.f. Workflow

Throughout the data, the interviewees present a number of examples of how the new system has affected workflow within the network. The ED doctor explains that one Minor Trauma unit had already stopped treating major trauma cases well before the introduction of the Trauma network. Moreover, he does not expect much of a reduction to accident and emergency cases at his trust, even with Major Trauma cases bypassing them. This is compared to another Minor Trauma unit, where a lot of Trauma is bypassing them completely

“... [Minor Trauma unit name] has also, while I’ve been at the Trust, has stopped being a Centre that would take major trauma patients ... perhaps like [2nd Minor Trauma unit name] where actually now a lot of their major trauma simply bypasses them.” (ED Doctor)

Even for trusts adversely affected by the new system, those who still want to involve themselves in major trauma work can work off site in the NUH. This can help promote relationships with other units in the network, but also avoid the deskilling expected in secondary units.

Though case load may not be an issue, the interviewees draw attention to a few issues related to workflow. The director discusses how a specific issue like weaning a patient from a ventilator, when assigned as a nurse duty, was problematic due a variety of issues unique to each centre. Although the goal was universal, the pathways differed

“And then I realised that they all went to the same end point but how they got there was a different journey”. (Director)

The ED consultant also notes that there have been tensions related to head injury patients, as they are expected to be moved to the major trauma centre but the centre has refused to take them.

The ED consultant feels that overall, despite changes to team structure, the workflow has remained unchanged.

“... well the activation will be the same but who will be on the trauma team will be actually a little bit different from what it has been in the past... We’re not going to change our activation particularly...” (ED Consultant)

The teams still function as standby, if they have suspicions raised by the local ambulance service that an incoming patient is in need of trauma care, or active if the care is requested. The standby phase allows for a quicker transition into the active phase. Part of the reason for not changing this style of working is the previous over-zealous pre-hospital assessment of trauma patients.

This issue of overzealous triaging of patients ties into a number of issues revolving around decision-making.

“... the Network is currently over triaging patients based on the initial assessment of what we thought they would triage.” (ED Consultant)

The ED consultant expects that decisions to diagnose or manage patients on-site in minor units will reflect case-level, intuitive decision making rather than general guidelines

“I think we're going to be common sense about it and we will be going to send, sending more of the trauma that gets sent to us than we ever have before but at the same time there will be patients with what appears to be relatively isolated injuries which fall within our competencies to manage and we'll manage them.” (ED Consultant).

Although the local ambulance service prefer to let their staff decide for themselves what's best for a patient, others feel that, when a patient dies, decisions like these come under scrutiny and, if algorithms are not followed rigorously, it could necessitate disciplinary action

“...where trauma patient dies in the back of an ambulance on the way to somewhere, then part of SUI review would involve the paramedics decision making process...” (Consultant Orthopaedic Surgeon)

These attempts to preserve decision-making prerogatives could be a reflection of professionals trying to preserve professional autonomy.

Where dealing with adverse clinical incidents is concerned, the ED doctor looks to an amalgamation of the clinical governance and steering groups, as he sees this as an inevitable outcome with them resolving similar issues, and it's also reflective of what already happens in the Critical Care network. So this may require no adjustment moving into the new trauma network system.

Each of the aforementioned workflow themes is only really mentioned in passing by the interviewees. Each area will likely require ongoing trialling, auditing, and research, to improve and standardise. The important question to ask is how these issues of delegation, decision-making, and changing care pathways, will be addressed by management, and the role leadership will play. Fortunately, most ground-level trauma care duties appear to have been unaffected by the introduction of the new system. There is evidence to draw upon, as Sinreich and Jabali (2007) show that careful shift scheduling can help create the most efficient workflow.

4. Network leadership ideology

4.a. *Clinically led*

The network is run by a medical lead, a medical service lead and a nurse lead who answer to the network director, who in turn is responsible for the Critical Care Network programme running effectively. The director here is not from a medical background. She identifies that healthcare managers are generally expected to be from a medical background and finds this frustrating. She explains that she is a patient, and has gone through the health service supporting a family member with a long-term illness. Equally, she feels that as a non-clinician, she can apply an alternate perspective and,

“... ask different questions that sometimes people miss or don’t always think to ask.”

