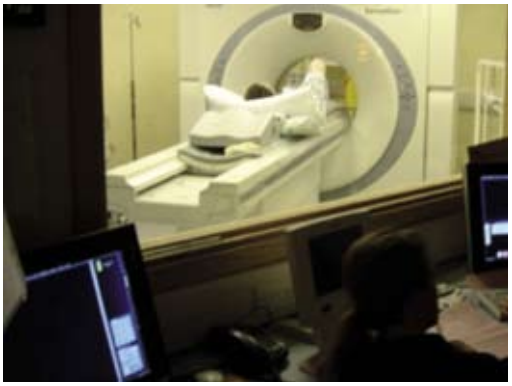

REGIONAL TRAUMA SYSTEMS
INTERIM GUIDANCE FOR COMMISSIONERS

THE INTERCOLLEGIATE GROUP ON TRAUMA STANDARDS

DECEMBER 2009

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FOREWORD

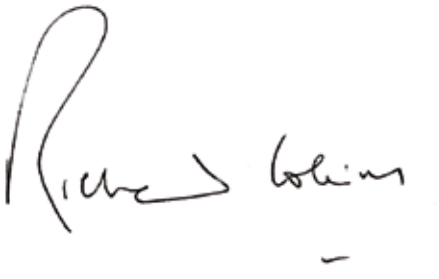
Over recent months I have had the pleasure of chairing an intercollegiate group, brought together to develop standards and guidance to support those involved in the planning, commissioning and delivery of high-quality trauma care.

For many years the medical profession has called for an overhaul of trauma services and for those services to be organised into networks that covered a defined region and met the needs of all trauma patients. The findings from the Next Stage Review confirmed what we already knew: the care of severely injured patients was largely suboptimal. That virtually all of the strategic health authorities' (SHAs') visions arising from the review cited improvements in trauma care as a priority was gladly welcomed, as was the appointment of the National Clinical Director, Professor Keith Willett.

Our group, comprising key royal colleges, specialty associations and faculties, as well as vital patient and public representation, has sought to develop information and guidance on the benefits of regional trauma systems across the country. NHS London has very much led the way in developing robust and transparent criteria to support the designation of trauma services within the capital. I make no apologies for drawing heavily on their excellent work. The Healthcare for London team and the supporting clinical expert group are to be commended. We are of course acutely aware of the demographic differences between various parts of the country. Individual SHAs will need to interpret the guidance to meet their own needs. There is no 'fit-all' scenario.

I should point out that the document deals largely with adult trauma. While this forms the bulk of trauma care provision, the intercollegiate group fully acknowledges that further work is urgently required to look specifically at paediatric trauma care, burns care and rehabilitation services.

I would like to thank the intercollegiate group, in particular Professor Karim Brohi and Professor Tim Coats, for bringing this work to fruition. I would also like to thank Mrs Jo Cripps for her administrative support. I hope you will find the document useful. I certainly commend it to you as a vital support tool as you develop and implement your integrated trauma care systems.



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1 HOW TO USE THIS DOCUMENT

PURPOSE

This document aims to provide generic information on trauma and trauma systems, and presents a proven practical and evidence-based model suitable for regional trauma systems in the UK. It is aimed at regional commissioners and other stakeholders involved in the assessment of the provision of trauma care and the reconfiguration of services to regionalised trauma systems.

BACKGROUND

This document was produced by an intercollegiate trauma standards working group, comprised of nominated representatives of medical royal colleges, specialty associations and patient representatives from the bodies listed on the previous page. The document pertains particularly to the management of adult trauma. We have incorporated some general recommendations for the consideration of paediatric services and rehabilitation. Further guidance is expected to be forthcoming.

The trauma-system model is built in large part upon the results of the ongoing Healthcare for London major trauma project. This model in turn is based upon public health models of trauma systems operating in North America, Australasia and Europe. These have proven efficacy in reducing death and disability from severe injury.

Numerous information sources exist that describe different aspects of trauma-care delivery. These range from evaluations of trauma-care performance to descriptions of trauma systems. The document synthesises this information into a format that can be used by commissioners. It should be used as a guide to the establishment of a commissioning and quality-assurance process for trauma-care improvement on a regional level.

STRUCTURE

1. **How to use this document** (this section)
2. **Context**
   Current drivers for regionalisation and the national process for trauma system development
3. **Introduction to trauma and trauma systems**
   Background information on trauma and the evidence for reconfiguration to regional trauma systems
4. **UK trauma care: the case for change**
   The current state of trauma care in the UK and the potential impact of regionalisation
5. **A regional trauma-system model for the UK**
   The structure, function and performance assessment of a UK regional trauma system
6. **The commissioning cycle**
   A stepwise approach to service assessment, system designation and implementation
7. **Other considerations**
   Related services and systems not included in this report
8. **Appendices**

Description of the injury severity score (ISS)

8. **Appendices (continued)**
   Trauma Audit and Research Network (TARN)
   Trauma pathways
   Designation criteria for trauma systems, major trauma centres and trauma units
9. **References**

2 CONTEXT

2.1 NEXT STAGE REVIEW

Over a number of years in the UK, several reports have been produced that have examined the quality of trauma care delivered to injured patients.[1,2] The consensus view contained in these reports was highly critical of the quality of service provided to trauma patients. Despite these reports the quality of trauma care has remained poor in the UK in relation to other international comparators.[3]

In 2008 the Department of Health published the final report of the Next Stage Review for the NHS.[4] The overarching theme of the document was putting quality at the heart of the NHS. Entitled *High Quality Care for All*, it set out the visions of each NHS region in England. These were developed in conjunction with local clinicians and other health and social care professionals in each area. Acute care groups formed in each of the regions gave compelling arguments for creating specialised centres for certain conditions, including major trauma. These plans for developing major trauma care across the UK are now at varying stages.

An earlier vision describing the necessity for improving the quality of services in London was published in 2007. *A Framework for Action* identified improvements in major trauma as being a priority for the capital.[5] A project was set up that year under the auspices of the Healthcare for London (HfL) programme to look at options to deliver this vision. A significant amount of work has been undertaken during this time to develop these proposals. This led to a public consultation on the options for delivering major trauma care in London. Following this a decision has been taken by the Joint Committee of Primary Care Trusts in London to commission four trauma networks to deliver trauma care.

2.2 FUTURE COMMISSIONING OF REGIONAL TRAUMA SYSTEMS

A national process for the delivery of regional trauma systems will be led by the National Clinical Director for Trauma Care, Professor Keith Willett. For the purpose of this document he has stated that:

> *'The resulting programme, through the development of clinical advisory groups, is investigating the evidence, national and international guidance and research required to assist SHAs in the successful execution of trauma networks. The programme will aim to deliver treatment for everyone which a) is based around the needs of individuals irrespective of where they suffer those injuries, b) delivers the patient as rapidly and safely as possible to the hospital that can manage the definitive care of their injuries either directly or by expedited inter-hospital transfer, c) supports the victim's family, d) defines a comprehensive prescription for rehabilitation and, importantly, e) moves the responsibility for definitive patient care from the receiving clinical team to the trauma network when the initial receiving unit is incapable of that care.*
>
> *'Such change can only occur by leadership at SHA-level steering commissioning for acute hospitals and ambulance services and working with designated trauma leads in each acute trust to develop bespoke direct transfer and referral policies. Currently many regions do not have key specialties*

(eg neurosurgery, orthopaedic trauma, plastics) co-located. The provision of pre-hospital airway skills, use of retrieval teams, open access policies, modes of transfer (including helicopters), 24-hour trauma team leaders, immediate access trauma theatres and intensive care and rehabilitation facilities will be components of each network's individual solutions.'

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Other areas of work that the National Clinical Director will examine will include the contribution of commissioning, audit, modelling, metrics, standards, payment by results, healthcare resource groups, critical care capacity, interventional radiology, rehabilitation, behavioural change, workforce, and training needs to improve outcomes of patients who have suffered major trauma.

3 INTRODUCTION TO TRAUMA AND TRAUMA SYSTEMS

3.1 WHAT IS TRAUMA?

Trauma is a disease caused by physical injury.

The word 'trauma' means wounding due to physical injury. It is important, however, to understand trauma as a disease entity. Although there are many ways to cause injury (road traffic incidents, falls, sporting injuries, occupational hazards, knife and gun injuries), they all result in trauma.

Trauma as a disease is a leading global public health problem affecting 135 million people a year and is responsible for about 5.8 million deaths annually (approximately 10% of all deaths).[6] Around 50 million people are moderately or severely disabled due to injury and over 180 million disability-adjusted life years are lost annually. Trauma exacts a major toll on families, communities and society.[7] The global burden of disease due to trauma is expected to increase dramatically in coming years, becoming the third leading cause of death by 2020.

