Worcestershire NHS
Acute Hospitals NHS Trust

Major Trauma Operational Policy
Worcestershire Acute Hospitals NHS Trust

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Target audience:	Clinical staff, Operational and Management team supporting Trauma Unit

Responsible Director's Name & Title:	Dr Christine Blanshard (CMO WAHT)
Department/Specialty:	Trauma Unit – Worcestershire Royal Hospital Local Emergency Hospital – Alexandra Hospital

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Revisions	v 2.0 Dec 2023: David Freeman v 1.75 Jan 2023: Karen Jones v 1.0 Jan 2019: Steve Goodyear

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Introduction

Worcestershire Acute Hospitals NHS Trust operates within the Birmingham, Black Country, Hereford & Worcester (BBCHW) Trauma Network. Regional planning of effective trauma care was implemented in March 2012 following publication of the 2007 NCEPOD 'Trauma: Who Cares?' report, which acknowledged the positive volume-outcome relationship for major trauma and the need for centralisation of care into specialist centres.

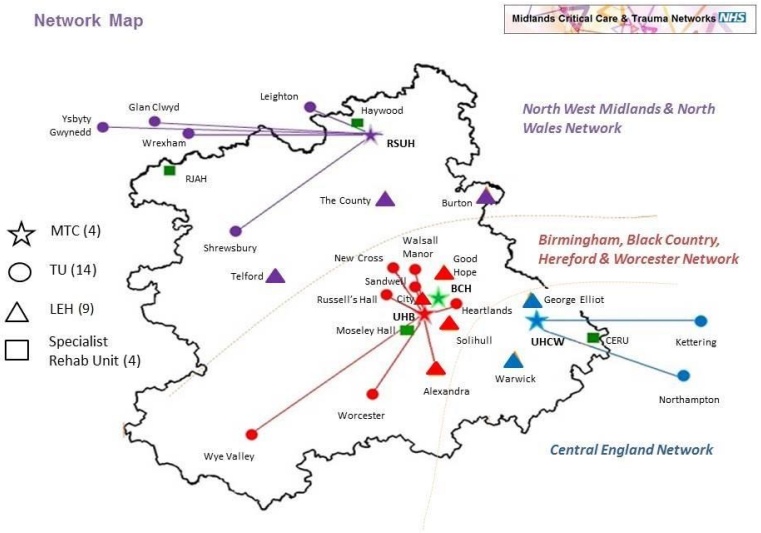
England's regional trauma networks are organised in a hub-and-spoke model with common regional operational policies. These comprise of:

- Pre-hospital services
- Major Trauma Centres (MTCs)
- Trauma Units (TUs)
- Local Emergency Hospitals (LEHs)

Within the BBCHW Trauma Network, the Queen Elizabeth Hospital at the University Hospitals Birmingham NHS Trust is the MTC for adults (age ≥16 years), with the Birmingham Children's Hospital the MTC for children (age < 16 years).

Worcestershire Royal Hospital (WRH) is a designated TU and receives both patients with traumatic injuries who are deemed too unstable for immediate transfer to the MTC and those with injuries that do not meet the threshold for immediate MTC care.

The Alexandra Hospital in Redditch (ALX), is a LEH and should not receive Major Trauma cases via the ambulance service. It also does not have surgical capacity to operate on non-major trauma patients as all trauma patients (for example fracture neck of femur and other appendicular bones). It is recognised however that these cases may occasionally present there, either due to patient self-presentation or due to under-triage by the ambulance service.



WRH Trauma Unit and ALX Local Emergency Hospital

Worcestershire Acute Hospitals NHS Trust was established on 1 April 2000. It covers the whole of Worcestershire, incorporating the Alexandra Hospital at Redditch, Kidderminster Hospital and Worcestershire Royal Hospital.

Worcestershire Royal Hospital (WRH) was opened in 2002, located to the east of Ronkswood. WRH provides a full range of District General Hospital services including Emergency Medicine and is also the county-wide centre for Vascular surgery, Maxillofacial surgery, Interventional Cardiology and Level 2 Neonatal Intensive Care. It operates all emergency trauma, stroke and paediatric services for the Trust.

