



Implementing trauma systems: key issues for the NHS



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This report has been developed in conjunction with the Ambulance Service Network. For further details of the Ambulance Service Network, please visit www.nhsconfed.org/asn or contact Jo Webber on 020 7074 3214 or at jo.webber@nhsconfed.org

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Executive summary

Trauma is the main cause of death in the first four decades of life and a leading cause of disability. Following a series of high-profile reports it is recognised that, while emergency care has improved, treatment for victims of major injury could be improved and coordinating trauma services is now a priority for the NHS. There is significant variation in outcomes across the system. Better organisation of care could ensure consistently higher standards of care. Evidence suggests that introducing trauma systems can reduce mortality rates by around 10 per cent, more efficiently use the £300-400m spending on emergency care for major injuries and contribute to reducing the estimated £3.3bn - £3.7bn annual economic cost of trauma.

The new coalition Government has confirmed that trauma systems should be developed by March 2011, and implemented the following year. This report highlights the key questions that regional commissioners and trauma care providers (ambulance services, hospitals, and rehabilitation units) will need to address to develop regionally appropriate changes to save more lives and reduce long-term disability.

Improvements to outcomes are most likely to be achieved, according to the evidence, by organising services strategically at a regional level. No one part of the system is likely to achieve this on its own. Therefore commissioners and providers need to collaborate to improve the whole pathway of care.

Commissioners and public health professionals, including GPs and local government, will need to understand the incidence of major injury in their locality so that they can implement interventions to **prevent** and reduce trauma from occurring, as well as guiding long-term strategic plans.

Ambulance services will clearly be key to delivering trauma systems, at both the emergency response and in transferring

patients to specialist services. While rapid response is desirable, time taken to arrive on the scene is not the main factor in improving outcomes. The National Confidential Enquiry into Patient Outcomes and Death (NCEPOD) recommended that greater priority is given to transfer major injury victims to a receiving emergency hospital following appropriate (but usually minimal) management and intervention on the scene. The evidence does not yet support the reliance on advanced care and triage of major trauma by ambulance services. However, there are pilots currently underway to test future development in these areas.

Emergency departments of receiving hospitals need to meet accepted standards, including rapid access to CT scans for brain injured patients and consultant-led trauma teams. Not all hospitals will be able to sustain a Level 1 major trauma service but all emergency departments need to be prepared to manage and stabilise major injuries. All receiving hospitals will also be required to submit outcome data to the Trauma and Audit Research Network (TARN).

At present there are unmet needs for **specialist surgery and critical care**, resulting in delays in transfers or sub-optimal outcomes due to lack of access. The primary aim of trauma systems should be to coordinate these aspects of care to ensure that specialist beds are not blocked and that transfers are not delayed. There may be insufficient capacity in some areas, especially as initial survival rates improve.

The need for **critical care transfers** is likely to increase as more patients are taken to specialist facilities. Ensuring the efficient use of existing capacity to reduce non-clinical transfers will play a part. More active commissioning of transfers (as well as emergency response services) from ambulance providers will be necessary.

With more victims of major injury surviving, trauma systems will need to address the likely increasing need for **long-term rehabilitation**, both in inpatient settings and in the community. This aspect of the pathway has not yet been sufficiently audited and understood, but is key to ensuring that the whole trauma system can operate efficiently.

This report also analyses the key issues and summarises the debates surrounding trauma system development. It stresses the overall importance of dynamic quality improvement through whole system coordination in achieving better outcomes. This requires collection, publication and analysis of data on activity, standards and outcomes from all parts of the system.

The report emphasises that a single model will not be appropriate for all localities. In particular, smaller hospitals in rural areas will have to plan (and invest) to be able to manage and stabilise major trauma victims where a direct bypass model is not feasible. Coordinating major trauma services, while requiring some reallocation of facilities, does not in itself require the closure of local

emergency departments, although it may be part of wider system changes.

The evidence on the impact of volume on outcomes is complex and suggests that facilities, skills and seniority, rather than the level of throughput, are the key to safety. Learning from this, decisions about the location of major trauma centres should be based on standards and modelled need, rather than simply on high volume.

From a financial point of view, better coordination and matching needs with services should lead to improved cost effectiveness. However, achieving cost reductions is unlikely. It is expected that increasing consultant presence in emergency departments, increasing the provision of intensive care beds and meeting probable rising need for rehabilitation will require greater investment and long-term spending. In the current climate this will need to be met from efficiencies elsewhere in the health system. However, the evidence from a range of studies now indicates strongly that this will be an investment worth making to save lives and reduce disability.

Introduction

Trauma – serious injury that could result in death or serious disability – is the main cause of death in the first four decades of life and a leading cause of disability. A series of recent high-profile reports, including the National Audit Office (NAO)'s *Major trauma care in England*, has made trauma a national priority for the NHS. While emergency care access and quality have improved since the NHS plan in 2000, professional opinion and evidence from reviews of patient care show that trauma care in England is in need of urgent attention.

The former Government recognised the importance of improving trauma care and the new coalition Government has reaffirmed the need to focus on improving clinical quality. Recommendations on trauma care featured in Professor Ara Darzi's 2008 NHS Next Stage Review and its regional plans, and a national clinical director was appointed in 2009.

Following the NAO report, the chief executive for the NHS in England told the Public Accounts Committee in March 2010 that all regions are expected to make plans for regional trauma networks in 2010/11 and that they should begin operating in 2011. The revised NHS Operating Framework for 2010/11 reaffirms the commitment of the coalition Government to implementing trauma reorganisations. It says: "The National Audit Office report published in February 2010 set out the need to improve the planning and design of major trauma networks. Proposals to raise the standard of trauma care should proceed this year."

About this report

This report is aimed at the NHS clinicians, service managers and commissioners who will be responsible for planning and implementing improvements in trauma care and its organisation. It highlights the key questions that

regions will need to address and the challenges to making it happen, specifically the need to:

- collect and submit data to the national audit so that service outcomes are made transparent and changes can be based on results
- plan now for networks, looking at the whole pathway and using the evidence to ensure they meet local need
- involve patients and the public at an early stage of the planning
- use 'volume-outcome' evidence with caution
- avoid simply designating trauma centre status
- bear in mind the need for longer-term investment.

This Ambulance Service Network (ASN) and NHS Confederation report will help service leaders to think through the necessary changes to trauma services. Section one highlights key issues for improving the care of major trauma patients from prevention to rehabilitation, and section two analyses the theory and evidence behind trauma system design and discusses the key debates in the literature. It should be read alongside the more detailed work being undertaken by the trauma clinical advisory groups, expected later in 2010.

The impact of trauma

Severe injury, measured as greater than 15 on the injury severity score (ISS) scale, occurs about 20,000 times per year in England. This means a smaller district general hospital will see fewer than two patients with severe trauma per week (larger emergency departments see just over one per day, on average) (Lecky, 2009). However, while severe trauma is relatively rare, it also has a very high impact.

It is the fourth largest cause of death in the UK, and the number one cause of death in the first four decades of life. For every life lost to major trauma, there are two victims who live on with severe or permanent injury (National Confidential Enquiry into Patient Outcome and Death (NCEPOD), 2007).

The long-term impact on victims also leads to long-term costs for society through health and care costs. The NAO estimated that immediate emergency and hospital care for major trauma costs the NHS in England between £300 and £400 million per year. Beyond the immediate health impact, the younger age profile of trauma victims also means that poor outcomes impact on economic productivity. For example, 78 per cent of young major trauma survivors reported disability after five years, with 17 per cent (of all survivors) reporting inability to work as a result (Evans et al, 2003). The NAO report estimated that the lost economic output as a result of trauma is between £3.3bn and £3.7bn per year (2007 prices).