In the UK, trauma is a leading cause of death in British citizens across all age groups, with over 16,000 deaths due to injury in England and Wales each year.[8] It is one of the few disease categories in which mortality is increasing.[9,10] The annual cost to the NHS of treating trauma injuries is currently estimated at £1.6 billion, about 7% of the total annual NHS budget.[11]

3.2 WHAT IS MAJOR TRAUMA?

Major trauma is trauma that may cause death or severe disability.

For the purposes of trauma systems quality assurance and performance improvement, major trauma is defined as those patients with an injury severity score (ISS) of more than 15. (See Appendix 8.1 for a description of the injury severity score.)

For the purposes of a regional system, major trauma also includes any injury so complex that it exceeds the capabilities or expertise of the receiving unit.

Some patients with an ISS below 15 are also at risk of death and disability. For example, the elderly or very young may be more likely to die from a more moderate injury than a young adult. These patients should also be managed in a major trauma centre and triage protocols should be designed to enable this. In addition, patients with multiple fractures and musculoskeletal injuries often have an ISS<15 but suffer severe, permanent disability that can be reduced by specialist care at major trauma centres.[12,13]

Note that the ISS is calculated retrospectively after all the patient's injuries have been identified and catalogued. The ISS is only useful for commissioning and monitoring system performance and not for directing patient flows.

3.3 HOW COMMON IS MAJOR TRAUMA?

Major trauma admissions to hospital (ISS>15) are estimated at 27–33 patients per 100,000 population per year (about 40% of trauma deaths occur at the scene of the incident.) About 15% of all injured patients have sustained major trauma. Major trauma represents less than 1 in every 1,000 emergency department admissions.

The exact numbers of major trauma patients in England and Wales are unknown due to lack of robust population-based data collection. The quality of available data varies from region to region.

3.4 WHAT ARE THE PRIORITIES IN TRAUMA CARE?

The overall goal of a regional trauma system is to reduce death and disability following major trauma.

The major trauma patient pathway is described as a 'trauma chain of survival'. Trauma patients' lives are saved by immediate pre-hospital interventions and then transfer to specialist surgical facilities in which bleeding can be controlled, traumatic brain injury managed and specialist critical care instituted. The trauma chain of survival therefore depends on an optimised pathway that includes pre-hospital care, emergency departments, specialist operating teams and critical care facilities. The chain continues into a phase of reconstruction, in which injuries are repaired and rebuilt, followed by rehabilitation and reintegration into society.

Priorities are therefore:

- identifying major trauma patients at the scene of the incident who are at risk of death or disability;
- immediate interventions to allow safe transport;
- rapid dispatch to major trauma centres for surgical management and critical care;
- coordinated specialist reconstruction; and
- targeted rehabilitation and repatriation.

3.5 WHAT IS A REGIONAL TRAUMA SYSTEM?

A regional trauma system delivers optimal trauma care to a population on a public health model.

A regional trauma system serves a defined population to reduce death and disability following injury. The trauma system includes public health, injury prevention, emergency medical services, all trauma-receiving hospitals, major trauma centres, rehabilitation services, research, education and systems governance.

The trauma system optimises the use of resources, so a trauma patient is treated in the right place at the right time by the right specialists. Major trauma patients are treated at major trauma centres, while other trauma patients are treated at trauma units. (Not all trauma patients should be treated at major trauma centres – see 3.7 below).

This requires optimisation of pre-hospital triage, bypass protocols, development of trauma unit emergency management protocols and rapid inter-hospital major trauma centre transfer capability. Acute rehabilitation services and repatriation pathways allow targeted patient rehabilitation in trauma units or dedicated rehabilitation facilities close to the patient's home.

There is an active injury prevention programme to reduce the overall burden of injury for a population. The system is underpinned by on going research and education activities. There is a robust public system performance improvement programme, which monitors the health of the trauma system, develops new policy and assures implementation. Inclusive regional trauma systems combined with the designation of high-volume major trauma centres can reduce mortality from major trauma by 40%.[14]

3.6 WHAT IS A MAJOR TRAUMA CENTRE?

A major trauma centre (MTC) is a specialist hospital responsible for the care of major trauma patients across the region.

The MTC has a clinical culture and management systems that reflect the importance of integrated trauma care. The centre has a regional leadership role with responsibility for optimising the pathways and care of major trauma patients wherever they are injured in the region. It has senior clinical and executive commitment to the care of major trauma patients and an integrated trauma service responsible for the ongoing care of all major trauma patients in the hospital.

The MTC has all surgical specialties and support services to provide care for major trauma patients regardless of their pattern of injury. It supports the other trauma units, pre-hospital care and rehabilitation providers in the region in optimising the trauma chain of survival. The centre has its own robust trauma clinical governance and performance improvement programmes and assists in delivering quality assurance and quality improvement across the network. The MTC has active and relevant research, education and injury prevention programmes that support trauma care across the region.

It is clearly recognised that there is a volume and outcome relationship in major trauma care and it is recommended that the MTC should see at least 400 major trauma patients each year. Major trauma centres with a sufficient volume of work to gain experience in managing these patients have a 15–20% improvement in outcomes (at 600+ patients per year).[15] Conversely, low-volume MTCs have little impact on patient outcomes. Each MTC should therefore serve a minimum population of approximately 2–3 million people.

MTCs will also manage a certain proportion of trauma patients who are not major trauma. These patients come from their local catchment area and from over-triage of trauma patients to the centre. On average the ratio of trauma patients to major trauma patients seen in an MTC is 2:1. Regional trauma systems operate within existing systems and should not compromise care of other emergency or elective patients. Instituting a trauma system has been shown to improve the care of other non-trauma emergency patients, reducing emergency department waiting times, improving operating room access and reducing hospital stays.[16]

3.7 WHAT IS A TRAUMA UNIT?

A trauma unit (TU) manages injured patients in its local catchment area.

A TU is responsible for the management of trauma patients who are not classified as having major trauma. Patients with less severe injuries (ISS≤15) do no better and may do worse if managed in an MTC. This is in part because they may be de-prioritized compared to the major trauma patients for operations, rehabilitation resources, etc.

TUs may also receive major trauma patients either due to under-triage errors or because patients require immediate life-saving interventions prior to continued care at an MTC. TUs have close links with the MTC through the network and immediate transfer agreements with the centre when a major trauma patient is received at a TU. The TUs have a responsibility to engage in trauma system activities including data collection, governance and performance improvement, research, education and injury prevention.

4 UK TRAUMA CARE: THE CASE FOR CHANGE

» Injury is a leading cause of death in British citizens across all age groups, with over 16,000 deaths due to injury in England and Wales each year.[8]
» In the absence of a trauma system, over 30% of all in-hospital trauma deaths in the UK are preventable and due to substandard management.[17]
» Implementation of a regionalised trauma system can rapidly reduce the preventable death rate to close to zero.[18–20]
» Regionalisation of care to specialist trauma units reduces mortality by 25% and length of stay by four days.[21]
» High-volume trauma centres reduce death from major injury by up to 50%.[15]
» Time from injury to definitive surgery is the primary determinant of outcome in major trauma (not time to arrival in the nearest emergency department).[22]
» Major trauma patients managed initially in local hospitals are 1.5 to 5 times more likely to die than patients transported directly to trauma centres.[23]
» There is an average delay of 6 hours in transferring patients from a local hospital to a major trauma centre. Delays of 12 hours or more are not uncommon. Across the UK, almost all ambulance bypasses can be achieved in less than 30 minutes.[23,24]
» Longer pre-hospital times have minimal effect on trauma mortality or morbidity – even in very rural areas such as the west of Scotland.[24]
» Trauma centres have significant improvements in quality and process of care. This effect extends to non-trauma patients managed in these hospitals.[25,26]
» Costs per life saved and per life-year saved are very low compared with other comparable medical interventions.[27,28]
» Currently UK mortality for severely injured trauma patients who are alive when they reach a hospital is 40% higher than in the US.[29]
» Without regionalisation, trauma mortality and morbidity in the UK will remain unacceptably high. The likelihood of dying from injuries has remained static since 1994 despite improvements in trauma care, education and training.[26,30]