(Director)

In the recent past, she questioned herself as to whether there is a place for her as a non-clinical manager in the NHS. She came to the conclusion that there are some clinical managers who lack proper management skill sets, and there are some clinical managers who conduct ‘bad management’. She also notes purely clinically led networks as being unable to adopt new practices. Moreover, she expresses that she has always been able to gain credibility and respect with the

clinicians she has managed up until the foundation of the new trust, where the emphasis has been on clinician-led healthcare.

The ED doctor acting as trauma lead for his trust is also the Clinical Director for Theatres, Anaesthetics and Clinical Care at two sites within the trust. He expresses that the large, necessary amount of change happening in the NHS should be clinically led or at least heavily clinical influenced.

“I mean ideally it would be very largely clinically-led. I think in the current NHS that’s probably a little bit unrealistic, but I think it needs to be very strongly clinically influenced...”

(ED Doctor).

The ICU consultants supports this by stating that being well known in the medical community, especially compared to other trauma network members, allows him to easily engage with ambulance services.

Moreover, the clinical steering group has been identified as providing a clinician-centred environment for clinicians to feed their perspective into the network. This is compared to other meetings that are more management focused

“It (Clinical Steering Group) provides a clinician focused area to discuss the matters which are affecting the Trauma Network.” (ED Consultant)

The consultant orthopaedic surgeon agrees, seeing the role of the clinical steering groups as ensuring clinical perspectives are heard, because if management decide to roll out an innovation or strategy and the clinicians are not consulted, it could fail straight away if the clinicians are not willing to cooperate.

It is unsurprising that clinicians vie for clinical leadership and the non-clinical director opposes this. The fact that both arguments are represented suggests that the network could experience the best of both worlds. Equally this could hint at divided, tense leadership. Ultimately,

due to issues of engagement, clinicians will not go unrepresented. Collins-Nakai (2006) explains that, while clinical leadership is desirable, clinicians do not innately possess the skills for leadership. Even so, non-clinical management can threaten medical autonomy and create unnecessary resistance (Nemerato, Salvatore and Fattore, 2011).

4.b. Service improvement

The director feels strongly about the direction the network should take. She notes that the difficulty in communication can be linked to one particularly difficult professional relationship, but suggests it doesn't stem from differences in opinion over what the network should be. She has had to delicately encourage members to adopt the same approach to service improvement for trauma care as in critical care, without being dogmatic about it

The network is committed to service improvement, as the ED doctor works for the Trauma network in a service improvement role. He explains that some people have interpreted this as him fulfilling a research based role, but he sees his role as far removed from an academic research role. Rather than creating a clear set of operational changes for both Clinical Care and Trauma care, the networks have been focused around meeting ideological goals for service improvement, like equality of access and consistent quality of care across the networks

“One is that we take key themes where we feel there is a need, a justification, for some network-wide work to improve the service, and that may be improving the service from a clinical perspective for patients”. (ED Doctor)

The data shows service improvement in the network has a specific focus. The management of multiple traumas and interventions makes up the more holistic modern form of trauma care. The consultant orthopaedic surgeon believes that bigger organisational changes are far more impactful on patient outcomes than any small technological innovation could be

“Yes and I think that the organisational improvements that are associated with Major Trauma Network probably, bigger benefit to trauma patients than any particular subtle in orthopaedic surgery.” (Consultant Orthopaedic Surgeon).

Concurrently, the ED consultant explains it is important to see the system as a whole that can be improved, but some members of the network see it as a tool to only improve their local services.

In contrast, the ED doctor explains that the expertise within the Trauma network is drawn upon by people identifying specific areas they want to improve. Although not usually planned for, improvements in specific areas may be adopted by other units within the network.

“... So we can use that to support people in doing local pieces of work.’ Then we share those local pieces of work across the Network and other people will pinch them largely...” (Ed Doctor)

The ED doctor explains that the process of partitioning service improvement with different trauma units across the network helps generate service wide improvements.

The rehab doctor has not been satisfied with rehab service improvement under the network. She has used a high volume of patient referrals to try and illustrate the lack of facilities, but also has felt referring many patients is preferable to providing them with an incomplete service. However she explains that the Trauma network is an especially positive development for rehab, as it brings it into the forefront of service improvement considerations, and it shows an equal credence for entry and exit to hospital care (Rehab Doctor).