Trauma care – the scope for improvement

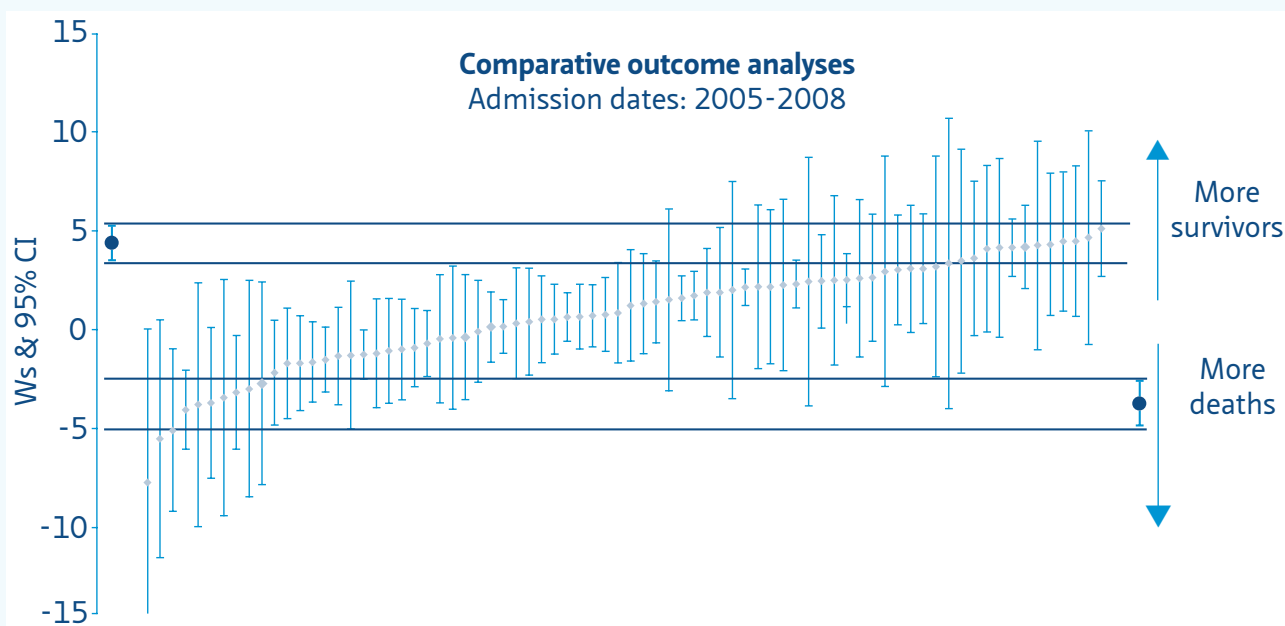
It is important to ensure that the NHS provides the best and most efficient care throughout the trauma pathway. Recent reviews of service provision have found areas for improvement and made a range of recommendations relating to processes of care.

- A report by the Royal College of Surgeons of England and the British Orthopaedic Association (2000) noted shortcomings of care provision in England.
- An audit by NCEPOD reviewed 795 cases in 2006, finding that almost 60 per cent of patients received a standard of care that was defined as 'less than good practice' (2007: 8).
- The NAO has also investigated trauma care and criticised the lack of progress since the early 1990s in both implementation of its previous recommendations and in improvements in outcomes.
- Making a comparison with outcomes in the US, the NAO estimated that mortality for patients admitted for major trauma in England was 20 per cent higher (2010: 4).
- A joint group of royal colleges produced commissioning guidance re-affirming the case for coordinating trauma care (Intercollegiate Group, 2009).

Some of these criticisms have been contested. For example, as yet unpublished data from the Trauma Audit and Research Network (TARN) suggests there have been improvements in outcomes since 2003 (TARN, personal communication). The comparison with the US is also risky. There is a higher incidence of trauma in the US, making investment more economical. The prospect of England achieving parity in facilities and outcomes with the US may be unrealistic.

The NAO also presents evidence from TARN that shows outcomes vary significantly across the country. This may be a result of the inconsistent provision of good practice care, including access problems within the system, although the data do not link variations in outcomes with variations in practice.

While some variation would be expected statistically, the data in figure 1 (see page 8) suggest there are several hospitals achieving a spread of outcomes below those expected, and a significant gap between the top ten and bottom ten hospitals. This evidence, with the NCEPOD audit and professional opinion, strongly suggests that provision of trauma care could be improved.

Figure 1: Unexpected deaths or unexpected survivors per 100 trauma cases

Source: Trauma and Audit Research Network, reprinted from NAO, 2010.

Preparing for change in 2011

The momentum for implementing improvements to trauma care appears to be reaching a tipping point and there is an opportunity now for NHS leaders and staff to implement improvements to trauma care while there is political and professional appetite and improved public focus. However, while the imperative to improve services is clear and shared, the path to improvement is not simple or universal. Some apparently simple solutions – for example, designating a major trauma centre – have been shown to be unsuccessful unless they are part of a whole system approach. Service leaders need to consider the whole pathway and take account of the evidence before making plans. The usual challenges involved in delivering service changes also need to be considered.

A series of reports, the national and regional Darzi reviews, the appointment of a national clinical director and a major NAO inquiry all indicate that crucial recommendations will now be implemented. All regions are expected to make plans for creating trauma networks during

2010/11 – similar to the cancer networks established after the Cancer Plan – with implementation expected from 2011 at the latest. This gives the NHS a short deadline to review current services, make plans and prepare for significant change.

Methodology

To help our members navigate these issues, the NHS Confederation and its Ambulance Service Network (ASN) brought together experts, stakeholders and practitioners for a workshop in autumn 2009 to explore what trauma networks could look like. This report sets out the key points from that discussion and from the recent reports to help regional planners develop proposals and to move towards implementation.

We are particularly grateful to Professor Jon Nicholl, Dr Fiona Lecky and Dr Kathy Rowan who presented at the workshop, and Professor Andy Newton who provided comments and on whose insights this paper draws. A full list of workshop participants is available in the appendix (see page 26).

Section 1: Changing the trauma pathway

The NAO, royal colleges and NCEPOD have made specific recommendations and detailed guidance will be provided by the trauma clinical advisory groups later in 2010. In the meantime, in this section we highlight the key issues to bear in mind for improving the care of major trauma patients from prevention to rehabilitation.

Improving the whole patient pathway

As we emphasise in section 2, simply designating trauma centres will not be enough to achieve improved quality of care for major trauma. Rather, detailed improvements need to be made across the whole patient pathway. Figure 2 describes the NAO's summary of the current trauma pathway.

Integrating prevention into major trauma plans

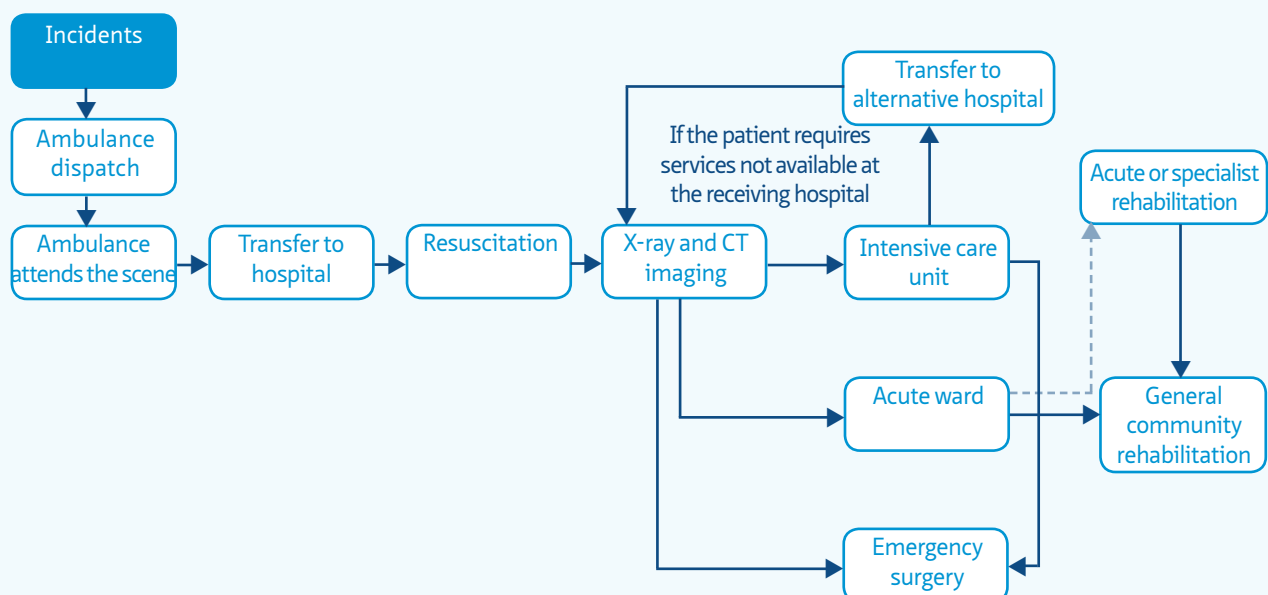
Most of the discussion about trauma improvement – including NCEPOD and regional Darzi reports – has so far focused on the organisation and provision of care. But it is likely

that greater total population health benefits can be achieved through preventing injury in the first place.