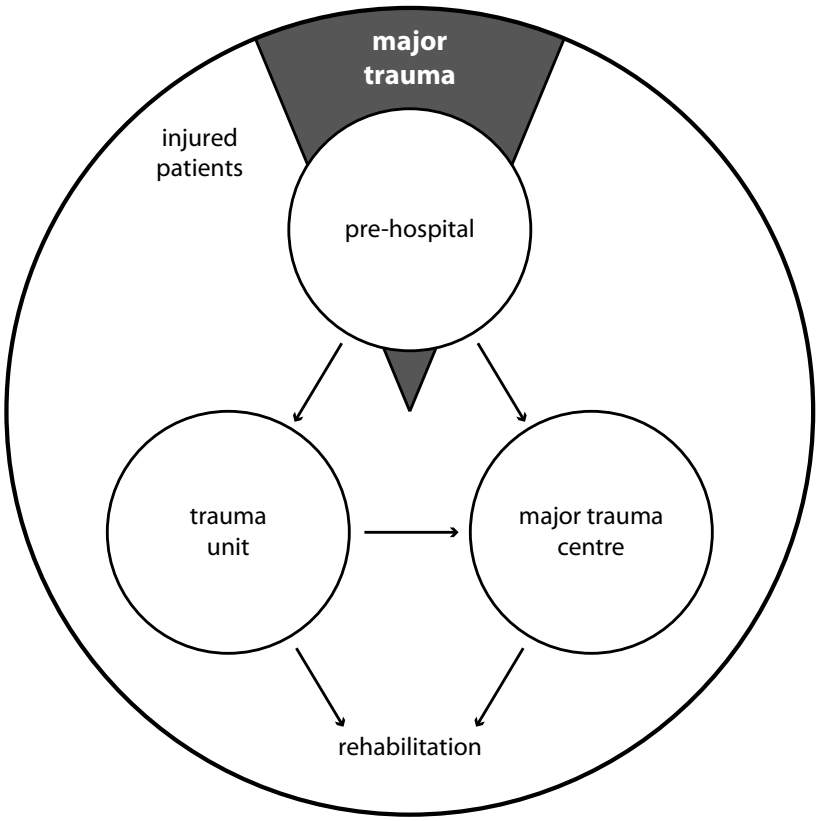
5 A REGIONAL TRAUMA SYSTEM MODEL FOR THE UK

5.1 KEY COMPONENTS OF A REGIONAL TRAUMA SYSTEM

» A philosophy that the injured patient anywhere in the region is the clinical responsibility of the trauma system and that clinicians have a clinical responsibility that extends outside their traditional boundaries.
» A culture of integrated multi-disciplinary working across specialist and professional groups, with trauma care seen as a specialist area of expertise.
» A regional system integrating hospital and pre-hospital care to identify and deliver patients to a place of definitive care quickly and safely.
» A pre-hospital care system closely integrated into the trauma system, with defined triage, bypass and inter-hospital transfer protocols.
» A network of hospitals designated as trauma units and major trauma centres, each with defined capability and capacity, and predetermined transfer agreements for optimising casualty flow.
» A specialist major trauma centre that has responsibility for the management of all major trauma patients in the region.
» Acute rehabilitation services to improve outcomes and restore casualties back to productive roles in society.
» A continuous process of system evaluation, governance and performance improvement across the network.
» Ongoing training and education for all pre-hospital, hospital and community healthcare professionals involved in the care of injured patients.
» An active injury prevention programme to reduce the burden of injury for the population the network serves.
» A responsibility towards research into trauma and its effects, to improve continuously care and outcomes following injury.
» Integration with emergency preparedness and the ability to implement a system-wide response to disaster and mass casualty incidents.
» A clinical and administrative structure to oversee system activities, led by a clinician.

5.2 PATHWAYS OF CARE WITHIN THE REGIONAL TRAUMA SYSTEM

The system is designed to match severity of injury to optimal resources and expertise.



» Major trauma patients are identified at the incident scene through the use of a triage protocol and transported directly to MTCs.
» Major trauma patients may be seen at TUs if:
  - pre-hospital providers elect to take a major trauma patient to a TU if they require an immediate life-saving intervention;
  - the full extent of the patient's injuries are not appreciated initially; or
  - the patient is brought to the TU by family/friends or via another non-standard route.
» The system must be able to manage under-triage. There is therefore a specific pathway for immediate notification and transfer of patients from TUs to MTCs.
» Once identified as a patient requiring transfer to a MTC, responsibility for timely and appropriate definitive care rests with the MTC.
» There are predefined pathways for major trauma patient rehabilitation and repatriation after the end of the acute phase of care.
» Detailed pathways of care used in the London process are given in Appendix 8.3.

5.3 CLINICAL GOVERNANCE, QUALITY ASSURANCE AND PERFORMANCE IMPROVEMENT

A robust performance improvement programme underpins the public health model of the regional trauma system.

» A defined dataset is collected on all injured patients across the network by pre-hospital care providers, TUs and MTCs.

» A regional trauma system clinical governance and performance improvement programme assesses the health of the system, institutes policy development and assures implementation.
» A similar process occurs in TUs, MTCs and pre-hospital care services. These programmes feed into the regional process.
» The system is assessed by measuring key performance indicators (KPIs) across the pathway of care. KPIs will assess markers of quality assurance, patient safety and patient experience.
» Key performance indicators will fall into categories of process of care, governance standards, clinical outcomes, resource utilisation, training and education, and patient experience.
» The regional system, MTCs and TUs will feed data to national audit bodies including the Trauma Audit and Research Network (TARN) (see Appendix 8.2).

6 THE COMMISSIONING CYCLE

6.1 ASSESSING NEEDS

The case for change outlined earlier describes in detail the need for regionalised trauma systems in order to deliver patient outcomes comparable to those in many parts of the world.

6.2 REVIEWING SERVICE PROVISION

Current service provision.

Clinical work streams should be established to understand how current service provision meets expected needs, designation criteria and quality measures. These need to be actioned within potential major trauma centres as well as across the region. The latter will feed into the regional governance structure.

Work streams include:

- Pre-hospital care
- Emergency departments
- Urgent diagnostics
- Specialist surgical services
- Emergency operating facilities
- Interventional radiology
- Critical care access
- Ward beds
- Rehabilitation – acute, general and specialist
- Emergency preparedness and major incident planning

For those involved in contributing to the work streams at a regional level, a clear understanding of the amount of time that needs to be committed should be stated. For those giving large amounts of time, arrangements should be made to second them into the SHA to ensure their ability to devote the necessary input to the project.

In addition, there will be a need for a team of people to drive the project deliverables linked in with the project governance arrangements. The skills required will include project management, data analysis and external communications.

6.3 PLANNING CAPACITY AND MANAGING DEMAND

Determining the incidence of trauma and major trauma.

Understanding the incidence of trauma and especially major trauma in the region is key to system design and development. For most regions, robust population data on major trauma patients do not exist, as less than half of all hospitals routinely collect injury severity data on trauma patients.

A number of data sources are available from which population estimates may be extrapolated:

- Existing TARN submission (see Appendix 8.2)
- Hospital episode statistics (HES) data
- Ambulance service data
- Intensive Care National Audit and Research Centre (ICNARC)

» Other in-hospital trauma registries
» Extrapolating from other regions with similar population distributions

Instituting data collection (through TARN data submission) at all hospitals early in the systems development process will significantly improve patient estimates and enable accurate strategic planning.

Understanding distances and travel times.

Key times for system functioning are:

» time from injury to arrival of pre-hospital teams; and
» time from injury to definitive care.

Understanding the geography of the region and main transport routes will aid decision-making regarding the deployment of paramedic services, the degree of expertise required, expected distribution of patients between MTCs and TUs and requirement for secondary transfer and retrieval services.

Existing ambulance service data can be analysed to produce travel time contours to anticipated MTCs. There will be different analyses required for urban and rural environments. In London for example, travel times were undertaken by sourcing ambulance records and comparing them with normal road journey times sourced from a commercial database. Additional information was used in the calculation to determine the effects of rush-hour traffic and the increase in speed when travelling by blue-light ambulance. This enabled maps illustrating contours of equal journey time around specified locations (known as isochrones) to be generated. Further information on this methodology is available.[31]

An understanding of the journey times involved in getting patients to definitive care and the ability to explain the impact of these on patient outcomes is an important aspect of implementing a regional trauma system.

6.4 SHAPING THE STRUCTURE OF SUPPLY

Structuring the regional system and core components.

The regional system must deliver trauma care to optimal standards of clinical quality, patient safety and patient experience, and meet key performance indicators (KPIs) intended to monitor system health. The pathways and resources used to deliver the standards are not prescribed and trauma networks must develop local solutions, given local capability and capacity.

The designation criteria for networks, MTCs and TUs given in Appendices 8.4–8.7 are suggested resource and system requirements and are based on available expertise and contemporary wisdom.

Core system infrastructure is required to implement and monitor the evolution of the regional system. These components include a regional trauma systems office, system director, a system manager and system data collection and performance monitoring teams. The regional trauma office will work closely with commissioners and providers to report on and improve the performance of the system. An annual report will provide a regular progress report – examples are available.[32]

Links also need to be made with neighbouring trauma systems as there will need to be some common practices, demand sharing, emergency preparedness planning and boundary-zone planning across regions.

Identifying potential major trauma centres.
Within a region the number of hospitals that would be candidates for major trauma centre status is limited. However, it is likely that not all required services will be present on a single site, or that these services will not be operationally capable of providing service to a level required of a MTC – either from a quality or volume standpoint.