Despite the interviewees expressing strong views about the importance of service provision, the ED consultant notes that, at the time of the interview, the auditing service for the network was on standby mode. Most of the focus was on establishing the network

“But there haven't been any significant really significant issues for a little while. Most of them relate to each other and individual Trauma Units coming on line...” (ED Consultant)

The service provision ideology appears to be present, but whether it is realised or not is uncertain.

Vander Laan *et al* (2001) discuss an example of service providers meeting with patients and family to discuss service provision improvements which might be a possible route for the trauma network.

Moreover, the literature suggests that breaking down professional boundaries is the best way to improve service provision (Lane, 2014; Kimble, Grenier and Goglio-Primard, 2010). So it seems that leadership to improve cooperation will also help achieve the service improvement goals outline by the interviewees.

4.c. Engagement

4.c.i. Culture

The data reveals the kind of culture present in the network. The director explains her experience of humility within the NHS which she tries to culture in the trauma network

“I wasn't brought up in a hierarchy... I worked for... well many years with a prof who was a Knight of the Realm, you know but he would introduce himself as David.” (Director)

Even so, there is a lot of competition within trusts, and in a way, the network provides an opportunity for clinicians to get counselling on issues they are having with their trust. She expands on this competitiveness, explaining that it is possible that, where information is being withheld from the network, it is linked to elitism within the Major Trauma centre.

The director did fear that there would be a culture of blame for specific transfer failures and pointing fingers rather than addressing them as network issues. Although initially they used

anonymised data on patient transfers, members in the meeting quickly de-anonymised themselves, as they didn't see it as necessary,

“... they themselves said we need to have this inclusive, no-blame culture... what have we learned and how do we share the learning?” (Director)

The interviewee notes that this may vary among networks, as they operate differently due to culture.

Even if there is a lack of blame culture, individual trauma units are still very keen on maintaining status and appearing to lead on at least one aspect of the network. The ICU consultant explains that, in order to engage people, you have to pander to their interests.

“They are variably engaged and disengaged depending on how it serves their self-interest.”
(ICU Consultant)

He elaborates that engagement with the trauma network is based on whether members feel it's in their interest.

So despite attempts to dissolve hierarchy, it persists through competition for status, which cannot be dissuaded too authoritatively because of the need to retain network members and keep them engaged. On the other hand, the fact that members are willing to accept shared blame suggests that competitiveness does not completely conflict with the functioning of the network. Understanding the culture emerging within the trauma network helps understand the profession, as professional identity is built through shared culture (Evetts, 2006). By rejecting blame culture, the network participants are displaying professional altruism, which can alleviate tensions caused by collaboration (Kimble, Grenier and Goglio-Primard, 2010).

4.c.ii. Evidence Base

An important aspect on engagement with the trauma network is being able produce evidence. The director explains that there is a wider trend in the NHS of there being little funding available to draw on, and organisations having to constantly justify their worth. The ICU consultant notes that evidence showing the new trauma system improves care without great costs is ideal

“Well I think, particularly given the financial climate that we're in, under, anything that demonstrates that that organisation model improves care and doesn't cost vast amounts of money is helpful.” (ICU Consultant)

The director sees the trauma network as underfunded with an overall decrease in budget of 36%. While the expenditure is usually within £1000 of the budget target, most of this goes on paying salaries. There is also a lack of general resources

“... but I don't have an HR director, director of workforce, strategy, service improvement, all these things that you feel belong in an organisation...” (Director)

The director feels a sense of responsibility if the network is not meeting expectations. But simultaneously, she feels she doesn't have enough time to even continue delivering a simple biannual newsletter to illustrate the impact of the network

“... so previously we had a bi-yearly network newsletter but I would have to gather all the articles, edit the articles, write everything and like I just can't do it...” (Director)

However, the trauma network is based upon an evidence-based hub-and-spoke model, so the network is not under as much scrutiny as it might be.

Creating an evidence base has been interwoven with service improvement. The director notes that after picking up the trauma unit programme, the managers drafted a protocol and

conducted assurance visits to the participating trauma units. The ICU consultant notes that auditing has shown improvement in survivability,

“... we get network reports from TARN from ICNARC... we know that all of the Major Trauma Centres are have shown about a 20% improvement in survival over the last 2 years.” (ICU Consultant)

He feels that this evidence could be used to argue for continuing major trauma training for doctors in peripheral units, or founding new stabilisation and transfer units. The logic he uses is because then further deskilling or marginalisation of smaller trauma units may reduce this survivability by disrupting the system.