There is evidence, reviewed by the Cochrane Collaboration for the effectiveness of public health interventions, to suggest that interventions can prevent injuries on the road, in the workplace and at home. While this is not the focus of this report, local and regional strategies should take account of the balance between public health and healthcare investments.

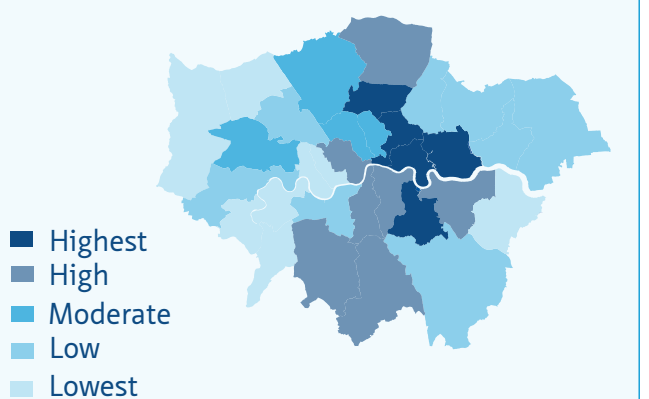
And an understanding of the epidemiology of trauma may also enable service leaders to plan for variations in volume between different locations, periods of the week, seasons and long-term cycles. For example, Healthcare for London's consultation on the trauma service changes in 2009 mapped variation in trauma incidence to show the need for services accessible to central boroughs (see figure 3 overleaf).

Figure 2: The current patient pathway for major trauma



Source: National Audit Office, 2010.

Figure 3: Where major trauma incidents happen in London



Source: Healthcare for London, 2009.

Ambulance response times and time on scene

High quality pre-hospital care and timely transfer to the most appropriate facility are key to making a trauma system work. The main focus for policy affecting ambulance services has been on improved response times. Performance measured by this indicator has improved and further progress remains a priority to ensure timely access to ambulance service care.

NCEPOD's audit of major trauma cases found that most were reached in less than 15 minutes, with the largest group reached between six and ten minutes. But the audit showed no difference in outcome, whether

a patient was reached at six minutes or 20 minutes (with implications for the emphasis on eight-minute ambulance response times). See figure 4.

NCEPOD was more critical about the amount of time spent at the scene of the injury. According to NCEPOD's advisers, 'good practice' suggests spending less than ten minutes on the scene, but ambulances were frequently spending longer without evidence to show that the length of time at scene had affected the outcome (see figure 5).

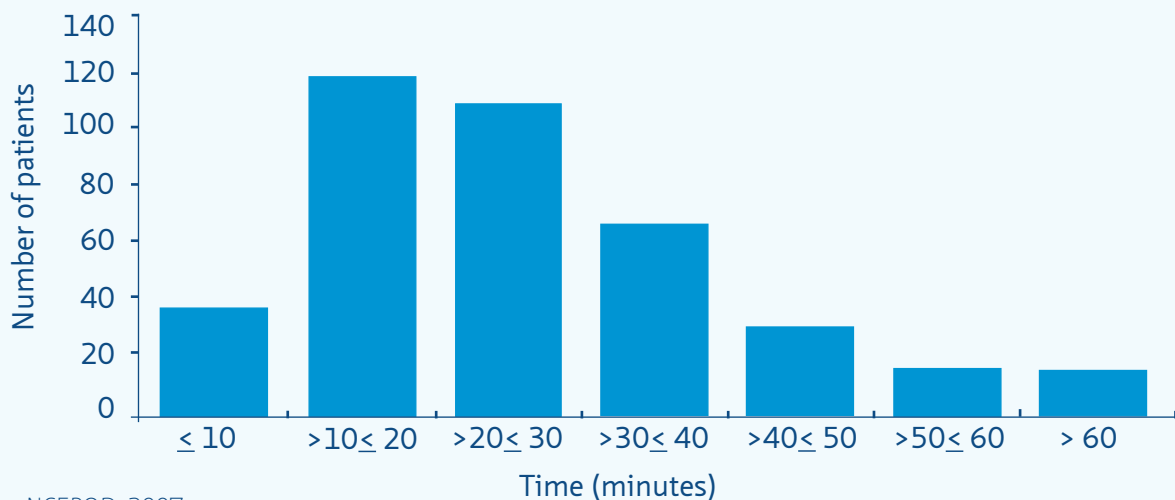
TARN audit data also shows that pre-hospital crews spend on average 0.4 hours at the scene, whether or not they are treating severe injuries. And evidence cited by NCEPOD suggests that ambulance crews attempt to carry out assessments on site, rather than prioritising transfer to hospital.

Some debate about the arguments for developing advanced care in the pre-hospital phase remains, including advanced paramedics and doctors in ambulances. The argument in favour is that advanced practitioners can improve decision making and provide more specialist care on the scene. However, increased intervention on the scene tends to delay transfer to definitive care, and depends on triage at the point of dispatch. Banken et al's

Figure 4: Prehospital response times (minutes) and patient outcome at 72 hours

	Alive	Deceased	Total	% Mortality
0-5	72	20	92	21.7
6-10	111	18	129	14.0
11-15	66	12	78	15.4
16-20	40	6	46	13.0
21-25	24	6	30	20.0
26-30	7	2	9	22.2
>30	11	2	13	15.4

Source: NCEPOD, 2007.

Figure 5: Length of time at scene of injury

Source: NCEPOD, 2007.

comprehensive literature review (2006) did not find sufficient evidence to support the roll out of this model (in Quebec), particularly for trauma care where time to definitive treatment was seen as the highest clinical priority.

Service developers will need to watch the evaluation of innovations and pilots to reach a suitable solution for their health economy and geographical circumstances. For example, South East Coast Ambulance Service NHS Trust has developed an innovative critical care paramedic service that is currently being evaluated (see case study on page 12). Local service leaders should also audit current practice and compliance with standards in their area, particularly the balance between intervening on site and transfer to hospital.

Triage and direct or indirect transfer

A key recommendation in the NAO report is that trauma networks prioritise the implementation of triage protocols. In particular the Intercollegiate Group suggests that direct transfer to a major trauma centre is preferable to indirect transfer via a local trauma unit, with indirect transfer via initial treatment at a local hospital increasing the risk of death by 1.5 to five times (Intercollegiate Group, 2009).

However, academic research is less conclusive. A number of studies raised doubts about indirect transfer models but Rivara et al concluded in 2008 that transfer status (whether a patient was directly or indirectly transferred) was not an important determinant of outcome for moderate to severe injuries. In relation to traumatic brain injury (TBI), a recent review by the National Institute for Health and Clinical Excellence (NICE, 2007) did not find sufficient evidence to recommend triage by ambulance services and direct transfer to a neurosurgical centre for all victims. Clearly this does not preclude local trauma systems from implementing direct transfer protocols, especially where extra distances are less significant and there is capacity at the major trauma centre 'hub'. However, trauma system planners need to understand the risks that may be associated with relying on triage.

Under triage of major trauma

Some major trauma is easily diagnosed and protocols can be established for direct transfer. However, in practice some major trauma victims are harder to diagnose in the pre-hospital phase. For example, Cooke et al (1999) found that over 20 per cent of serious

Case study – South East Coast Ambulance Service NHS Trust critical care paramedic pilot

The South East Coast Ambulance Service critical care paramedic (CCP) programme is modelled on Melbourne, Australia's very successful mobile intensive care paramedic (MICA) scheme.

The project takes experienced paramedics and provides them with an additional year of specialist training to enable them to manage the most seriously ill and injured patients more effectively. The curriculum was developed with a grant from the NHS Challenge fund and is delivered through a combination of classroom, clinical simulation and hospital placement-based teaching by senior clinicians. One CCP crew is planned for each PCT area and are selectively tasked by ambulance control to the more critical calls; they typically treat four times as many patients needing resuscitation and trauma care than other paramedic units.