A candidate list of major trauma centres will determine the number of networks within the region and inform the transformation process in terms of major trauma patient densities, access, geography and costs associated with reconfiguration of services.

6.5 MANAGING PERFORMANCE

Establishing a framework for developing a regional trauma system.
Individual SHAs will establish their own arrangements for approaching the establishment of a trauma system within their geographical area. This will include clear governance arrangements for decision-making and accountability. Following the commissioning cycle ensures that the appropriate planning, design of services and monitoring is undertaken.

Monitoring the process and quality of care – KPIs
Trauma systems will be monitored and assessed through continuous measurement of outcomes and the process of care delivery. KPIs will be used to ensure that the networks, major trauma centres and trauma units are delivering resource-efficient optimal trauma care. A select few of these KPIs will be used as a basis for ongoing commissioning.

KPIs will fall under the following broad categories:

» ***Resource***
  Example: (MTC) trauma teams are consultant-led at all times
  Example: (MTC) emergency fresh-frozen plasma is available within 15 minutes of request
» ***Process***
  Example: (MTC) emergency CT scan is performed within 30 minutes of arrival
  Example: (network) emergency neurosurgery (craniotomy) is performed within four hours of injury
  Example: (MTC) spinal assessment is complete within four hours of injury
» ***Outcome***
  Example: (MTC) mortality from haemorrhagic shock is below 30%
» ***Governance***
  Example: (network) complete submission of required trauma datasets to TARN
  Example: (MTC) specialty liaisons attend performance improvement meetings

» ***Training and education***
Example: (MTC) All trauma team members have current ATLS®/ATNC/TNCC or equivalent certification
Example: (MTC) specialty surgeons are current in trauma-specific continuing professional development
» ***Patient experience***
Example: (network) repatriation for rehabilitation occurs within 72 hours

The final set of key performance indications has not yet been defined for the London system.

6.6 SEEKING PUBLIC AND PATIENT VIEWS

Due to the complex nature of injuries sustained by major trauma patients, there is no one patient body that represents major trauma patients with whom linkages can be made in order to inform the development of regionalised trauma systems. A number of voluntary sector organisations exist that are equipped to provide patient input, along with the patient representative groups from the royal colleges and other professional bodies. In addition, other input from patients on a local level may be obtained through the Local Involvement Networks (LINks, www.dh.gov.uk/en/Managingyourorganisation/PatientAndPublicinvolvement/DH_076366).

6.7 FINANCE

Major trauma is not as easily defined as other surgical groupings using existing management information and so there is likely to be no comprehensive or systematic count of the volume or nature of major trauma activity taking place across SHAs. In addition, as the activity is imperfectly captured by healthcare resource groups (HRG) v3.5, the spell costs are only poorly represented in the payment-by-results (PbR) tariffs at present.

The HfL project used the ISS system to categorise trauma into major and non-major. The ISS is an anatomical scoring system that provides an overall score for patients with multiple injuries. The score can be from 0 to 75 and a reasonably accepted definition of major trauma is activity with an ISS score of higher than 15. ISS scoring is provided by the Trauma and Audit Research Network (TARN). While this system is clinically meaningful it should be noted that it has not been designed to reflect resource consumption.

The publication of HRG v4 with a subchapter on polytraumatic injury is a step towards better identifying major trauma-type activity. Even so only 50% of major trauma, as defined by ISS, falls into this subchapter. Also the PbR tariff for this activity still does not properly remunerate the spell cost of the activity.

HfL proposed a specification for its major trauma centres. In considering the additional costs of the major trauma service in London an element of the costs was deemed to be fixed and driven by the specification; this could be met by the payment of a quality premium (possibly through a Commissioning for Quality and Innovation-type mechanism). The other noteworthy element of system cost relates to the concentrating of under-remunerated activity into a few centres; this has led to the consideration of a tariff top-up. At the time of publication, neither of these funding elements has been finally agreed but SHAs may wish to consider appropriate

funding for trauma care.

At a national level, consideration will have to be given to ensuring that HRG v4 better discriminates polytrauma and that the costs associated with this activity are properly compiled by trusts so that the resultant PbR tariffs are calculated correctly. This will not happen in the short term and due to the averaging effects of PbR and coding, may not ever reflect truly the cost of this activity in the tariff. SHAs may wish to follow the above model with a fixed element of funding and a top-up on tariff.

7 OTHER CONSIDERATIONS

7.1 PAEDIATRICS

The provision of care for seriously injured children should be considered alongside that of adults in order to realise the benefits of co-locating services. There are too few injured children in the UK to give sufficient experience for separate systems to treat children. The injured child therefore needs to be the responsibility of the trauma system but with additional expertise drawn from paediatric specialists. There will be considerable variation between SHAs in their approach to this depending on availability of specialist children's services. Links with regional children's retrieval services might be helpful in defining the pathway for injured children.

7.2 BURNS

It is uncommon for burns to be associated with multiple other injuries. Burns care also benefits from integration with the trauma system. Ideally burns care should be co-located within a MTC. If such care is not co-located robust arrangements need to be in place to deliver multi-specialist care (or transport of the patient to a place in which such care can be given). Care for the child with burns can be delivered more effectively if burn and paediatric services are co-located. However, such services may need to be delivered on a national rather than a regional pattern.

7.3 REHABILITATION

Organised and integrated rehabilitation is key to the functioning and sustainability of a major trauma system. Significant deficiencies exist in the capacity and capability of rehabilitation services across the UK. This is across all domains, including physical and psychological, and pertains to acute and chronic rehabilitation. Future work steams are planned and seek to address these deficiencies. It is recommended that development of a trauma system incorporates assessment of rehabilitation within all phases of design and implementation.

7.4 EMERGENCY PREPAREDNESS

Emergency preparedness and major incident planning is best undertaken in the context of a regional trauma system. Existing capabilities need to be taken into account when developing a regional trauma system to ensure resilience, effective emergency response and appropriate use of resources. Cross-regional plans for 'mutual aid' between regional trauma systems must be in place.

7.5 CROSS-BOUNDARY COOPERATION

Patients who are injured near to the boundary between regions may, depending on the geography of local services, be better cared for in a neighbouring system (for example the nearest MTC may be in another region). Each trauma system should have robust agreements with its neighbours that define how cross-boundary treatment and repatriation issues are handled.

8 APPENDICES

8.1 THE INJURY SEVERITY SCORE

The injury severity score (ISS) is an anatomical scoring system that provides an overall score for patients with multiple injuries.[33] Each injury is assigned an abbreviated injury scale (AIS) score, allocated to one of six body regions (head, face, chest, abdomen, extremities (including pelvis) and external). Only the highest AIS score in each body region is used. The three most severely injured body regions have their score squared and added together to produce the ISS score.

The ISS takes values from 0 to 75. If an injury is assigned an AIS of 6 (incompatible with life), the ISS score is automatically assigned to 75. The ISS correlates with mortality, morbidity, hospital stay and other measures of severity.

Its weaknesses are that any error in AIS scoring increases the ISS error; many different injury patterns can yield the same ISS score; and injuries to different body regions are not weighted. Also, as a full description of patient injuries is not known prior to full investigation and operation, the ISS (along with other anatomical scoring systems) is not useful as a triage tool. The system is not currently included in the training curricula for pathology, radiology or surgery so clinical injury descriptions (for example in operating notes, radiology reports or post-mortem reports) seldom use the AIS's internationally recognised terminology for describing injuries.

Its strengths are that it is internationally accepted, giving a common language by which injuries can be described. It is well validated, reproducible and provides a well-established tool. It provides the basis for probability of survival scores, which can be used to identify cases (the 'unexpected' survivors and deaths) for further detailed review in multidisciplinary trauma audit meetings. These scores can also be used to compare institutional or system performance.

Example ISS calculation

Region	Injury description	AIS	Square top three
Head and neck	Cerebral contusion	3	9
Face	No injury	0	
Chest	Flail chest	4	16
Abdomen	Splenic contusion	2	
	Complex liver injury	5	25
Extremity	Fracture femur	3	
External	No injury	0	
Injury severity score			**50**

8.2 TRAUMA AUDIT AND RESEARCH NETWORK: OVERVIEW

The Trauma Audit and Research Network (TARN) has been working with NHS trusts across England and Wales for 20 years. It aims to improve emergency healthcare systems by collating and analysing trauma patient care data within each trust. The registry of more than 250,000 injured patients provides a statistical base to support clinical audit and is a rich source of information to support trauma service improvement.