The ED doctor suggests that because of the role of ongoing care after acute trauma care, it is hard to show improved patient outcomes beyond the obvious decrease in mortality. He explains that, although there is motive to improve and there are strategies to improve, one of the biggest issues is measuring improvement. The doctor expects that a good evidence base will increase levels of engagement with the network. He also identifies the lack of inter-network comparisons for care delivery and levels of engagement

“...having really good evidence about improving outcomes will be really good for keeping people engaged”. (ED Doctor)

The rehab doctor explains a similar approach to building an evidence base. By sending data on staffing levels, the rehab department provides a self-audit which is combined with data from other departments on a national scale to produce a level-based classification for rehab. She also identifies that, in order to provide evidence for up-skilled rehab care, a comparison study between general and specialised rehab would be needed.

The data explicitly calls for a need for a proper evidence base for the new trauma network, in order to justify funding. While auditing measure are in place for both acute and ongoing care,

mortality statistics are more readily available than quality of life measurements (Davenport *et al*, 2009; Sleat, Ardonlino and Willett, 2011). The interviewees also express the importance of wider comparative studies to contextualise developments in the East Midlands trauma network. This evidence base could provide a number of advantages from better education (Shepherd, 1990) to better innovative capability (Harvey *et al*, 2011).

4.c.iii. Perceptions of network

The director prioritises changing stakeholder opinions of the network. She explains that getting stakeholders to want to take part is crucial, and she avoids being demanding so people aren't put off. Similarly, by focusing on what the clinicians think is important, which is improved patient experiences and outcomes, the manager ensures they are willing to keep attending network meetings. The ED doctor summarises this by saying:

“If you just say, ‘Well actually your job is just to put people back in an ambulance and sending them into Queen’s, chances are people aren’t going to be particularly bothered about being engaged in the Network then.” (ED Doctor)

The director is aware that this task is challenging. She outlines the sheer volume of expectations from people involved in the network, and the combination of small specific requests that amount to a huge scope for the network. The ED doctor also points he was pressured to take the job as trauma lead because it wasn't exactly popular:

“I mean originally I was persuaded to do it rather than particularly wanting to do it, and in part I think that was that nobody else wanted to do it.” (ED Doctor)

The consultant orthopaedic surgeon sees it as necessary as part of his role to manage public expectations of the trauma network. Moreover, the director explains that conducting assurances and outlining standard operating procedures have been necessary to prove the network is active, as some still perceived it as regular meetings and nothing more.

Moreover, while expectations are set high, there is also concern regarding the network. The director discusses how some people misinterpret the concept of the network as a threat to their autonomy, whereas it actually facilitates medical staff governing themselves rather than controlling them

“... the network in that respect is a close threat, because it might be that we're going to tell people what to do... Whereas actually, because they are the network, they are governing it, they're directing it, they're leading it because all we're doing is facilitating...” (Director)

The ED doctor elaborates that, although he himself is comfortable with the change, he identifies that some co-workers who aren't used to network organisation have found the change unsettling. For most doctors, the loss of major trauma cases has little effect on day to day activities, but for orthopaedics it feels like a threat to their core business.

The data reveals these types of fears are present in smaller trauma units. The ED doctor identifies fears that reorganisation of Trauma Care will lead to down-skilling in the minor Trauma centres. He argues that, due to when they are on call and the relative rarity of Major Trauma cases, an orthopaedic surgeon might only encounter a few Major Trauma cases a year, which is not enough to maintain any skill level of trauma care.

“So statistically any one of those consultants is going to be involved with the management of, you know, maybe two, maybe three, major trauma cases a year.” (ED Doctor)

Concurrently, because there has been talk of shifting even more trauma cases towards the Major Trauma centre, the interviewee thinks that changing this aspect of the Trauma Network could provoke more resistance. In addition, the practicalities of reorganising the whole spectrum of Trauma Care would be too problematic.