WRH Emergency Department (ED) has approximately 85,000 attendances per year. The department comprises a 4-bedded resuscitation room, a 4-bedded High Dependency area, 2 Rapid Assessment Cubicles, 13 Majors cubicles, 9 Overflow trolley spaces, 3 Paediatric cubicles, 5 Minor Injury assessment cubicles and a negative-pressure isolation cubicle. There is an ED Consultant resident from 0800–0000, 7-days per week. From 0000-0800, the ED is led by the ED Middle Grade (equivalent to ST4 or above) with non-resident ED Consultant cover (< 30-minute response time).

The Alexandra Hospital, Redditch was opened in 1985 and is a designated Local Emergency Hospital. The hospital is the centre for the county's Urology Service but does not treat emergency major trauma or paediatrics. The ALX ED has approximately 61,000 attendances per year and comprises a 3-bedded Resuscitation Room, a 5-bedded Respiratory Cohort area, 2 Rapid Assessment Cubicles, 14 Majors cubicles, 2 Fit to Sit Cubicles and 4 Minor Injury assessment rooms. There is an ED Consultant resident between the hours of 0800–1900, 7-days per week. From 1900-0800, the ED is led by the ED Middle Grade (equivalent to ST4 or above) with non-resident ED Consultant cover (< 30-minute response time).

All ED Consultants and Middle Grade doctors are expected to be Instructors or Providers for:

- Advanced Trauma Life Support (ATLS) or European Trauma Course (ETC)
- Advanced Paediatric Life Support (APLS) or European Paediatric Advanced Life Support (EPALS)

Worcestershire Acute NHS Trust runs both EPALS and ATLS courses and prioritises places for ED medical staff.

All ED Nurses at WRH and ALX are supported to achieve Level 1 Trauma Nursing competency. The Trust runs the Trauma Nursing Core Course (TNCC) 4 times a year.

WAHT Trauma Group

The Trust Trauma group oversees the clinical care and clinical governance of patients presenting to Worcestershire Acute Hospital NHS Trust with Major Trauma. The group is chaired by the Clinical Lead for Major Trauma: Dr David Freeman, Consultant Anaesthetist and Deputy Clinical Lead for Major Trauma: Dr Iraklis Kagkouras. The Trust Trauma Group consists of the the following members:

David Freeman	Trauma Group Chair, Clinical Lead for Major Trauma
Iraklis Kagkouras	Deputy trauma lead role for 0.5 PA per week

WAHT TARN Co-ordinator: Lindsay Coleman

Nick Turley	ED Trauma lead
David Raven	ED Consultant
Baljinder Singh	ED Consultant
Abdul Jalil	ED Consultant (Alex)

Laura Kocierz	ICU Consultant, Critical Care Lead for Trauma
Sian Bhardwaj	ICU Clinical Director and Consultant

Charlie Docker	Trauma & Orthopaedics Consultant
Shahbaz Malik	Trauma & Orthopaedics Consultant, Lead for Trauma

Indy Nagra	Consultant Radiologist (send invites, may come)
Dr Singh	MSK Consultant Radiologist

Cearann Reen	Matron for Trauma & Orthopaedics
Tracey Dennehy	Lead Practitioner for Orthopaedics
Laurie Jewkes	Lead Practitioner for General Surgery
Helen Hawkes	Lead for Physiotherapy / Rehabilitation
Beverley Phillips	Lead OT Trauma

The multidisciplinary trust trauma group meets at least quarterly. All Trauma deaths are presented and discussed, as well as items detailed on a recurring agenda.

1. Declarations of interest
2. Minutes
3. Matters arising- Outstanding actions
4. Trauma Network – news / issues
5. Trust Trauma Group – news / issues
6. TARN submissions / feedback
7. Trustwide Major Trauma Mortality / Morbidity
8. TRID cases
9. Individual cases for discussion / feedback
10. Rehabilitation
11. Major Trauma Training
12. Audit / QI Activity
13. Any other business
14. Next meeting

Trauma Audit and Research Network (TARN)

The Trauma Audit and Research Network (TARN) is a national organisation that collects and processes data on moderately and severely injured patients in England and Wales.