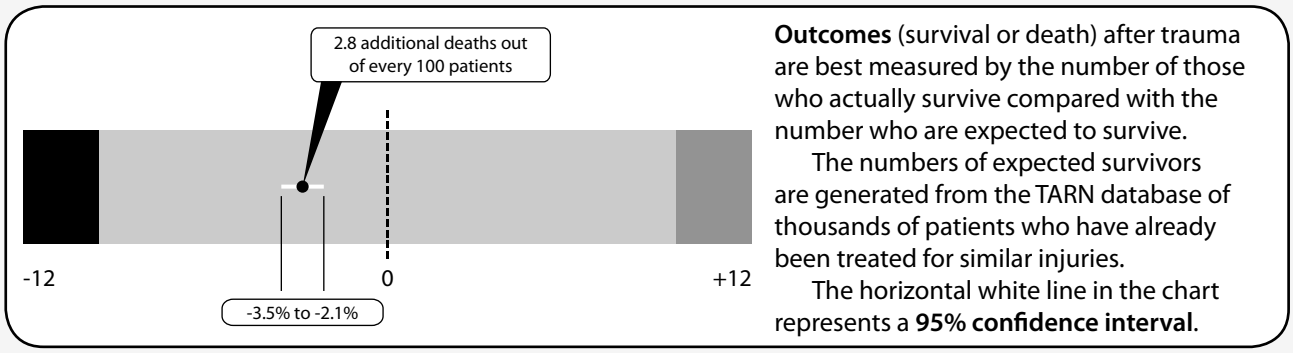
TARN produces monthly clinical and quarterly comparative reports for 60% of hospitals in England and Wales. These aid multispecialty clinical case review and systems of trauma care evaluation. The epidemiology and level of trauma care can be accurately assessed and developed within a hospital or network of care.

TARN is a non-profit organisation (part of the University of Manchester) and is funded by participation fees. The trauma registry has already provided long-term stability for trauma audit and has been viewed as a potential future model for other national clinical audits. This non-profit-making funding model has enabled TARN to exist for 17 years with widespread support.[2,34] Both reports recommend that all NHS trusts should take part in national trauma audit through TARN, thus ensuring the continued strength of the organisation.

The data collection and reporting system is web-based and generically designed so that data may be entered on interventions, observations, investigations, surgical procedures and the details of the clinicians who attended the patient. Since a trauma patient may be treated in many departments in the pre-hospital and hospital setting, the design encourages data entry at any of these locations.

Comparisons of trauma care were successfully published in August 2007 on an open access website (www.tarn.ac.uk) with full agreement of NHS trust medical directors and in accordance with national recommendations that patients and the public have direct access to outcome information. The information on the website has been collected from many of the hospitals that treat trauma patients in England and Wales and shows rates of survival and adherence to standards of trauma care. Other hospitals, which do not currently collect this information, are also listed for completeness.

Rates of survival and adjustment for risk are displayed as follows:



Outcomes (survival or death) after trauma are best measured by the number of those who actually survive compared with the number who are expected to survive.

The numbers of expected survivors are generated from the TARN database of thousands of patients who have already been treated for similar injuries.

The horizontal white line in the chart represents a **95% confidence interval**.

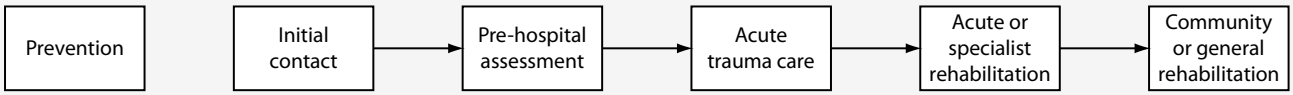
Figure courtesy of TARN

Yearly figures for rates of survival are reported in two-year intervals so that the hospital staff and patients are able to monitor the effectiveness of their local trauma care closely. It is important to review how injured patients are cared for at regular intervals since treatment and practice at the hospital may change.

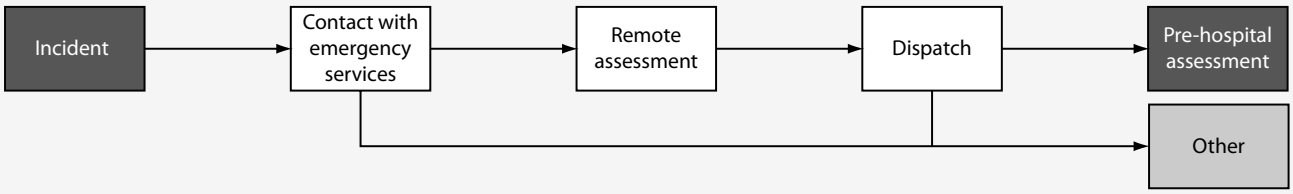
Data quality is assured by internal system validation and checks against other national systems. The information provided on the website is collected in different ways by different hospitals. Some hospitals have better resources than others for collecting data and this may affect the quality and completeness of the data.