Although there is the possibility that the network may shift this way, and there is concern about caseload reduction trickling down to moderate or even minor Trauma, the ED doctor thinks

this is unlikely, due to the public engagement angle they used when establishing the network. The following argument was used to counteract public fears about their distance from a Major Trauma centre:

“... ‘it’s going to get me (the public) better outcomes’ and it’s very-very small numbers of very-very sick patients...” (ED Doctor)

The doctor expects that going against this message would be too much of a risk.

In spite of these concerns, the ED doctor explains that, after realising what little effect the current new system would have on case load, orthopaedic surgeons at his trust realised that they would retain the majority of their Trauma cases. The interviewee explains this was so acceptable, because they would only be losing the most severe cases, and none of the orthopaedic doctors at his trust are especially enthused about Trauma work.

Indeed, the director suggests that there are definitely some positive perspectives of the network. She highlights that people follow the network’s recommendations, because they see the intended benefits

“... the network has teeth because generally what the network suggests, recommends or says, people do because they see the benefit of it...” (Director)

The ED doctor explains that his trust will still have trauma patients coming in that need stabilising and transferring, so the A&E department isn’t worried. He notes that it may affect Critical Care but, even so, because Critical Care is already working in a network format, members in individual trusts will accept the changes as ‘best for the patients’.

Even with the patient-centred approach to framing the network, the consultant orthopaedic surgeon still sees himself as responsible for protecting Derby hospital’s interests, and interpreting

what changes to Derby's service provision will be needed. In his opinion, even if it's been for better patient outcomes, for Nottingham the trauma network has been somewhat self-serving.

"There are certainly some people who take the view that there has been an element of empire building." (Consultant Orthopaedic Surgeon)

As well as these suspicions, there are other factors that threaten confidence in the network. The consultant orthopaedic surgeon expresses a fear of appearing unsupportive of the network. Although he supports the logic behind it, with regards to these triaging issues,

"... what we don't want to do is introduce instability across the system where all the patient flow is in the wrong direction." (Consultant Orthopaedic Surgeon)

In this context the surgeon is concerned about all cases going through the Major Trauma centre and being transferred out for minor treatment. Interestingly he wants to be clear he isn't challenging the network implementation.

"... I don't want it to be seen that I'm not supporting the Major Trauma Network."
(Consultant Orthopaedic Surgeon)

The ICU consultant goes a step farther and states that he would abandon the hub and spoke model of trauma care, if another more effective model was available.

From these excerpts, it is clear that managing stakeholder, public and even board member perspectives on the network is crucial. Some network members harbour concerns, but still want to show solidarity. Timmons and Nairn (2015) explain that playing on perceptions of emergency medicine as being patient-centred and politically charged can give it an edge by improving its specialist status. These perceptions of the East Midlands trauma network are tightly linked to creating the evidence base discussed in the above section, and it may be that as evidence is

gathered, concerns are abated. Some practitioners within the network do have doubts and the section below explores this in greater details.

4.d. Conflict/resistance

The network managers give great consideration to the level of conflict experienced during the foundation of the new network. The director mentions the necessity of conflict management in building the new trauma networks, and highlights that some members are reluctant to recognise the network out of impatience. She notes a lot of political conflict and explains her resolution,

“... identify your key players, if they are the ones that are giving you cause for concern and look at how you can embrace them and bring them in.”

She does go on to say she’s been dubbed a ‘networkologist’, and has a particular set of skills geared toward setting up networks, specifically getting people engaged and managing conflict. She explains she doesn’t mind this conflict and, in fact, embraces it for the sake of service improvement, and explains it is linked to impatience regarding the development of the network.

Despite the director’s experience with conflict and her ability to embrace it, she notes that there are certain members of the trauma community she is doubtful she will ever be able to get on board.

“I’m not convinced with some of the players that we’ll ever get them in.” (Director)

She describes the network’s first meeting discussing patient transfers as a difficult one, and she admits that cooperation between the network committee and staff working within the network can be turbulent.

The data reveals a number of disciplines that have presented conflict during this trauma network restructuring. While orthopaedic surgeons have had some involvement, the ED doctor expresses how hard it has been to engage general surgery with the changes to trauma care.

“I sense there’s probably very little involvement from people like general surgery. I mean certainly in our Trust there is.” (ED Doctor)

He explains his trust holds meetings to compliment the network wide trauma meetings. These are trust-wide ‘pan-speciality’ meetings, but they see poor attendance from general surgery and radiology compared to more interested specialities. The ED consultant also notes resistance from the spinal medicine group at his trust, who initially felt threatened, but this has since been resolved.