The Trauma Audit & Research Network (TARN) has been working with NHS Trusts across England and Wales for 20 years to improve emergency health care 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 as a source of information is used to support trauma service improvement. TARN produces quarterly comparative reports for participating hospitals.

In doing so, it allows networks, major trauma centres, trauma units, ambulance services and individual clinicians to benchmark their trauma service with other providers across the country.

Details of all appropriate trauma cases are to be uploaded to the TARN database. Emma Brookes-Wiggins is the trust's TARN co-ordinator. Lyndsay Coleman is the deputy TARN Co-Ordinator and can assist in Emma's absence.

Data are collected retrospectively from WRH ED coding records. Data completeness and quality are discussed at the Trust Trauma Group Meeting on a quarterly basis, in addition to network review.

Pre-Hospital Triage & Trauma Team Activation

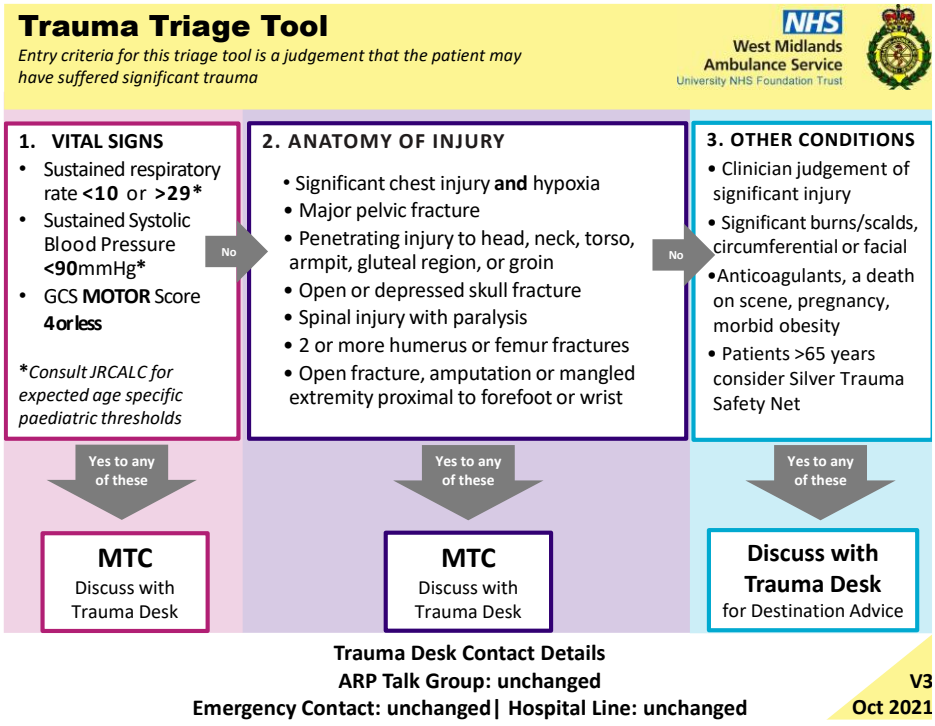
Approach to Trauma Care

From the moment of injury, the Trauma Network aims to optimise patient care and ensure that the right person gets the right treatment, at the right place and at the right time.

The key structures in place to optimise the care of major trauma patients are:

1. Use of a Pre-Hospital Triage Tool to identify patients who require direct transfer to the MTC
2. Support for pre-hospital teams from the West Midlands Ambulance Service (WMAS) Regional Trauma Desk, staffed 24:7
3. Direct pathways between TUs and the MTCs via the WMAS Regional Trauma Desk
4. Specialist pathways for Neurosurgical referrals
5. Rehabilitation Pathways with the development of Rehabilitation Prescriptions to accompany patients on their transfer back from the MTC to their local Trust

WMAS Pre-Hospital Trauma Triage Tool



Regional Trauma Desk

The WMAS Regional Trauma Desk can be contacted for advice or hyperacute transfer as below:

Regional Trauma Desk – Hospital line: 01384 215697

Regional Trauma Desk – General Enquiries: 01384 215696

Regional Trauma Desk – Emergency line: 01384 215695

This is to facilitate arrangement of transfers into:

- University Hospital Birmingham
- University Hospital Coventry and Warwick
- University Hospital North Midlands (Stoke)

Trauma Team Activation Criteria

The Hospital Trauma Team should be activated in the following circumstances:

- Routinely following pre-alert of a patient who triggers the WMAS Trauma Triage Tool
- On recognition of the arrival of a patient who triggers the WMAS Trauma Triage Tool to either WRH or the ALX, either due to self-presentation or to under-triage by WMAS
- When the local Trauma Team Activation Criteria are met, but not the WMAS Trauma Triage Tool, the Emergency Physician In Charge (EPIC) will determine whether a full Trauma Team or an internal ED team response is required
- Multiple or mass casualties
- At the discretion of the Trauma Team Leader (TTL)

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TRAUMA TEAM ACTIVATION CRITERIA

Following Handover/Pre-Alert from Ambulance service or on Triage Assessment – do following criteria apply?

MECHANISM OF INJURY

- Fall >20 feet / 2 storeys (or >2 x height in a child)
- Death of another vehicle occupant
- Ejection from the vehicle (complete or partial)
- Intrusion >30cm at patient site
- Entrapment/Long extrication (> 20 minutes)
- Motorcycle crash >20mph
- Pedestrian/cyclist vs motor vehicle >30mph
- Crush injury to thorax/abdomen
- Stabbing (except if limb only)
- Gunshot wound
- Fall down full flight of stairs

YES

NO

APPARENT INJURIES

- Airway compromise
- Penetrating Trauma (neck / chest / abdomen)
- Blunt trauma (suspected major chest/abdo injuries)
- Suspected significant pelvic fracture
- 2 or more long bone fractures (hum/fem/tibia)
- Amputation proximal to wrist or ankle
- Suspected spinal cord injury
- Burns >20% BSA with associated trauma, or evidence of airway burns
- Open or depressed skull fracture

YES

NO

ABNORMAL VITAL SIGNS (as a consequence of Injury)

Systolic BP <90

RR<10 or >29

Heart rate >120

GCS <13

O2 sats <94 on air

FOR CHILDREN

Clinical Hypovolaemia

Resp distress/Failure

GCS <14

SpO2 <94% on air

YES

SPECIAL CONSIDERATIONS

Age >65 – increasing age can lead to more severe injuries for any mechanism including simple falls.

Pregnancy >16 weeks – OBSTETRIC TRAUMA CALL

Children (see Paediatric Trauma Proforma) – PAEDIATRIC TRAUMA CALL

Suspected significant Haemorrhage / Bleeding disorders / anticoagulants – early consideration of need for blood products / activation of major haemorrhage protocol