The combination of increased training and increased exposure to the sickest patients, means that clinical skills are well honed and practised frequently, and ensures that the most experienced paramedics are available to the patients who need them most. The scheme was devised with both improving patient outcome and efficiency in mind and required no additional staff or training costs. An NHS Service Delivery and Organisation (SDO) Network evaluation is underway in an attempt to determine which aspects are most important in achieving quality improvements.

injuries were under-triaged at the point of dispatch. Added to that, about 5 per cent of major trauma patients self-referred to the local emergency department in a Sheffield study (Nicholl et al, 1997).

Even for identified major trauma victims there may be clinical reasons for indirect transfer and for the ambulance to take them to the nearest non-major trauma centre. For example, where a patient's airway is blocked by a complex injury, in some cases intubation should be undertaken in a hospital setting with anaesthetist input rather than attempted at the scene by paramedics. In these cases, attempting direct transfer to a distant major trauma centre without the airway being secured would risk adverse outcomes.

Therefore, even if pre-hospital triage and direct transfer is part of a trauma system's plan, facilities and protocols for unplanned trauma cases would still be required in all emergency departments receiving non-major trauma victims.

Over-triage of non-major trauma

Over-triage creates inefficiencies for the ambulance service. Ambulances are tied up in long round trips to major centres, patients who experience a delay in their care are put at risk, and there's an impact on other patients in major trauma centres whose quality of care can suffer – as discussed in section 2 – in excessively busy emergency departments.

International studies by Esposito (1995), Kann (2007) and Macken and Manovel (2005) found that the positive predictive value of pre-hospital triage systems was between 19 per cent and 25 per cent, meaning that four out of five patients taken to the trauma centre in a direct transfer model were unlikely to benefit from the higher level of service. Similarly, Lerner (2006) found that pre-hospital triage criteria only had a specificity of 8 per cent, meaning 92 per cent of non-major trauma patients were incorrectly triaged as major trauma.

Improving triage

Recent research suggests triage accuracy has

the potential to be improved (for example Lehmann et al, 2009). London Ambulance Service NHS Trust began testing a new triage tool in April 2010 that aims to improve the differentiation of those who require major trauma centre treatment. Evaluation of this

new tool should help inform approaches across the rest of the country. And local managers and planners may wish to take into account the fact that triage is an emerging science and cannot yet be relied on as the only model of pre-hospital care.

London's major trauma decision tree

The Healthcare for London Major Trauma Project was established in 2007. An essential aspect of this was the development of a triage tool to enable ambulance crews to identify those patients who would benefit from conveyance directly to a major trauma centre equipped to deal with the most seriously injured patients. The tool was adapted from the American College of Surgeons field triage decision scheme. The design of the London decision tree used experience from other algorithms to make it simple to follow.

The tool is based on four steps for patients who have been subject to traumatic injury. If a patient triggers on any step they are conveyed to a major trauma centre, bypassing their local trauma unit.

- **Step one** identifies patients whose physiology is deranged following injury. This includes their Glasgow coma scale and vital signs.
- **Step two** identifies patients whose anatomy of injury indicates they are at high risk. This includes penetrating injuries to the neck, chest, abdomen or groin and suspected fractures of the skull or pelvis.
- **Step three** identifies patients whose mechanism of injury puts them at risk. This includes falls of more than 20 feet, and 'one unders' (patients under a train).
- **Step four** includes injured patients with other risk factors such as obesity or pregnancy who may benefit from admission to a major trauma centre.

All London Ambulance Service frontline personnel have been trained in the use of the decision tree. Other pre-hospital care providers such as HEMS (Helicopter Emergency Medical Service) are also using the tool.

A clinical coordination desk has been established within the emergency operations centre to:

- provide crews with assistance in decision making where necessary, both in trauma cases and where general treatment advice is required
- monitor the patients who are being taken to one of the major trauma centres. This allows a degree of flexibility to redirect some patients to another major trauma centre if a large number of patients have been taken to one of the centres with a short timeframe.

Experience since go-live date

The London Trauma System went live on 6 April 2010 and data is being collected to evaluate its effectiveness. This involves identifying on which steps the tree is being triggered, and linking this to the injury severity of those patients who triggered the tree and were transported to major trauma centres. This will indicate the degree of over-triage the tool is delivering and a decision will then be taken about any necessary adjustments.

Meeting major trauma standards in emergency departments and surgery

NCEPOD and the NAO reports, as well as the Intercollegiate Group guidance, have consistently emphasised the gap between established standards for major trauma treatment in emergency departments, and that provided in hospitals currently receiving major trauma patients. For example, they are clear that major trauma care should be led by a consultant with timely access to CT scanners and round-the-clock specialist surgery.

They also point out problems with:

- trauma teams not being established in emergency departments
- trauma patients not being assessed by a consultant
- lack of consultant presence at nights and weekends, when trauma is more likely to occur
- patients needing a CT scan but not receiving one, or delays in scans being conducted
- lack of provision of specialist surgery out of hours
- delays in access to surgery due to lack of internal coordination of care for trauma.

(NAO, 2010)

These shortcomings are acknowledged by the NHS, and they should be addressed during development of trauma systems. But designating major trauma centres is only part of the process and a major challenge will be

investing in facilities and staffing to meet quality standards. Given the likelihood of many trauma patients still being treated in local hospitals, investments are likely to be required in local trauma units, not just in the major hubs. For context, the College of Emergency Medicine has called for a near-tripling of emergency medicine consultants to meet international standards (CEM, 2010).

Coordinating specialist and critical care access

Outcomes are not only determined by the pre-hospital and emergency phase. After initial surgery, major trauma patients continue to need specialist critical care with intensive medical and nursing supervision. This is likely to include a spell in intensive care (also known as intensive therapy) followed by high dependency care and they may also require specialist supervision, for example in a neurosurgery ward. TARN and Intensive Care National Audit and Research Centre (ICNARC) data also highlight a gap between the need for and access to specialist critical care, with delays in transfers or lack of access to the right specialist unit (Lecky, 2009; Rowan, 2009).

We know that when patients with traumatic brain injury do not have access to specialist neurosurgical centres there are adverse impacts on outcomes, as figure 6 shows.

The primary aim of developing trauma systems should be to coordinate access to critical and specialist care across the network. At present, access to critical or specialist care is determined by the receiving centre and it has been argued

Figure 6:

	Non-neurosurgical centres	Neurosurgical centres
Number of patients	4916	3505
Deaths	1624 (61%)	1406 (35%)

Source: Patel et al, 2005.

that responsibility for specialist care for patients with major trauma should lie with the trauma system, rather than with the referring hospital. The new trauma systems will have to change the process and the culture from a 'push' to a 'pull' system to one where the trauma system identifies an appropriate location for treating major trauma victims and manages the care from when the patient is identified as a specialist case.

The problems accessing critical care may also reflect overall capacity shortages. For example, in the last decade high dependency beds have increased by over 100 per cent but intensive care capacity has only gone up by a quarter (see figure 7), potentially below the increase in need. Overall capacity is also stretched by blockages in the flow of patients between different levels of care. Planners will need to address this in plans