One large concern is that the new model of trauma care will be highly in favour of the Major Trauma centre, and the interviewee paraphrases this opinion:

“Well is this all just being done because [Major Trauma centre name] just want all the exciting sexy patients.” (ED Doctor)

The ICU consultant explains it can be challenging keeping other large hospitals engaged, when they can’t act as major trauma centres but may still want to practice it, when they see themselves as equal or when they made a bid for co-major trauma centre. (ICU Consultant)

The consultant orthopaedic surgeon uses his Trauma unit as an example of this, explaining that because standards of trauma care are a matter of pride for his hospital, it’s hard to engage with the network, when it seems as if there is no need not to treat patients locally. Likewise, because there are a number of specialisms that his hospital is equipped for, the interviewee asks who is going to match this hospital’s level of expertise in the Major Trauma centre, and what will happen to his hospital’s specialisms?

“... we have what we think is a pretty good pedigree of high standard trauma care over the years and the last thing we want in engaging with the Trauma Network, is actually allow [Minor Trauma unit name] to become disadvantaged and have a lot of our stuff that we’ve historically done well, taken off us...” (Consultant Orthopaedic Surgeon)

These concerns are linked with the fear that deskilling is a one-way process. Moreover there are less tangible aspects of medicine that may be lost, such as flexibility in healthcare systems.

Not surprisingly, the consultant orthopaedic surgeon explains that there appears to be a level of animosity and suspicions aimed at other members of his hospital who collaborate directly by working in the Major Trauma centre, which he himself has experienced. Still, he expects this is the future of consultants in healthcare; that they will work for more virtual organisations rather than being confined to a single-building organisation.

As well as the more obvious factors relating to conflict and resistance, the interviewees bring up a few less obvious ones. Because the Trauma network is being run by those members of the Critical Care network, there is an assumption that other specialities are as aware of the benefits of network work as they are, when in fact they have no experience of it.

“... that for other specialities who’ve never had any experience of network working... maybe they don’t necessarily see the benefits that we think are just intuitive...” (ED Doctor)

The director also notes that, when developing performance indicator tools, she was hindered by issues like data restrictions within her own trust.

As well as causes for conflict, the data shows a few instances where it has been passively diffused. The ED doctor notes that there was a sense of inevitability about the trauma network and, because of that, there was little resistance within the clinical reference group

“I think we always felt that it was going to happen in this region so I think this network there’s never been a great feel from the Clinical Reference Group that it was a problem, that it shouldn’t happen...” (ED Consultant)

Similarly, the ED consultant suggests that, for the most part, members in spoke trauma units are not resentful to see cases transferred to the major trauma centre, as they feel that is where they belong. This mentality is fostered by the understanding that there is an insignificant decrease in workload.

While it helps to have managers who can anticipate and engage with conflict effectively, this will not negate the presence of conflict entirely. The presence of conflict is linked with evidence favouring the network and stakeholder perceptions of the network. It could be the conflict apparent in the data is a matter of 'growing pains' that naturally follow organisational restructuring. Finally, it appears that not all conflict is possible to tackle head on. As the data shows, stakeholders may express their resistance through apathy and disengagement. West *et al* (2003) discuss how leadership, clarity, and conflict management can improve participation, and quality of care, in medicine. The conflict present is not unique to this network; as Spain and Miller (2005) discuss members of the trauma community have been speaking out against over-specialisation, and in medicine itself, there is a history of conflict due to professional hierarchy (Raferty, Ball and Aiken, 2001).

4.e. Neutrality/Non-statutory status

Within the data, the interviewees discuss the decision not to base the network in any invested organisation. The director states that the network is not physically located and not authoritative

“The network therefore is a kind of a different organisation almost this regional non-statutory organisation, that is not real, it's a virtual organisation...” (Director)

The decision to be hosted within the ambulance trust was because of their neutrality in both the trauma and critical care networks

“... we wanted to be hosted by neutral organisation... so it made geographical and political sense to move us to an acute provider that was neutral in both the Major Trauma and Critical Care Networks.” (ICU Consultant)

As a resultant, the network has ties with the ambulance trust and service only, and the chair of the network is chief executive of the trust.