Multiple Injured Patients

ANY OTHER CONCERNS FROM ED STAFF OR OTHER TEAM MEMBERS

YES

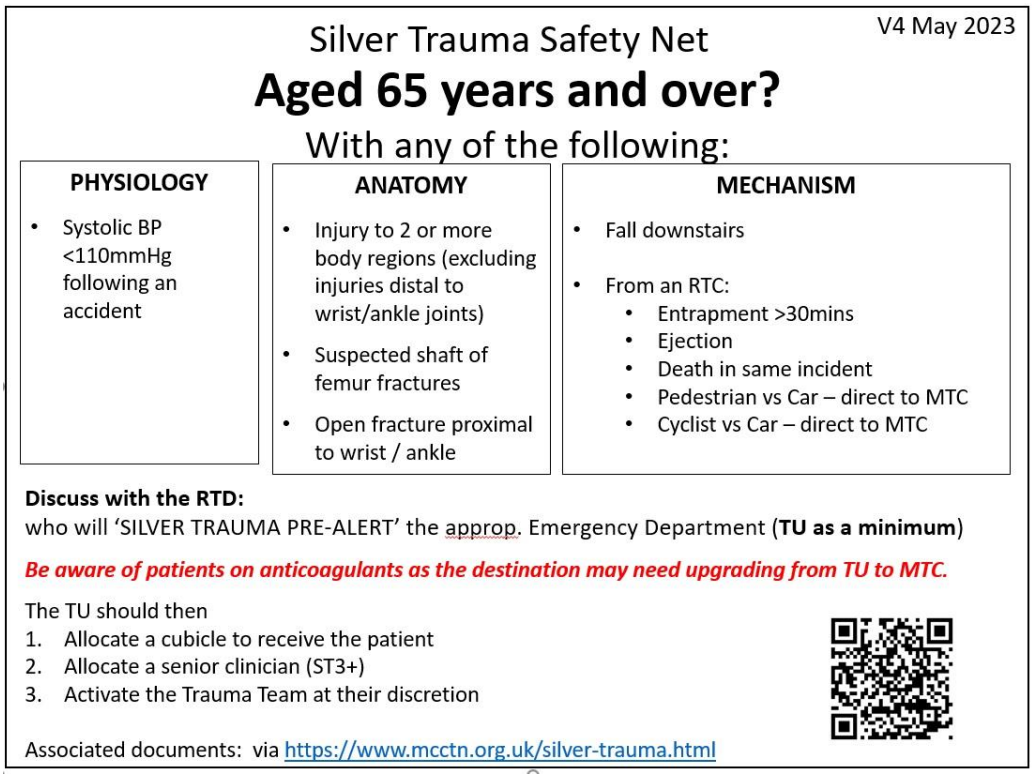
1) Inform most Senior ED Doctor on Shop-Floor – ED middle grade or Consultant will usually be Trauma Team Leader
2) On decision to activate trauma team - Dial **2222** to put out 'Trauma Alert, A&E' and expected ETA of patient.
3) If out-of-hours, contact ED Consultant on-call.
4) Ensure appropriate space for patient to be received and assessed by trauma team – ideally in RESUS area.
5) **Suspected Significant Haemorrhage -** early consideration of need for blood products / activation of major haemorrhage protocol.

Discuss Case with Most Senior ED doctor or Consultant-on-call if any concerns.

Silver Trauma Safety Net Tool

Research and TARN data demonstrate that older patients may sustain severe injuries from seemingly innocuous, low energy mechanisms. Severe injuries may also be more difficult to detect in this group due to increased co-morbidities and prescription medication use attenuating the physiological responses to injury. To address this, the Midlands Regional Trauma Network has implemented the Silver Trauma Safety Net tool for use in individuals aged 65 years and over.

Patients aged 65 years and over who trigger the WMAS Trauma Triage Tool should be managed according to that tool. Those who do not, should be checked against the Silver Trauma Safety Net tool and if appropriate be discussed with the WMAS Regional Trauma Desk prior to a "Silver Trauma Pre-Alert" being put out to the appropriate TU or MTC.



Silver Trauma Safety Net

V4 May 2023

Aged 65 years and over?

With any of the following:

PHYSIOLOGY

- Systolic BP <110mmHg following an accident

ANATOMY

- Injury to 2 or more body regions (excluding injuries distal to wrist/ankle joints)
- Suspected shaft of femur fractures
- Open fracture proximal to wrist / ankle

MECHANISM

- Fall downstairs
- From an RTC:
  - Entrapment >30mins
  - Ejection
  - Death in same incident
  - Pedestrian vs Car – direct to MTC
  - Cyclist vs Car – direct to MTC

Discuss with the RTD:
who will 'SILVER TRAUMA PRE-ALERT' the approp. Emergency Department (**TU as a minimum**)

Be aware of patients on anticoagulants as the destination may need upgrading from TU to MTC.

The TU should then
1. Allocate a cubicle to receive the patient
2. Allocate a senior clinician (ST3+)
3. Activate the Trauma Team at their discretion

Associated documents: via https://www.mcctn.org.uk/silver-trauma.html

Silver Trauma Pre-Alert Response

The Hospital Trauma Team should be activated for any older person who meets the Trauma Triage Tool activation criteria and considered for those meeting local Trauma Team Activation criteria.

When a "Silver Trauma Pre-alert" is received for a patient who does not meet the Trauma Team Activation criteria, the following should occur:

- Identification of a cubicle within the Emergency Department to receive the patient into
- Ensure a senior member of the clinical team (equivalent to ST4 or above) meets the patient on arrival with additional nursing support
- Make an early judgement on whether spinal immobilisation can be removed or whether another form of protection can be used until imaging is performed

The Trauma Team (WRH Trauma Unit)

Trauma Team Leader (TTL)

There will be a designated TTL in the event of Trauma Team activation.