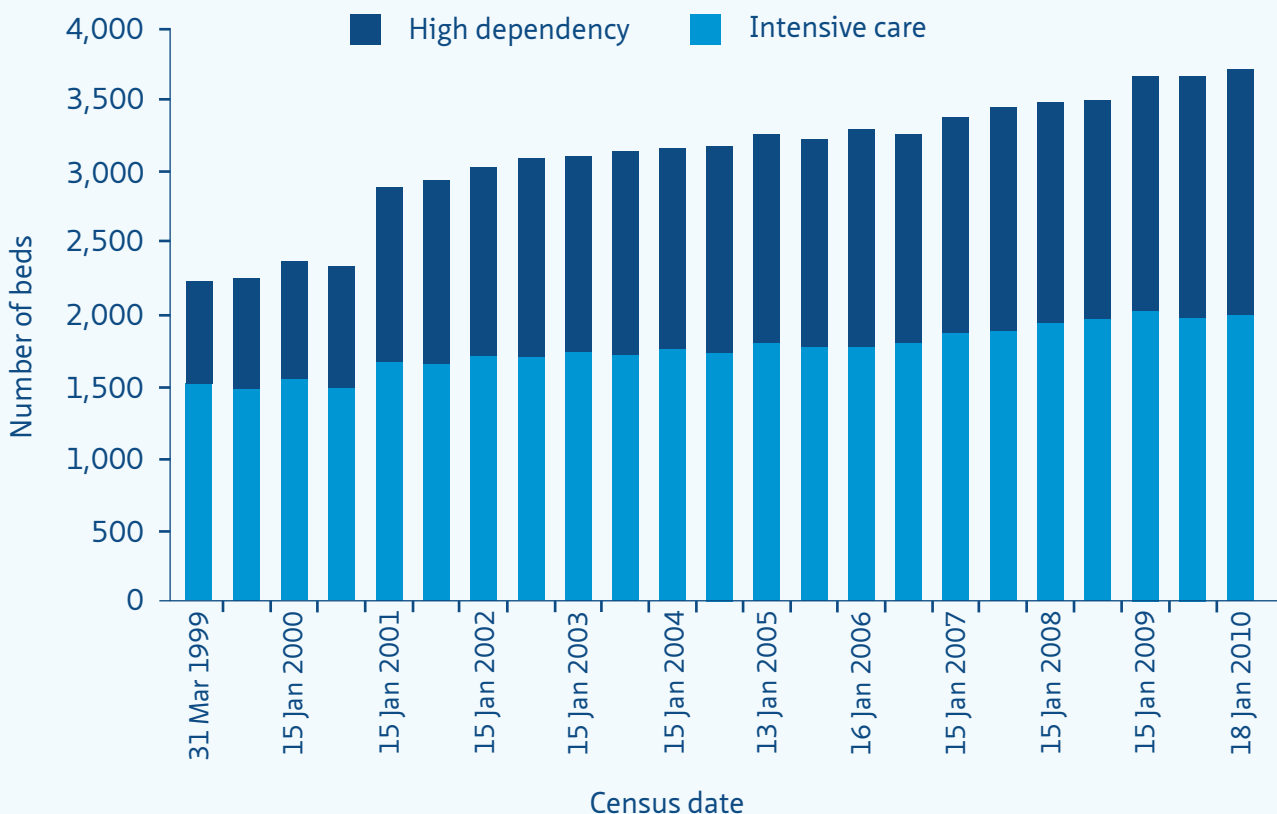
for trauma systems to ensure the appropriate and efficient use of critical care and access for major trauma patients.

Critical care transfers

A direct implication of creating a trauma system – whether or not a bypass model is preferred – is that some critically injured patients will need to be transferred between hospitals to receive the specialist care they need. This will require planning on the part of local critical care networks that currently coordinate transfers of the critically ill according to standards set by the Intensive Care Society (ICS), including protocols and effective systems for managing and staffing transfer journeys.

Critical care transfers are risky and complex but there are ways to make complex transfers safer, including retrieval models where the specialist

Figure 7: Number of open and staffed adult critical care beds on the census day



Source: DH, 2010.

unit sends a team to supervise the transfer. So a starting point would be a thorough analysis of current transfer needs and modelling of future demand.

Ambulance services have, to date, been commissioned and performance managed primarily on their initial responses to emergencies, rather than on the quality of transfer services. As NCEPOD showed, emergency response times are less important in determining outcomes than the subsequent treatment that patients receive – which is more dependent on timely and safe transfers. If transfers are going to become a core ambulance service requirement they will need more formal recognition and to be commissioned and performance managed to ensure timeliness and quality.

We know that one third of transfers are currently for non-clinical reasons (Rowan, 2009). The ICS guidance emphasises that transfers for capacity reasons alone should be a last resort (ICS, 2002) as it carries a risk to patients and cost to services. Better provision and organisation of critical and rehabilitative care capacity could smooth the flows of patients and reduce the need for transfers for those without a clinical need to do so. The rate of non-clinical transfers could be used as an indicator to help local health economies benchmark to reduce inappropriate transfers and direct resources to transferring those with an urgent clinical need.

The coalition Government is placing greater emphasis on plurality of provision and competition. This is likely to affect ambulance

services, with commissioners expected to stimulate markets and encourage new entrants to provide urgent and emergency care. Commissioners and providers may need to consider how stronger market principles will apply in the provision of critical care transfers, and engage with alternative providers to ensure that safety and continuity of care are maintained.

Post-acute care rehabilitation – unfinished business?

The high-profile inquiries by NAO, NCEPOD and the Intercollegiate Group primarily focused on the emergency care phase rather than the acute phase of major trauma care. The programme for implementing a major trauma system in London has also predominantly focused on the emergency service organisation.

The NAO highlighted concerns about lack of capacity in rehabilitation and delays in accessing these services, despite evidence that timely access to rehabilitation affects length of stay and outcomes. Delegates at our ASN workshop in autumn 2009 suggested that many of the delays in the system can be traced to delays in rehabilitation rather than to the organisation of the front end of the care pathway. Developing integrated trauma systems will therefore need to address the whole pathway. However, neither NCEPOD, the Intercollegiate Group nor the NAO have conducted a thorough audit of trauma rehabilitation and this remains an urgent task. The NHS Confederation plans to convene a follow-up workshop on this specific issue to ensure it is not ignored.

Section 2: Trauma systems – evidence analysis and discussion

The main recommendation from the NAO and NCEPOD, repeated by royal colleges, to deliver trauma service improvements is for the NHS to implement regional trauma networks. Responding, the chief executive of the NHS in England assured MPs in March 2010 that all regions would be required to implement trauma networks by 2011, and therefore now is the time for the NHS to be planning for implementation. This section summarises the discussion from our workshop in autumn 2009 and some of the key questions that will need to be addressed to make them work most effectively.

The concept of a trauma network is that services are coordinated regionally, similar to the cancer networks established after the Cancer Plan. Rather than trying to treat all injured patients at local hospitals, operating discretely from each other and where facilities could be inadequate, trauma networks will coordinate care so that designated centres are equipped to deal with major trauma, supported by ambulance services and local trauma units with protocols to stabilise and transfer those patients requiring specialist care.

The term 'network' describes the components required for delivering high-quality trauma care but it is helpful to view it as a dynamic 'system' that is actively managed and constantly developed.

There is evidence to suggest that creating 'trauma systems' with highly specialist hubs supported by networks of local services can improve outcomes. However, the debate about mechanisms for achieving this is ongoing. As they make plans for implementing trauma systems from 2011, NHS planners will need to examine the evidence carefully so that lessons can be applied to their regions.

The aims of a trauma system

The main aim of setting up trauma systems is clearly to improve quality. This should be monitored ultimately by outcomes, but important clinical process measures should enable planners to evaluate existing practice and the success of any changes. Before implementing a system it will be necessary to review current practice. Requiring submission of data to the TARN as a condition of participation in a trauma network will be an important step.

Organising trauma care into systems will help improve the provision of the right care at the right place at the right time, but reorganisation alone is not the solution. Clinicians and managers need to transform frontline clinical practice (see section one) to improve outcomes and achieve the benefits of service reorganisation.

Is there a single model?

Much of the debate about improving trauma services, and acute service organisation more generally, is conducted at a national level but this risks over-generalisation and applying single models to the whole country. It is therefore crucial that health systems audit how their trauma care is organised and delivered before deciding on a particular model for reorganisation. Making sure services meet local need should be an explicit objective of thinking about trauma service reorganisation to make sure one-size approaches are not used inappropriately.

Some areas have historic multi-specialty hubs at the centre of population centres that can be relatively easily developed into major trauma centres. In densely populated areas with several local hospitals around central hubs, trauma systems can be developed with

protocols for ambulances to bypass local hospitals for major trauma without risking significant delays to life-saving treatment. However, other parts of the country have lower population and hospital density meaning indirect transfer models are more appropriate. And some areas have networked tertiary services in different locations rather than a single hub. Without completely reorganising and rebuilding all the specialist services in the area to create a hub and spoke system, alternative models of major trauma care will need to be developed.