8.3 PATHWAYS OF CARE AS DEFINED IN THE LONDON PROCESS

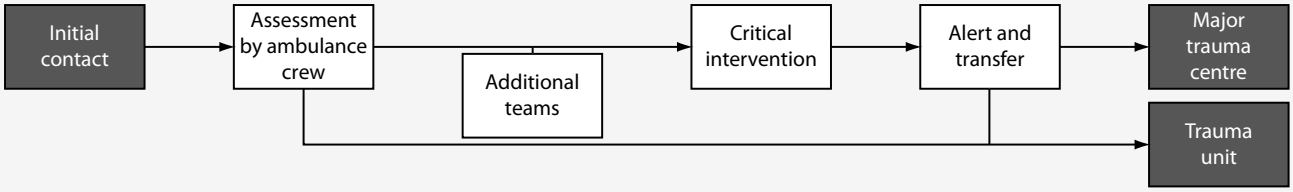
High-level major trauma pathway



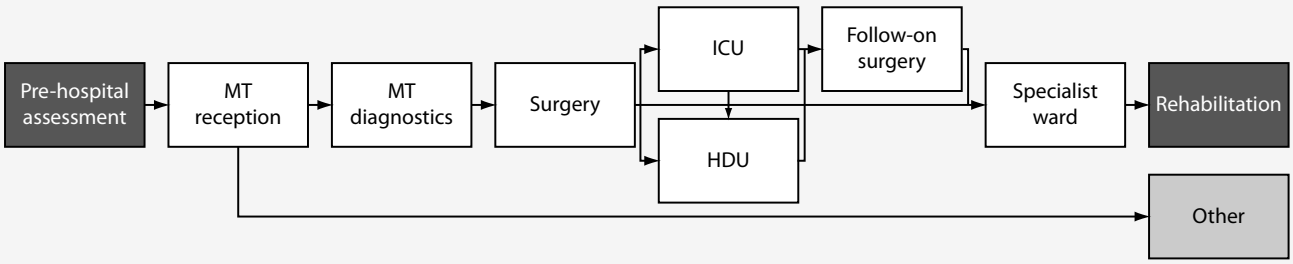
Initial contact – outline



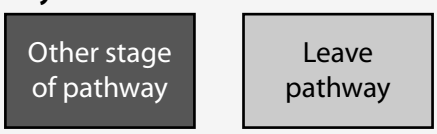
Pre-hospital assessment – outline



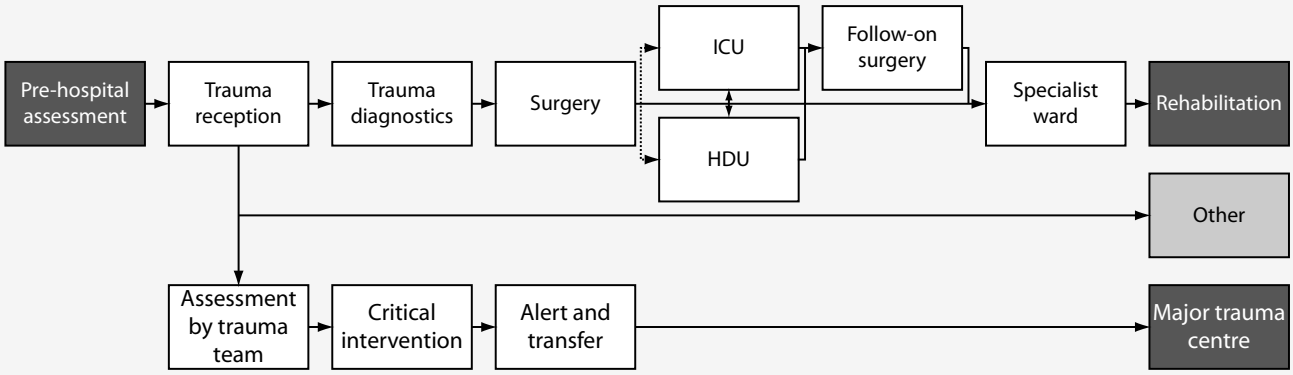
Major trauma centre – outline



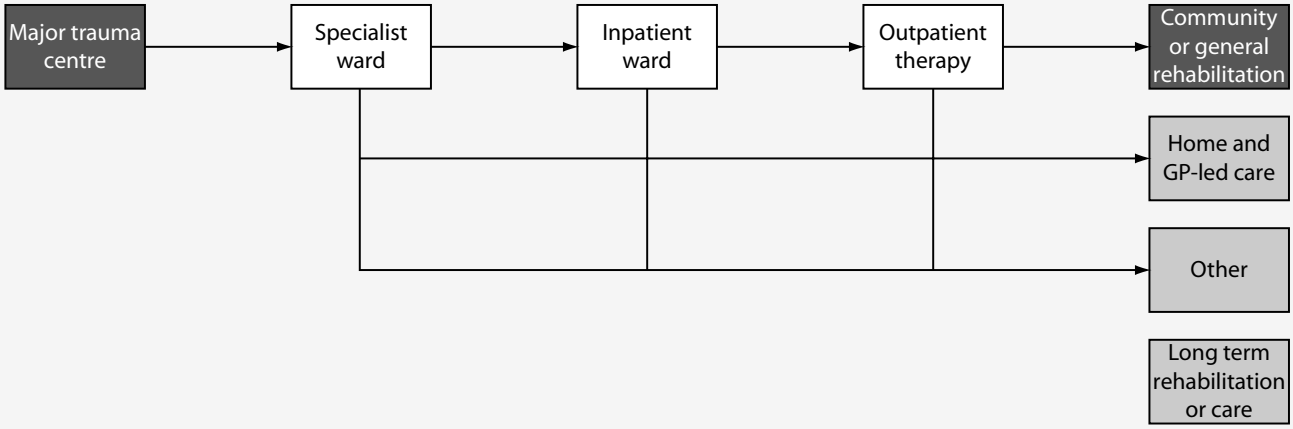
Key



Trauma unit – outline

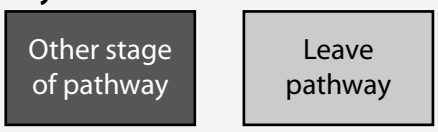


Acute or specialist rehabilitation – outline



Community or general rehabilitation – outline

Key



8.4 OPTIMAL RESOURCES FOR DESIGNATION OF TRAUMA NETWORKS

Level of importance of criterion – in the HfL designation process, each criterion was allocated a level of importance from 1 to 5, with 5 being the most important. When evaluating the bids for trauma networks it was deemed that all level 4 and 5 criteria should be achieved in order for the bid to pass.

8.4.1 GOVERNANCE AND CULTURE

Criteria number	Description	Evidence required	Method of assessment	Level of importance criterion
1. Clinical leadership	Identified network director and network board (this may be the network director for the major trauma centre or a trauma unit): clear structure, roles and responsibilities A trauma director in each major trauma centre and trauma unit	Name of individuals in post or networks Demonstrate how appointment to posts will take place Existing or proposed network board structure including director Network board terms of reference including how links and reporting lines will be set up with primary care trusts	Document inspection Site visit	4
2. Network cooperation	Evidence-based network guidelines and protocols for management of trauma and major trauma patients to ensure consistency of management Forum for sharing ideas and practice for developing the network including input from ambulance service	Updated protocols and guidelines Process for regular review of protocols and guidelines Network meeting agenda and minutes	Document inspection	4
3. Network information	System for communicating with all those involved in the network: this may take the form of a newsletter or a website	Newsletter or website address	Document inspection	2

8.4.2 QUALITY AND SAFETY

Criteria number	Description	Evidence required	Method of assessment	Level of importance criterion
4. Effective transfer of patients	Patients who are under-triaged to the trauma unit are rapidly transferred to the major trauma centre without delay Patients suitable for local rehab-ilitation are transferred when ready Protocols are in place to support the above transfers Structures are in place to ensure ambulance service input and involvement into network transfer protocols and audit of triage	Transfer protocols from trauma unit to major trauma centre Repatriation protocols for patients suitable for rehabilitation Audit of transfers, repatriation and reasons for delay	Document inspection	5
5. Review of clinical performance	Regular review of patient outcomes Regular multi-professional reviews of individual cases (morbidity and mortality (M and M) meetings) throughout the network to identify areas of good practice and areas for improvement	Trauma registry, TARN data Agenda and minutes for M and M meetings	Document inspection	4
6. Risk management	Processes in place for identification and monitoring of network-related critical incidents and action plans designed to improve performance	Risk management structure Minutes of risk management meetings	Document inspection	4

8.4.3 NETWORK EFFECTIVENESS

Criteria number	Description	Evidence required	Method of assessment	Level of importance criterion
7. Medical Emergency Response Incident Team (MERIT) availability	A MERIT team available within the network at all times for deployment to the scene of a major incident if required either within the network or for an incident within another network. (NB final designation of this criterion should be in accordance with the Department of Health emergency preparedness guidance.)	MERIT team member structure Rota Training programme for MERIT team members	Document inspection Site visit	4
8. Major incident capability	Ability to continue functioning as a network during a major incident demonstrating effective communication and ability to deliver major trauma and trauma care	Network major incident policy Audit of major incident plan effectiveness	Document inspection	4

8.4.4 REHABILITATION

Criteria number	Description	Evidence required	Method of assessment	Level of importance criterion
9. Approach to rehabilitation improvement	A clear outline of how network rehabilitation providers will begin to map the current and future pathways for rehabilitation to deliver improvement through commissioning. Involvement of patients in redesigning rehabilitation services	Outline rehabilitation project brief Outline project plan Rehabilitation improvement team membership including commissioners and patients Terms of reference of rehabilitation improvement group	Document inspection	4

8.4.5 EDUCATION AND TRAINING

Criteria number	Description	Evidence required	Method of assessment	Level of importance criterion
10.Training across network	Provision of multi-professional training opportunities across organisational boundaries	Network education timetable	Document inspection	3
11. Opportunities to gain experience across network	Opportunities to rotate through different organisations within network to gain breadth of trauma experience and maintain skills	Network policy on rotation and secondment	Document inspection	2

8.4.6 RESEARCH AND DEVELOPMENT

Criteria number	Description	Evidence required	Method of assessment	Level of importance criterion
12. Involvement in trauma research	A commitment to participate in multi-centre trials	Commitment to research involvement	Document inspection	3

8.4.7 PREVENTION STRATEGIES

Criteria number	Description	Evidence required	Method of assessment	Level of importance criterion
13. Injury prevention programme	A programme of public education delivered across the network designed to reduce the number of trauma injuries – this could be delivered on a system-wide basis	Programme of activities	Document inspection	2

8.5 OPTIMAL RESOURCES FOR DESIGNATION OF MAJOR TRAUMA CENTRES

8.5.1 INSTITUTIONAL COMMITMENT

Criteria number	Description	Evidence required	Method of assessment	Level of importance criterion
14. Institutional commitment	Commitment from executive team and senior staff to the provision of a high quality major trauma service within the trust Presence of a major trauma management structure that supports the delivery of a high quality major trauma service led by a clinical director for trauma together with a designated major trauma programme manager and data manager Presence of a clinical structure that supports the delivery of a high quality major trauma service Presence of a governance structure that assures quality of service and allows for continuous measurement and improvement	Written memorandum of commitment from trust board (or minutes) Business plan Management structure – organisational chart with names of those roles already filled Clinical structure Governance framework Evidence of audit and improvement or future plans if not in place Evidence of regular case review meetings Subscription to TARN Education programmes Patient board/representation	Document inspection Site visit	5

14. Institutional commitment (continued)	Commitment to engage in the process of continuous improvement Submission of full data set to TARN annually Provision of education – eg ATLS, ALS, CCriSP, ATNC, TNCC or equivalent and other educational opportunities. Commitment to adherence to major trauma system performance Framework and monitoring Involvement of patients in developing services to meet patient need			

8.5.2 SERVICE

GLOSSARY OF SERVICE LEVELS

Level Description

1. Consultant available immediately on site (the same hospital site) 24 hours, 7 days a week; available to lead major trauma team
2. Consultant-led service available on site (the same hospital site) 24 hours, 7 days a week with continuous junior presence out of hours and consultant available on site within 30 minutes
3. Consultant available within 30 minutes. No commitment to provide ongoing continuous care on site (may be provided within network)

Criteria name	Description	Level			Examples of evidence	Assessment	Level of importance of criterion
		1	2	3			
15. Designated major trauma resuscitation team	Responsible for receiving, resuscitating, coordinating care and treating trauma patients including undertaking resuscitative thoracotomy The team should be led by a consultant with on-site presence at all times with immediate response Responsible for care of the patient until admitted under a specialty lead	×			List of consultants involved in delivering major trauma care and their level of service commitment to trauma, eg full time, half time Validation of resuscitative thoracotomy skills List of specialist nursing AHP roles supporting trauma care Team membership and structure Organisational chart Activation protocol (state levels)	Document inspection Site visit	5