0800-0000, 7 days a week: ED Consultant (or directly supervised ED Middle Grade)
0000-0800, 7 days a week: ED Middle Grade (equivalent to ST4 level or above)
ED consultant on-call informed by WRH Switchboard

The Trauma Team will be activated by the ED team dialling '2222' and asking for the appropriate Trauma Team activation:

The Trauma Teams will be mobilised by two consecutive audio-bleeps of the following formats:

- "Adult Trauma Alert, [location], ETA [time]."
- "Paediatric trauma alert, [location]. ETA [time]." (age < 16)
- "Obstetric trauma alert, [location]. ETA [time]." (≥16 weeks' gestation)

In the event of failure to respond to a trauma bleep, the TTL will, at their discretion:

- Place a further trauma call via switchboard
- Escalate to the relevant specialty consultant

Trauma Team Members

Members of the WRH Trauma Team (will be notified and MUST attend):

Trauma Team Leader: ED Consultant or ED Middle Grade from 0000-0800
ED Nursing Staff on duty in Resuscitation Room
Airway Management: ITU Registrar and SHO
Horizontal Primary Survey: ED Middle Grade/SHO, Surgical SHO and T&O SHO
Secondary Survey: T&O SHO (or Registrar)
Assessing need for Damage Control Surgery: Surgical Registrar*
Assessing need for Immediate Orthopaedic Surgery: T&O Registrar*

NB. Paediatric Trauma only (<16 years old): Paediatric Registrar
Obstetric Trauma only (>20 weeks pregnant): Obstetric Registrar and midwife

*If surgical or orthopaedic registrar is unavailable (operating), contact relevant Consultant on-call.

Worcestershire Royal Hospital - Adult Trauma bleeps

154	ED X-ray	602	Critical Care Consultant
163	Tracey Dennehy	652	Debbie Yates
174	Surgical Triage Nurse	655	Chris Doughty
300	Site Lead	688	Surgical SHO on-call
333	Nurse Practitioner Site Bleep	699	Surgical Registrar on-call
362	ED Porter	700	Anaesthetics SHO Theatre
400	Amber Bright	701	Anaesthetics SHO Maternity
401	Senior Nurse	702	Critical Care Registrar
419	ED Bleep	703	Anaesthetics Senior Registrar
420	T&O Registrar	704	Anaesthetic Registrar
454	ED CT		
493	T&O SHO on-call	737	ACCPs or ICU SHO
600	Anaesthetic Consultant		

Worcestershire Royal Hospital - Obstetric Trauma bleeps

154	ED X-ray	601	Anaesthetic Obstetric Consultant
163	Tracey Dennehy	602	Critical Care Consultant
174	Surgical Triage Nurse	651	Neonatal Registrar
223	Maternity Unit Bleep	652	Debbie Yates
250	Riverbank Unit	653	Paediatric Registrar
300	Site Lead	654	Gynae Registrar
333	Nurse Practitioner Site Bleep	655	Chris Doughty
362	ED Porter	659	Paediatric SHO
400	Amber Bright	688	Surgical SHO on-call
401	Senior Nurse	676	Paediatric Consultant
419	ED Bleep	679	Neonatal Consultant
420	T&O Registrar	699	Surgical Registrar on-call
432	Chargehand Porter	700	Anaesthetics Theatre SHO
454	ED CT	701	Anaesthetics Obstetric SHO
493	Orthopaedic SHO on-call	702	Critical Care Registrar
566	Caesarean Section Consultant	703	Anaesthetics Senior Registrar
600	Anaesthetic Consultant	737	ACCPs or ICU SHO
800	Obstetric Registrar	878	Meadow Birth Unit