The ED doctor explains that by locating the management centre of the Trauma Network outside even the minor centres, they are able to retain a neutral, independent image. He states that it might not be hugely important but it helps disarm some more problematic parties

“... I think the perception then is that, ‘Oh this is all being run by the Major Trauma Centre’, and I think some colleagues in peripheral hospitals will not have a great problem with that. Others will have a significant problem with it.” (ED Doctor)

Similarly, the ICU consultant explains there have been requests regarding changes to the system which are most digestible when coming from the neutral trauma network rather than from the Major Trauma centre itself. The ED doctor agrees that, if the Trauma Network operates entirely out of the Major Trauma centre, then it reinforces the idea of hub-centric network.

As well as wanting to appear neutral, the director explains that, drawing on her own experiences from other trusts, it is important to avoid affiliation with service provider organisations. This is because these organisations can have expectations about network funding,

“... most of them (trauma networks) sit in the provider organisations and they are struggling... now they're now sitting in a provider organisation that's said ‘you have network budgets that's something that can come back into our organisation’...” (Director)

She provides strong evidence for this, as she mentions that someone located at the Major Trauma Centre initially expected to handle the finances for the entire major trauma network, because they understood that their centre would be paying for it.

Overall, the director appreciates being able to stand back and observe the trauma network and the Major Trauma centre without being situated directly within it. She states that they deliberately maintained neutrality, as a result of the initial move to create a strategic, service delivery network for trauma. She also explains how one partner she worked with in setting up the network has been extremely influential - favouring the network itself rather than any specific hospital

“... we sit there in a neutral organisation... this affords us a position of neutrality. We’ve got, fought hard to keep that”. (Director)

It is clear that for the founding members, neutrality was carefully considered and deemed non-negotiable. There are a number of obvious advantages although, as has been mentioned in previous sections, there is no support for funding or administrative aspects of the network. With regard to conflict and engagement, the benefits to neutrality likely outweigh the drawbacks. The value of this decision might become clearer with more comparisons to subsequent UK trauma networks. Because networks are virtual organisations, the choice to include strict agendas or let participants direct their organisation lies with the managers (Thomas *et al*, 2001).

CONCLUSION

In this study, I have examined secondary literature to identify an opportunity for a study of the foundation of the East Midlands trauma network to contribute to existing theoretical arguments. These include leadership during the implementation of service reorganisations, the difficult process of introducing multidisciplinary collaboration into healthcare services, and the effect of specialisation on the generalist nature of trauma medicine.

I have then used methodological theory to construct a study design that uses qualitative interview data to explore the research questions generated from my literature review. By coding the data and using a generalist inductive approach, I have been able to draw out concepts from the data and then summarise and synthesise them with evidence from existing literature. From this a number of conclusions about the foundations of the East Midlands trauma network have been drawn. It is clear that planning for the network's foundation has been heavily influenced by previous healthcare networks like the Critical Care network, as well as observations of other UK trauma networks.

Where implementation is a clear goal for the new network, management needs to be focused on building good communication and knowledge sharing practices to achieve the holistic, large-scale, organisational innovations they are hoping for. Unfortunately, the network board members have many service preoccupations that restrict them from being able to formulate effective strategies. In addition, the interviewees reported that resources are scarce with shortages of practitioner capacity, funding, and administrative workforce.

The reason the interviewees' discourse revolves heavily around service improvement strategies is because of the need to engage practitioners within their network. Concurrently, they have to prove value for money by building an evidence base through auditing, although initial research has shown decreases in mortality, which is unsurprising given the hub-and-spoke model of care is an evidence-based innovation.

While there are a range of perceptions of the network, and there is notable resistance and conflict surfacing during the implementation of the network, generally the role of the NUH as a Major Trauma centre, and the function of the new trauma system, are mostly accepted. Even so, the network leaders will have to continually monitor public and clinical engagement as more restructuring is anticipated, namely the development of rehabilitation services and the decision of what proportion of trauma cases will go through the central hub.

Overall, the leaders of the East Midlands trauma network have adopted a non-hierarchical, neutral approach to leadership, which focuses on service provision strategies, engaging participants through building an evidence base, and drawing upon experience of previous networks. Their input has been crucial in managing the implementation of the network, but due to the lack of innovations within the network thus far, their effect on innovation is unclear.