Trauma and the service reconfiguration debate

As with all reconfiguration, trauma service changes need to be developed in collaboration with specialist and primary care clinicians, patients and the public to ensure that they meet their needs and expectations. An Independent Reconfiguration Panel report in 2009 reviewed the lessons learned from reviews of service change proposals and highlighted effective early engagement as one of the key weaknesses of local NHS planning processes, leading to increased risk of referral by overview and scrutiny committees. The Secretary of State for Health has set out the criteria that he expects service changes to meet, including clinical (particularly GP) leadership and local public support. Public, patient and staff representatives are more likely to be champions of change if the outcome benefits can be demonstrated, and proposals meet the local geographical requirements.

Fear of losing services for major injuries – where the assumption is that closeness, rather than specialism, is key to saving lives – is a significant concern for many local residents so it is important to reiterate that trauma is a relatively rare event, with on average only two cases per district general hospital per week. There may be good clinical arguments for reorganising care for patients with severe injury, but this should not determine the

whole acute system. Therefore a positive case for improvement for this patient group may alleviate some concerns about reconfiguration. That said, as this report has shown there are good arguments for retaining service capacity locally in less densely populated areas. Where there is evidence to support centralising services, losing two patients per week is not, on its own, a sufficient driver for centralising all acute emergency care from a general hospital and hollowing out services. Wider reasons will need to be given to justify more comprehensive service changes.

How do we know that trauma systems improve outcomes?

NCEPOD, Intercollegiate Group and NAO reports have all recommended trauma systems or networks as the way forward, and this now has national impetus. The evidence for creating trauma systems has historically been contested, with problems in comparing different systems, or before and after studies, and in isolating the impact of reorganisation itself. Two recent systematic reviews concluded that treating trauma patients in higher level trauma centres compared with lower level centres can achieve a reduction of 10-20 per cent of in-hospital mortality (Mann et al, 1999; Celso, 2006).

However, achieving these benefits is not automatic and requires more than simply designating a major trauma centre. Improving outcomes requires:

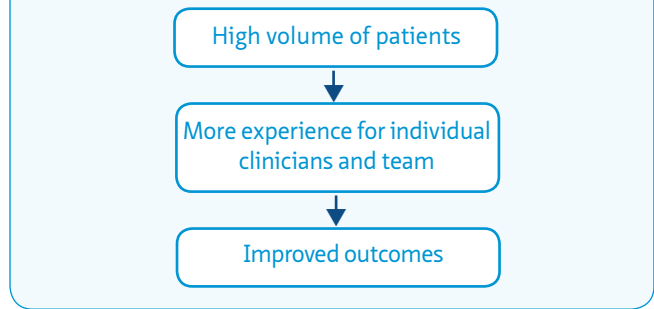
- effective organisation of resources and facilities to ensure that higher level trauma centre standards can be met
- sorting and transferring patients to the most appropriate centre
- ongoing sharing of learning and expertise, coordinated training including rotations between different parts of the system, continuing re-evaluation of the system and revisions to plans to meet changing needs and practice.

Is concentrating volume sufficient to improve outcomes?

NHS planners need to understand how having trauma systems in place will improve outcomes, and learn from previous unsuccessful pilots. The 2007 NCEPOD report suggested that high volume centres tended to have higher chances of delivering good practice care. The Intercollegiate Group guidelines for commissioners repeat this claim, on the basis that clinicians will have more exposure to major trauma cases.

The common interpretation of the relationship between volume and outcomes is summarised in figure 8.

Figure 8: Quality-volume relationship: traditional interpretation



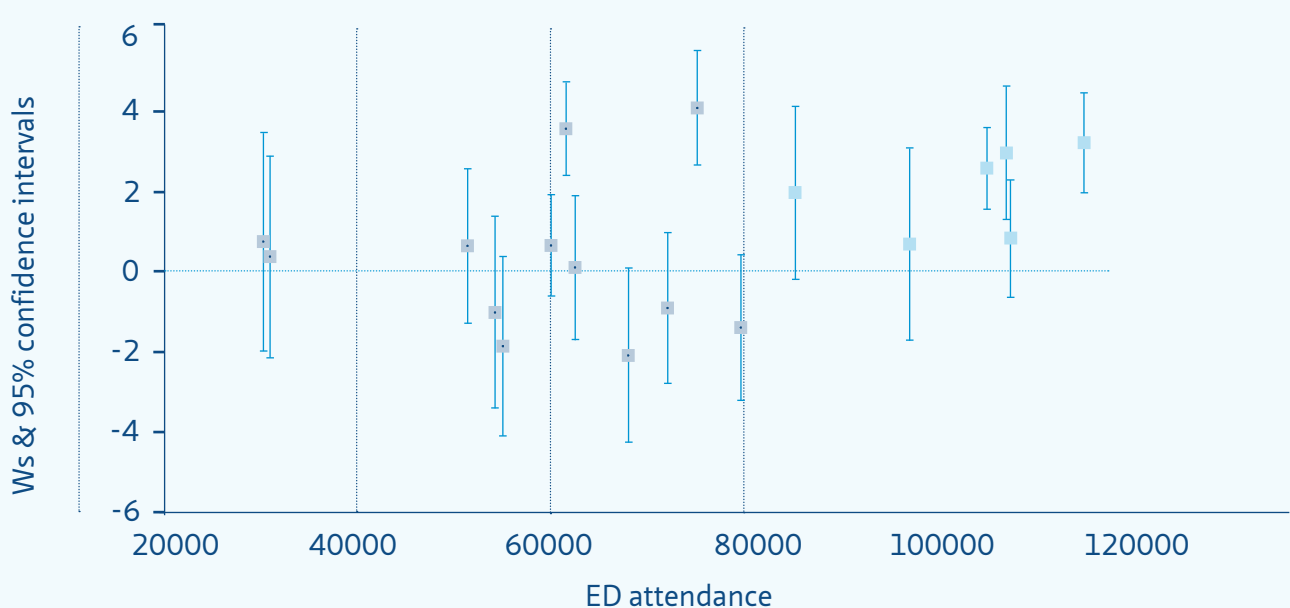
Volume-outcome relationships – US vs UK findings

Despite evidence to the contrary in the US, TARN audit data fails to demonstrate a significant correlation of high volumes and

outcomes (Wang et al, 2007). Figure 9 ranks against volume to illustrate the lack of a clear correlation.

Recent analysis of the US National Trauma Databank has thrown further doubt on the volume-outcome relationship across the Atlantic and recommends re-examining the volume criteria set by the American College of Surgeons (Glance et al, 2004).

Figure 9: Outcomes from trauma for emergency departments, grouped by volume of trauma attendances (higher W score = fewer deaths than expected)



Source: TARN data, 2004-06.

Risks of concentrating volume

The evidence is uncertain for creating trauma systems to concentrate volume as the means of improving quality. In fact, evidence suggests that increasing volume can have negative effects on quality rather than improve it. Demetriades et al (2005) found that while designated major trauma centres had better outcomes than undesignated providers for equivalent patients, volume did not lead to improvement between high and low volume Level 1 centres, or between high and low volume Level 2 centres. Busy units can lead to worsening outcomes due to 'swamping', either with extra trauma patients or with non-severe trauma patients who could be treated locally.

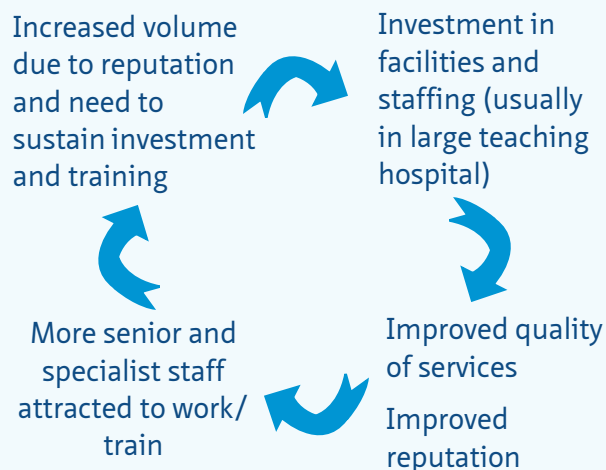
Towards a model of volume, organisation and facilities

Both the literature and the NHS Confederation and ASN expert workshop conclude that improved care and outcomes in major trauma centres come from superior services, facilities and staffing, rather than simply from volume (Nicholl et al, 2008).