16. Ongoing patient care team	Responsible for admitting patients under specialty and coordinating ongoing care under the responsibility of a designated lead consultant. This may include roles such as trauma nurse coordinator to facilitate care coordination		×		Description of how a consultant-led service for ongoing coordination of care for patients with polytrauma will be delivered List of consultants involved in delivering major trauma care and their level of service commitment to trauma, eg full time, half time List of specialist nursing and AHP roles supporting trauma care Rotas Team membership and structure Organisational chart Sample plan of patient care Dedicated trauma ward for co-location of patients	Site visit	4

Criteria name	Description	Level			Examples of evidence	Assessment	Level of importance of criterion
		1	2	3			
17. Resuscitation bay with equipment appropriate for treating patients with polytrauma	Resuscitation bay that can accommodate the major trauma team and supporting teams with: » resuscitation trolley » basic and advanced airway management equipment » fixed and portable ventilator and gas supply » anaesthetic machine capable of delivering oxygen, air and volatile anaesthetic agent » Entonox cylinder and delivery system » ultrasound and x-ray machines » blood gas and electrolyte machine » spinal immobilisation	*Not applicable to this criterion*			Site visit	Site visit	4

17. Resuscitation bay with equipment appropriate for treating patients with polytrauma (continued)	» monitoring (invasive/non-invasive) compatible with that used in theatres and intensive care units and able to store parameters. Functions must include ability to undertake arterial, CVP, pulse oximetry, CO_2 and temperature monitoring » packs for peripheral and central venous access (including cut-down and intraosseous) » chest drain insertion pack » thoracotomy tray » arterial lines pack » pressurised high-volume heated fluid delivery device » limb splints and pelvic binders » family room				

Criteria name	Description	Level			Examples of evidence	Assessment	Level of importance of criterion
		1	2	3			
18. Emergency department (ED)	Responsible for supporting the major trauma resuscitation team in its role, receiving, resuscitating, stabilising, performing emergency procedures		×		List of consultants involved in delivering major trauma care and their level of service commitment to trauma, eg full time, half time At least band-7 nurse cover for ED at all times List of specialist nursing and AHP roles supporting trauma care Rota	Site visit	3
19. Neurosurgery	Responsible for advice and/or treatment of all trauma patients with head injuries Provision of a lead consultant responsible for coordinating all care for patients admitted into specialty A neurosurgical trauma liaison consultant should be identified within the service with responsibility for liaising with the major trauma service			×	List of consultants involved in delivering major trauma care and their level of service commitment to trauma, eg full time, half time Describe how a neurosurgery trauma liaison post is currently or will be delivered Describe how long it will take to have a senior specialty trainee (StR) in attendance List of specialist nursing and AHP roles supporting trauma care Rota	Document inspection	5

20. Spinal injury service	Responsible for advice, non-surgical and surgical treatment of spinal injuries			×	Description of how spinal service will be delivered in the centre, either on site or through use of expertise off site with referral protocols Protocols for how patients with spinal trauma will be assessed and managed	Document inspection	4
21. General surgery	Responsible for advice, non-surgical and surgical treatment Provision of a lead consultant responsible for coordinating all care for patients admitted into specialty A general surgery trauma liaison consultant should be identified within the service with responsibility for liaising with the major trauma service		×		List of consultants involved in delivering major trauma care and their level of service commitment to trauma, eg half time, full time Describe how a general surgery trauma liaison post is currently or will be delivered Describe how long it will take to have a StR in attendance List of specialist nursing and AHP roles supporting trauma care Rota	Document inspection	4

Criteria name	Description	Level			Examples of evidence	Assessment	Level of importance of criterion
		1	2	3			
22. Vascular surgery	Responsible for advice, non-surgical and surgical treatment Provision of a lead consultant responsible for coordinating all care for patients admitted into specialty		×		List of consultants involved in delivering major trauma care and their level of service commitment to trauma, eg half time, full time Describe how a vascular surgery trauma liaison post is currently or will be delivered List of specialist nursing and AHP roles supporting trauma care Rota	Document inspection	3
23. Orthopaedics	Responsible for advice, non-surgical and surgical treatment Provision of a lead consultant responsible for coordinating all care for patients admitted into specialty An orthopaedic surgery trauma liaison consultant should be identified within the service with responsibility for liaising with the major trauma service		×		List of consultants involved in delivering major trauma care and their level of service commitment to trauma, eg half time, full time Describe how an orthopaedic surgery trauma liaison post is currently or will be delivered Describe how long it will take to have a StR in attendance	Document inspection	4

23. Orthopaedics (continued)					List of specialist nursing and AHP roles supporting trauma care Rota		
24. Cardiothoracic surgery	A service responsible for advice, emergency/other surgical treatment and emergency thoracotomy and ongoing care of trauma patients admitted under the specialty If no on-site cardiothoracic service available then cardiopulmonary bypass equipment to be available on site, even if surgeons off site		×		Describe how a cardiothoracic surgery trauma liaison post is currently or will be delivered List of specialist nursing and AHP roles supporting trauma care Rota Evidence of how emergency cardiothoracic surgery will be delivered if surgeons off site	Document inspection Site visit	4
25. Radiology: plain film	X-ray imaging availability in ED with facilities for reporting of films Facilities for plain film reporting by radiology consultant within 24 hours: this service available 7 days per week Radiology liaison consultant should be identified within the service with responsibility for liaising with the major trauma service			×	Rota Letter from clinical director of radiology confirming level of consultant-led reporting for radiological investigations Describe how a radiology trauma liaison post is currently or will be delivered	Document inspection Site visit	4

Criteria name	Description	Level			Examples of evidence	Assessment	Level of importance of criterion
		1	2	3			
26. Radiology: ultrasound	Availability of ultrasound scanning in ED resuscitation room			×	Rota	Site visit	4
27. Radiology: CT	Availability of CT imaging within 30 minutes Safe transfer, monitoring and resuscitation facilities available Facilities for CT reporting by radiology consultant within one hour. Service available 7 days per week Commitment to teleradiology for access to imaging across the network		×		Rota Letter from clinical director of radiology confirming level of consultant-led reporting	Site visit	4
28. Radiology: interventional	Interventional procedures within 30 minutes, with safe transfer, monitoring and resuscitation facilities		×		Rota	Site visit	4
29. Radiology: MRI	MRI imaging available within 24 hours with safe transfer, monitoring and resuscitation facilities			×	Rota	Site visit	3

30. Theatre	Immediately available, fully equipped and dedicated staffed trauma theatre with second available if services overwhelmed Routine orthopaedic trauma lists, staffed separately to the emergency lists, available 7 days per week.	*Not applicable to this criterion*			Rota for emergency theatre 1 Rota for emergency theatre 2 Protocol for activation of emergency theatre 2 if services are overwhelmed	Document inspection Site visit	4
31. Anaesthetics	Available for airway management and surgery Equipment available for advanced/complex airway management Invasive monitoring compatible with ED system Senior personnel available and experienced in trauma anaesthesia An anaesthesia liaison consultant identified within the service with responsibility for liaising with major trauma service		×		List of consultants involved in delivering major trauma care and their level of service commitment to trauma, eg half time, full time Describe how an anaesthesia trauma liaison post is currently or will be delivered Rota	Document inspection Site visit	4

Criteria name	Description	Level			Examples of evidence	Assessment	Level of importance of criterion
		1	2	3			
32. Critical care	Available for intensive care support of major trauma patients.	*Not applicable to this criterion*			Number of beds available for major trauma patients and bed management protocol Network contingency plan if no beds available or capacity exceeded Dialysis facility Intracranial monitoring	Document inspection	4
33. Critical care team	Responsible for intensive care management of major trauma patients Critical care liaison consultant identified within the service with responsibility for liaising with the major trauma service		×		Describe how a critical care trauma liaison post is currently or will be delivered List of specialist nursing and AHP roles supporting trauma care	Document inspection	4
34. Laboratory services (haematology, coagulation, clinical chemistry and microbiology)	Staffed laboratory available for immediate analysis of blood and other specimens 24 hours a day, 7 days per week	*Not applicable to this criterion*			Rota Site map/visit	Document inspection Site visit	4

35. Blood bank	Available for providing blood and blood products with massive transfusion protocol Linked with 24/7 haematology advice Provision of a lead consultant responsible for policy development and quality assurance with trauma services	*Not applicable to this criterion*			Rota Site map/visit Massive transfusion protocol	Document inspection Site visit	4
36. Plastic surgery	Responsible for advice, non-surgical and surgical treatment (* NB: if centre designated as burns centre then it becomes level 2)		×*	×	Rota	Document inspection	3
37. Obstetrics and gynaecology)	Responsible for advice and/or treatment			×	Rota	Document inspection	2
38. General medicine	Responsible for advice and/or treatment		×		Rota	Document inspection	3
39. Urology	Responsible for advice and/or treatment			×	Rota	Document inspection	3
40. Maxillofacial	Responsible for advice and/or treatment			×	Rota	Document inspection	4
41. Ophthalmology	Responsible for advice and/or treatment			×	Rota	Document inspection	2
42. ENT	Responsible for advice and/or treatment			×	Rota	Document inspection	3
43. Cardiology	Responsible for advice and/or treatment		×		Rota	Document inspection	2