The production of an evidence base, focussed on service improvements and the knowledge-sharing potential of the trauma network, illustrate how it is furthering the specialisation of trauma medicine. The prioritisation of surgical interventions and prehospital care do show that holistic, ongoing care has taken a back seat, but it does not seem to be as a result of specialisation. It seems that specialist trauma services have been targeted for improvement, because of the political appeal and potential to reduce mortality. By default, rehabilitation services have been side-lined.

To summarise, it appears that leadership has been an important factor in facilitating the foundation of the East Midlands trauma network. While service improvement is an ideological goal, there is need for adequate leadership as innovations begin to emerge through clinical steering. The network appears to be handling the demands of multidisciplinary collaboration as shown by their no-blame policy, but there have been the expected levels of conflict and resistance. Also as expected, the specialisation of trauma care has led to an over-emphasis of acute services, but more holistic long-term care may be addressed in the near future.

So, in answer to my research question 'what role does leadership play in the foundation of a trauma network', there are a number of roles the East Midlands trauma leaders must fulfil. Firstly, the leaders outline the task of implementing the network, with limited physical resources to draw upon, but with a wealth of knowledge and previous experiences. For many participating as practitioners, this requires the duality of management and clinician outlined in the literature (Collins-Nakai, 2006, Waring and Currie, 2009). This appears to have been a partial success with the network meetings functioning as expected, but the rolling out of the network limited by issues like capacity. This is foreshadowed in the literature as virtual organisations are seen to need very structured implementation in order to generate predictable and positive outcomes (Thomas *et al*, 2001). It appears that the leaders are forced into maximum cost efficiency, even though it is accepted that bridging the gap between knowledge and practice is costly (Berwick, 2003).

The second role for leaders in the network is engaging the East Midlands trauma community and negotiating with resistance. You could describe this as the active dissemination style of leadership for innovation (Greenhalgh *et al*, 2004). The resistance within the network is typical for healthcare restructuring, as is the role of leaders as mediators (Waring and Currie, 2009). Engaging the community is recognised as important by the participants and the literature shows it is essential for maintaining authority (Bacon and Borthwick, 2012). Fostering knowledge sharing and cooperation means losing autonomy and requires altruism (Kimble, Grenier and Goglio-Primard, 2010), which can be difficult to promote, but the data shows that this culture is emerging.

The third role is linked closely to the second, but is distinct - whereas the second is active engagement with the community, the third involves fostering useful perceptions of the network. This is through presenting evidence that the network is functioning as intended but also that both patients and practitioners are benefitting. While this is known to be the case from the literature (Lamontagne *et al*, 2011), it is difficult to convince the community of it. The urge to see clinical

leadership reflects fears of corruption from management culture (Nemerato, Salvatore and Fattore, 2011), which is why it's important the network is seen as having high clinician acceptance.

While the leaders of the network try to emphasise the benefits of the Major Trauma centre system of care, there are still typical concerns of deskilling (Kim *et al*, 2003). However, the data shows there are those in the community who do recognise that trauma cases are not a defining part of their profession (Spain and Miller, 2005). As well as concerns of deskilling, the leaders also have to deal with concerns of favouring acute care. The data repeatedly shows the short-sightedness of the network in not considering the whole trauma care pathway. This is a commonly accepted side-effect of specialisation (Donini-Lenhoff and Hendrick, 2000, Moore and Showstack, 2003).

During this study, all data has been anonymised and kept confidential. I have remained aware of the ethical implications of presenting a critical account of a recent and politically charged innovation in healthcare policy. Although some of the interview responses are emotionally charged, none of them appear to cause participant distress or present a risk to their well-being. Also, my findings are subject to validity constraints as they have been produced by a novice researcher who is an outsider to the field of healthcare leadership.

As this study is primarily exploratory, there are opportunities for subsequent research to expand on these findings. Future research on this topic could compare other trauma networks with this East Midlands one. There is also the option of comparing this trauma network with any rehabilitation networks that might be founded in the future. Also, this study draws upon managerial perspectives and so, after the network is fully founded, it might help to gain the lower-level practitioners' point of view. There is also potential to compare the experience of the trauma network in both hub and spoke centres of the model.

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