This means that, while planning based on volume has a role, it should not be the direct determinant for improving services. In fact those arguing for concentrating volume may be right in practice, but for the wrong reasons. Figure 10 provides an alternative explanation of the volume-outcome relationship.

The alternative model in figure 10 shows there may be an argument for concentrating volume for economic and workforce reasons. It is not usually financially viable to equip and staff a high number of Level 1 trauma centres – including the back-up clinical departments needed – within the small population served by a district general hospital. And it may not be possible to attract the consultants required

Figure 10: Quality–volume relationship: alternative interpretation



to sustain a high-quality complex service or provide sufficient experience for trainees.

In practice the economic case for concentrating volume may still be compelling. However, it is important to make the distinction that volume itself is not the primary determinant, for two key reasons:

- Firstly, we should not expect volume alone to achieve improved outcomes. Investment in facilities and staffing is needed to achieve high-quality services and the service needs to be well managed to make the best use of the network system. The American College of Surgeons' (non volume related) requirements for accreditation as a Level 1 trauma centre are a useful benchmark.
- Secondly, if volume is not a necessary precondition of quality, it may be desirable to sustain a major trauma centre even where the volumes do not justify it economically. If a remote trauma service can be made clinically viable, but cannot sustain itself economically, it might be more efficient to subsidise it financially at lower volumes than to attempt to divert to a distant centre, if that would trade timeliness for cost.

Having considered the trade-offs of dispersal versus concentration, planners then need to consider the 'Goldilocks' question – how much centralisation is enough? Some regions may only justify having one major trauma centre and one hub-and-spoke system. Other systems may need to be more complex with different pathways for different types of trauma. Services should be designed around expected needs but plans are also needed for dealing with unexpected and rare events, such as multiple trauma incidents.

How should trauma status be designated?

The research clearly shows that creating a system is more important than simply designating different levels of trauma centre. Indeed, the process of designation could become a distraction from the task of systematising the care that is provided. Designation itself is meaningless without the resources or the other parts of the system working well. As Gorman et al stated (1995): "Improvements can only be achieved by developing a total system of care. It is this maxim, rather than trauma centres being a panacea, which American experience has repeatedly demonstrated."

Designation lessons

Nicholl's evaluation of the attempted creation of a trauma system in Sheffield in the 1990s provides an object lesson in the importance of the system over designation. Here the health authorities designated a major trauma centre but did not engage ambulance services and other local hospitals as part of it. As a result, the trauma centre was not part of a genuine system, and had no effect on volumes or outcomes at the centre, despite an investment of facilities, staff and training (Nicholl and Turner, 1997).

Processes for designating Level 1 status may be based on a range of approaches. One approach might be for individual providers to choose to invest to meet accredited standard, then

earning the right to enter the market. However, this may not lead to an equitable distribution – for example if large teaching hospitals dominated trauma provision there might be lack of coverage for suburban and rural areas. A market approach may therefore fail public and clinical acceptability criteria. Trauma services are more likely to require regional commissioning, including targeted investment in some centres, to bring them up to standard.

In selecting trauma centres, location and travel times will clearly be a consideration, alongside a good understanding of the incidence of injuries so that centres can be located optimally in relation to access. For example, the consultation on trauma centre designation in London identified that major trauma tends to happen in central urban areas, whereas stroke is more likely in outer London where there is a higher proportion of older people.

While it has been shown that volume itself may not be a sufficient criterion for selection, as more hospitals submit data to the TARN it should be possible to commission more trauma services on the basis of outcomes. This is likely to be a key emphasis in forthcoming commissioning frameworks.

However, designation itself is only a small part of the process; improvement is only achievable if services are developed to meet major trauma centre standards and services are coordinated across the health economy.

Cost effectiveness

In the current financial climate, there is an additional pressure to examine the cost effectiveness of trauma service improvement and it will be difficult to justify improvements to service quality that do not also improve efficiency.

Cost effectiveness is often measured by cost per quality adjusted life year (QALY) saved. A rudimentary calculation by Jon Nicholl, based

on the expectation of delivering a 10 per cent improvement in mortality (with additional adjustments for age), suggested that a health economy serving a population of 1 million could invest up to £5 million in trauma systems (per year) to achieve a quality improvement within the NICE threshold of £30,000 per QALY saved.

Commissioners will need to carry out their own modelling to estimate the costs of introducing a trauma system in their area. The implication of the NCEPOD audit and research is that, although reorganising the system and improving processes can achieve significant benefits, further investment in facilities and staffing across the system will also be necessary.

There are few studies of the cost effectiveness of trauma systems, but one comparison in 1996 concluded that Level 1 trauma centres had relatively higher charges per case and per day, and a similar or longer average length of stay than other hospitals (Goldfarb et al, 1996).

Reflecting this, the Department of Health is developing a tariff for major trauma care that will cover the higher costs associated with higher specification of facilities but it is not clear if this will be cost neutral with trauma tariff increases being offset by reductions elsewhere.

Can major trauma systems lead to reduced overall costs?

For some aspects of quality improvement, the cost savings are obvious, for example providing

patients with the right care in a timely way and reducing unnecessary delays. Improving trauma systems can reduce morbidity, particularly disability following major injury, which leads to overall savings in terms of long-term rehabilitation and long-term social care. However, there is more likely to be a case for investing in trauma services for the benefit of the economy as a whole. For example, Healthcare for London estimates that, with trauma affecting a relatively youthful population, service improvements that improve recovery and allow people to go back to work will repay five to 15 times the healthcare investment.

However, where health economies are currently under-providing trauma services, capital investments and running cost increases are likely to be necessary. And those making regional trauma plans should be aware that advances in medical care tend to lead to increased demand for the best quality. For example, in Victoria, Australia, the numbers of patients classified as having major trauma increased after the introduction of a trauma system (Nicholl, 2009). Some of this inflationary pressure may be addressed through coding audits, but the overall trend is unlikely to change. And of course if improvements in care lead to reduced mortality more people with severe injuries are likely to require long-term rehabilitation and social care. Planners need to be prepared to increase capacity further along the patient pathway as front end trauma services improve.

Conclusion

Following the increased focus on major trauma in recent years, this report has highlighted the importance of trauma service improvement to improve quality of care for severe injury. The evidence is compelling that there is significant scope to improve care in the NHS. A key enabler to improvement will be the development of trauma systems across NHS regions. This has been announced by the chief executive of the NHS in England as a priority for planning in 2010/11, with the expectation that all regions will implement trauma systems from 2011.

We support this ambition. However, we are clear that creating a network, including designating Level 1 trauma centre status, is only the start of the process of improving the total system of trauma care. It is important that planners in NHS regions, and their advisers centrally, take into account the uncertainties in the evidence about how to improve outcomes and do not try to implement uniform systems based on received wisdom, for example about direct transfer or straightforward volume-outcome relationships.

The first step to improving our understanding of what works to improve outcomes will be to ensure that all providers of trauma care collect and submit quality data to the Trauma Audit and Research Network. The TARN has already led the way by publishing existing outcome data publicly. Universal publication will enable providers and commissioners, including GPs, to identify where improvements are needed and to measure the impact of trauma systems.

While the TARN data currently relates only to the initial admitting hospital, NHS planners also need to look beyond the organisation of front end services to look at the whole system of care for major trauma. It is clear that many of the delays and quality gaps in the system stem from blockages to patient flow in critical care and rehabilitation. It is also likely that improvements to emergency care will place

greater pressure on longer-term services as more major trauma victims survive with complex ongoing rehabilitation and care needs. As the NHS moves to organise emergency trauma care, the same level of audit and mobilisation needs to be made for the rest of the care pathway.

The clinical case for implementing proper trauma systems to improve quality is clear, particularly given the impact on younger people and their likely long-term disability as a result of trauma. The NHS needs to acknowledge the public value of the 'rule of rescue', the principle that health services have a duty to save endangered lives.

However, while improvements may be cost effective and even pay dividends for society in the longer term, there is no evidence that this will lead to net savings for health economies and the NHS should not plan on that assumption. Introducing trauma systems in new locations has traditionally been accompanied by additional investment, higher running costs and management capacity to design, manage and monitor trauma systems. Careful investigation is also needed to plan the costs of trauma system implementation, particularly now that the NHS chief executive has announced the roll out across England from 2011.