Criteria name	Description	Level			Examples of evidence	Assessment	Level of importance of criterion
		1	2	3			
44. Nephrology	Responsible for advice and/or treatment			×	Rota	Document inspection	2
45. Care of the elderly	Responsible for advice and/or treatment			×	Rota	Document inspection	3
46. Psychiatry	Responsible for advice and/or treatment			×	Rota	Document inspection	3
47. Endocrinology	Responsible for advice and/or treatment			×	Rota	Document inspection	1
48. Nutrition service	Responsible for advice and providing total parenteral nutrition and oral supplements	*24/7 advice* *9–5/5 days per week on site*			Rota	Not assessed at this stage	
49. TPN service	Responsible for providing TPN	*24/7*			Rota	Not assessed at this stage	
50. Transplant coordinator service	Responsible for transplant service coordination of donor organs	*24/7 advice within 60 minutese*			Rota	Not assessed at this stage	
51. Speech and language	Responsible for advice and/or treatment	*9–5/5 days per week*			Rota	Not assessed at this stage	
52. Specialist ED trauma nursing	Nurses responsible for specialist nursing, coordinating role or nurse consultants as part of the major trauma resuscitation team or service; list nurse consultants, CNS, ANP	*24/7 or as needed*			Rota Job descriptions	Not assessed at this stage	

53. Acute physiotherapy	Responsible for advice and/or treatment	*24/7 within 30 minutes*	Rota	Not assessed at this stage	
54. Occupational therapy	Responsible for advice and/or treatment	*9–5/5 days per week*	Rota	Not assessed at this stage	
55. Acute psychology	Responsible for advice and/or treatment	*9–5/5 days per week*	Rota	Not assessed at this stage	
56. Social services	Responsible for advice and/or treatment	*24/7 advice* *9–5/5 days per week*	Rota	Not assessed at this stage	
57. Provision for vulnerable adults	Facilities and processes to deal with vulnerable adults	*24/7*	Protocol	Not assessed at this stage	
58. Acute rehabilitation physician	Responsible for advice and/or treatment	*9–5/5 days per week*	Rota	Not assessed at this stage	
59. Specialist rehabilitation coordinator	Responsible for rehabilitation advice and coordination. List all those staff in this kind of role both qualified and unqualified	*9–5/5 days per week*	Rota Job descriptions	Not assessed at this stage	
Paediatrics	NB paediatrics was not included in the HfL first-stage trauma process (see section 7.1)e				

8.6 OPTIMAL RESOURCES FOR DESIGNATION OF TRAUMA UNITS

8.6.1 INSTITUTIONAL COMMITMENT

Criteria number	Description	Examples of evidence	Assessment	Level of importance criterion
60. Institutional commitment	Commitment from executive team and senior staff to the provision of a high-quality trauma service within the trust Presence of a trauma management structure that supports the delivery of a high-quality major trauma service led by a designated trauma medical director Presence of a clinical structure that supports the delivery of a high-quality trauma service Presence of a governance structure that assures quality of service and allows for continuous measurement and improvement Commitment to engage in the process of continuous improvement, including working closely with the major trauma centre	Written memorandum of commitment from trust board (or minutes) Business plan Organisational chart Clinical structure Governance framework Evidence of audit and improvement or future plans if not in place Evidence of regular case review meetings Subscription to TARN Educational programmes Network transfer protocol (under network section) Patient board	Document inspection Site visit	5

60. Institutional commitment (continued)	Submission of full data set to Trauma Audit and Research Network (TARN) annually Provision of education, eg ATLS®, ALS, CCriSP®, ATNC, TNCC or equivalent and other educational opportunities Commitment to adhere to a performance-monitoring framework System for rapid identification and transfer of under-triaged patients to major trauma centre Commitment to being part of a trauma network Involvement of patients in developing services to meet patient need			

8.6.2 SERVICE AND PROCESS

GLOSSARY OF SERVICE LEVELS

Level	Description
1.	Consultant available immediately on site 24 hours, 7 days a week; available to lead trauma team
2.	Consultant-led service available on site 24/7, with continuous junior presence out of hours and consultant available on site within 30 minutes
3.	Consultant available within 30 minutes; no commitment to provide ongoing continuous care

Criteria name	Description	Level			Examples of evidence	Assessment	Level of importance of criterion
		1	2	3			
61. Designated trauma resuscitation team	Responsible for receiving, resuscitating, coordinating care and treating trauma patients Can be led by an appropriate team member with agreement and support of a named consultant within the network		×		Rota Team membership Team structure Organisational chart Hospital at Night arrangements describing level of senior support at night Activation protocol Audit data (previous year)	Document inspection Site visit	4
62. Ongoing patient care team	Responsible for admitting under a specialty and coordinating ongoing care under the responsibility of a designated lead specialty consultant		×		Rota Team membership/structure Organisational chart Referral/care plans	Not assessed at this stage	

63. Resuscitation bay with equipment	Resuscitation bay that can accommodate the trauma team and supporting teams with: » Crash trolley, intubation equipment » Ventilator and gas supply (including Entonox) » Ultrasound and x-ray machines » Blood gas and electrolyte machine » Spinal immobilisation » Monitoring (invasive/non-invasive) » Packs for chest drains, central lines, venous cut-down, arterial lines, diagnostic peritoneal lavage, level 1 transfusion device » Limb splints and pelvic binders » Family room				Site visit	Not assessed at this stage	
64. ED	Responsible for supporting the trauma resuscitation team in its role, receiving, resuscitating, stabilising, performing emergency procedures		×		Rota	Not assessed at this stage	

Criteria name	Description	Level			Examples of evidence	Assessment	Level of importance of criterion
		1	2	3			
65. Orthopaedics	Responsible for orthopaedic advice, non-surgical and surgical orthopaedic treatment		×		Rota	Not assessed at this stage	
66. General surgery	Responsible for general surgical advice, non-surgical and surgical treatment		×		Rota	Not assessed at this stage	
67. Radiology: plain film	X-ray imaging in ED if not possible, 5 minutes proximity, with safe transfer, monitoring and resuscitation facilities, and immediate reporting		×		Rota Site visit	Not assessed at this stage	
68. Radiology :CT	CT imaging close proximity, with safe transfer, monitoring and resuscitation facilities		×		Rota Site visit	Not assessed at this stage	
69. Radiology: ultrasound	Ultrasound imaging within ED and immediate reporting		×		Rota Site visit	Not assessed at this stage	
70. Theatre	Immediately available, fully equipped theatre with dedicated staff and a second theatre available if services are overwhelmed		×		Rota	Not assessed at this stage	

71. Anaesthetics	Available for airway management, procedures and anaesthetic for surgical operations		×		Rota	Not assessed at this stage	
72. ITU	Available for intensive care and ventilation		×		Rota Number of beds and bed management protocol for trauma patients	Not assessed at this stage	
73. Laboratory	Response for analysis of blood and other specimens	*24/7 7 days per week*			Site map/visit	Not assessed at this stage	
74. Blood bank	Available for providing blood and blood products: type-specific, full cross matched, platelets, cryoprecipitate, FFP, factors Massive transfusion protocol	*24/7 7 days per week*			Site map/visit Protocol	Not assessed at this stage	
Paediatrics	NB paediatrics were not part of the HfL first-stage trauma process (see section 7.1)						

8.7 OPTIMAL RESOURCES FOR DESIGNATION OF REHABILITATION SERVICES

8.7.1 SERVICE AND PROCESS

Criteria number	Description	Evidence	Assessment	Essential
75. Acute rehabilitation inpatient			Not assessed at this stage	
76. Long-term rehabilitation inpatient			Not assessed at this stage	
77. Long-term rehabilitation outpatient			Not assessed at this stage	
78. Multi-injured patient			Not assessed at this stage	
79. Amputee			Not assessed at this stage	
80. Head injury			Not assessed at this stage	
81. Spinal			Not assessed at this stage	
82. Medical rehabilitation director		Job description	Not assessed at this stage	
83. Rehabilitation physician		Rota	Not assessed at this stage	
84. Rehabilitation nurses		Rota	Not assessed at this stage	
85. Physiotherapists		Rota	Not assessed at this stage	
86. Occupational therapists		Rota	Not assessed at this stage	
87. Speech and language therapists		Rota	Not assessed at this stage	
88. Social services			Not assessed at this stage	

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