The NHS Confederation is clear that NHS leaders need to maintain their focus on improving quality despite the financial challenge. The ambition to develop trauma systems during a period of financial austerity is a good example of the scale of the challenge, and the size of the prize that can be measured in lives saved and disability avoided.

We look forward to working with members as they prepare for trauma networks in 2011. For further information please contact joe.farrington-douglas@nhsconfed.org

References

1. Banken, R., Côté, B., de Champlain, F. and Lavoie, A. (2006), 'Introduction of advanced care to pre-hospital services in Quebec - Executive Summary', *Journal of Emergency Primary Healthcare* 4(2).
2. Celso B, Tepas J, Langland-Orban B, Pracht E, Papa L, Lottenberg L, Flint L. (2006), 'A systematic review and meta-analysis comparing outcome of severely injured patients treated in trauma centers following the establishment of trauma systems', *Journal of Trauma*, 60(2): 371-378.
3. Cochrane Injuries Group (not dated) Injuries Group Reviews, London: London School of Hygiene and Tropical Medicine <http://injuries.cochrane.org/injuries-group-reviews> (accessed June 2010).
4. College of Emergency Medicine (2010), *Emergency Medicine Consultants: Workforce recommendations*, London: CEM.
5. Cooke, M, Morrell, R, Wilson, S, Bridge, P, Edwards, S, Allan, T, Holder, R. (1999) 'Does criteria based dispatch of 999 calls adequately detect the critically ill and injured?', *Pre-hospital Immediate Care*.
6. Department of Health (2008), *High Quality Care For All: NHS Next Stage Review Final Report*.
7. Department of Health (2010), *Critical Care Survey*.
8. Demetriades D, Martin M, Salim A, Rhee P, Brown C, Chan L (2005), 'The effect of trauma center designation and trauma volume on outcome in specific severe injuries', *Ann Surg* 2005;242(4):512-7; discussion 517-9.
9. Esposito, T., Offner, P., Jurkovich, G., Griffith, J., Maier, R., (1995), 'Do Prehospital Trauma Center Triage Criteria Identify Major Trauma Victims?' *Archives of Surgery* 130(2):171-176.
10. Evans, S., Airey, M., Chell, S., Connelly, J., Rigby, A. and Tennant, A. (2003), 'Disability in young adults following major trauma: 5 year follow up of survivors', *BMC Public Health* 3 (8).
11. Freeman J, Nicholl J, Turner J (2006), 'Does size matter? The relationship between volume and outcome in the care of major trauma', *Journal of Health Services Research and Policy* 11(2): 101-105.
12. Glance, L; Osler, T; Dick, A; Mukamel, D (2004), 'The relationship between trauma center outcome and volume in the national trauma databank', *Journal of Trauma* 56:3.
13. Goldfarb, M. Bazzoli, G. and Coffey, R. (1996), 'Trauma systems and the costs of trauma care', *Health Services Research* 31(1): 71-95.
14. Gorman, D., Teanby, D., Sinha, M., Wotherspoon, J., Boot, D and Molokhia, A., (1995), 'The epidemiology of major injuries in Mersey Region and North Wales', *Injury* 26(1): 51-54.
15. Healthcare for London (2009), *The Shape of Things to Come*.
16. Independent Reconfiguration Panel (2009), *Learning from reviews: An overview*.
17. Intercollegiate Group of Trauma Standards (2009), *Regional Trauma Systems: Interim Guidance for Commissioners*. Royal College of Surgeons of England, London.

18. Kann S H, Hougaard K, Christensen E F. 'Evaluation of pre-hospital trauma triage criteria: a prospective study at a Danish Level 1 trauma centre', *Acta Anaesthesiologica Scandinavica*, 51(9): 1172 – 1177.
19. Lecky, F. (2009) 'Trauma Care: What is happening nationally' presentation to NHS Confederation/ Ambulance Service Network workshop, Sept 2009 available at www.nhsconfed.org/asn
20. Lehmann, R., Brounts, L., Lesperance, K., Eckert, M., Casey, L., Beekley, A., Martin, M. (2009), 'A Simplified Set of Trauma Triage Criteria to Safely Reduce Overtriage', *Archives of Surgery*, 144(9):853-858.
21. Lerner, E. (2006) 'Studies Evaluating Current Field Triage: 1966—2005', *Prehospital emergency care*, 10 (3), Pp 303-306.
22. Macken L, Manovel A. (2005) 'Trauma bypass in south-eastern Sydney: an 8 year review', *Emergency Medicine Australasia*, 17(2): 137 – 142.
23. Nathens et al 2001, *Journal of the American Medical Association*.
24. National Audit Office (2010), *Major Trauma Care in England*.
25. National Confidential Enquiry into Patient Outcome and Death (2007), *Trauma: Who Cares?*
26. Nicholl JP, Turner J. (1997), 'The effectiveness of a regional trauma system in reducing mortality from major trauma', *BMJ* 315: 1349-1354.
27. Nicholl, J., Coleman, P., Turner, J. (2008), *Re-organising trauma care: A rapid review of the literature*. Medical Care Research Unit, Sheffield.
28. Nicholl, J., 2009 'Reorganising Trauma Care' presentation to NHS Confederation/ Ambulance Service Network workshop, September 2009 available at www.nhsconfed.org/asn
29. H C Patel, H, Bouamra, O., Woodford, M., King, A., Yates, D. and Lecky, F (2005), 'Trends in head injury outcome from 1989 to 2003 and the effect of neurosurgical care: an observational study', *Lancet* 366: 1538–44.
30. Rivara FP, Koepsell TD, Wang J, Nathens A, Jurkovich GA, Mackenzie EJ. (2008), 'Outcomes of trauma patients after transfer to a Level 1 trauma center', *Journal of Trauma*, 64(6): 1594-1599.
31. Rowan, K (2009), 'What is currently happening in the transfer of the critically ill?' Presentation to NHS Confederation/ Ambulance Service Network workshop, September 2009, available at www.nhsconfed.org/asn
32. Royal College of Surgeons of England and British Orthopaedic Association (2000), *Better care for the severely injured*.
33. Wang, W., Dillon, B., Bouamra, O. (2007), 'An Analysis of Hospital Trauma care evaluation', *Journal of Trauma Injury, Infection, and Critical Care*.

Appendix

Expert workshop participants

ASN /NHS Confederation Trauma and transfer workshop, 15 September 2009, BMA House

Delegate list

Title	Forename	Surname	Job title	Organisation
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Ms	Helen	Dowdy	Head of Strategic Programmes	NHS Yorkshire & Humber
Mr	Nigel	Edwards	Director of Policy & Communications	NHS Confederation
Mrs	Alida	Farmer	Service Development Manager	NHS East of England
Mr	Joe	Farrington-Douglas	Senior Policy Manager	NHS Confederation
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Mr	Roland	Furber	Chief Executive	British Paramedic Association
Ms	Liz	Kendall	Director, Ambulance Service Network	NHS Confederation
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Mr	Peter	Lyne	Vice-President	Disabled Motorist Federation
Prof	Hugo	Mascie-Taylor	Medical Director	NHS Confederation
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Implementing trauma systems: key issues for the NHS

Trauma is the main cause of death in the first four decades of life and a leading cause of disability. Following a series of high-profile reports it is recognised that, while emergency care has improved, treatment for victims of major injury could be improved and coordinating trauma services is now a priority for the NHS. There is significant variation in outcomes across the system. Better organisation of care could ensure consistently higher standards of care. Evidence suggests that introducing trauma systems can reduce mortality rates by around 10 per cent, more efficiently use the £300-400m spending on emergency care for major injuries and contribute to reducing the estimated £3.3bn - £3.7bn annual economic cost of trauma.

The new coalition Government has confirmed that trauma systems should be developed by March 2011, and implemented the following year. This report highlights the key questions that regional commissioners and trauma care providers (ambulance services, hospitals, and rehabilitation units) will need to address to develop regionally appropriate changes to save more lives and reduce long-term disability.

The report also analyses the key issues and summarises the debates surrounding trauma system development, and also emphasises that a single model will not be appropriate for all localities.

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