Worcestershire Royal Hospital - Paediatric Trauma bleeps

163	Tracey Dennehy	600	Anaesthetic Consultant
154	ED X-ray	602	Critical Care Consultant
174	Surgical Triage Nurse	652	Debbie Yates
250	Riverbank Unit	653	Paediatric Registrar
300	Site Lead	655	Chris Doughty
333	Nurse Practitioner Site Bleep	659	Paediatric SHO
362	ED Porter	676	Paediatric Consultant
400	Amber Bright	688	Surgical SHO on-call
401	Senior Nurse	699	Surgical Registrar on-call
419	ED Bleep	700	Anaesthetics Theatre SHO
420	T&O Registrar	701	Anaesthetics Maternity SHO
432	Chargehand Porter	702	Critical Care Registrar
454	ED CT	703	Anaesthetics Senior Registrar
493	T&O SHO on-call	737	ACCPs or ICU SHO

The Trauma Team (ALX Local Emergency Hospital)

A reduced trauma team remains in place at the ALX for the emergency management of self-presenting or under-triaged Major Trauma cases.

From 0800-1900, the ED Consultant (or directly supervised ED Middle Grade) will act as Trauma Team Leader (TTL) in the event of Trauma Team activation. From 1900-0800, an ED Middle Grade (equivalent to ST4 or above) will assume the duties of TTL. From 1900-0800, ALX Switchboard will inform the on-call ED Consultant in the event of Trauma Team activation, who will offer immediate advice or attendance as appropriate for the clinical situation.

Members of the Trauma Team (ALX) (will be notified and **MUST** attend)**:**

Trauma Team Leader: ED Consultant or ED Middle Grade from 1900-0800
Airway Management: ITU Registrar
Horizontal Primary Survey: ED Middle Grade/SHO, Surgical SHO, T&O SHO
Secondary Survey: T&O SHO
Assessing need for Damage Control Surgery: Surgical Registrar/Middle Grade*
Assessing need for Immediate Orthopaedic Surgery: T&O Registrar/Middle Grade**

*If a patient presenting to the ALX requires emergency Damage Control Surgery for Major Trauma, **the Regional Trauma Desk (RTD) will be contacted immediately and Life/Limb-Threatening Transfer to the MTC effected without delay [see Chapter 4]**. If a patient requires urgent/emergency surgery, **the On-Call Consultant General Surgeon at WRH will be contacted immediately for discussion and the patient transferred to WRH ED without delay if appropriate using the established WAHNT Emergency Surgery Pathway (see Appendix 11 & 12).**
**Out of hours: T&O Registrar is a secondary member of the Trauma Team, contactable by mobile phone via switchboard – contact is at the discretion of the TTL or T&O SHO (response time < 30 minutes).

The Trauma Team will be activated by the ED team dialling '2222' and asking for the appropriate Trauma Team activation:

Members of the Trauma Team will be mobilised to Trauma Alerts by two consecutive audio-bleeps of the following format:
"Trauma Alert, [location**]. ETA [**time**]."**

The list of those receiving each type of alert is in Appendix 2
In the event of failure to respond to a trauma bleep, the TTL will, at their discretion:
- Place a further trauma call via switchboard
- Escalate to the relevant specialty consultant.

Alexandra Hospital – Adult Trauma bleeps

1244 ED X-ray
1905 Surgical FY1
1910 Surgical SHO
1920 Surgical Registrar
(on mobile after 5pm)
1913 Orthopaedic SHO
1907 Anaesthetic SHO
1933 Anaesthetic Registrar
1903 Nurse Co-ordinator
1255 Haematology bleep holder
1278 ED Matron

Role of the Trauma Team Leader (TTL)

The Trauma Team Leader should adopt a hands-free approach to the patient to maintain situational awareness, and only intervene if specific skills/expertise are beyond the competencies of the individual trauma team members.

The Trauma Team Leader should perform the following:

1. Five Second Round
2. Receive ATMIST handover from the Paramedics
3. Collate Findings of Primary Survey and Coordinate Appropriate Management

Five Second Round

As the patient arrives in the ED Resuscitation Room, the TTL should perform a brief initial assessment of the patient before handover commences (assessing social interaction, respiratory effort and skin perfusion). This should take approximately five seconds to perform and aims to rule out the following life-threatening conditions:

1. Complete airway obstruction
2. Massive external haemorrhage
3. Traumatic cardiac arrest

If the TTL identifies any immediately life-threatening conditions, they MUST immediately direct the team to take actions to address these. If the Five Second Round does not cause concern, the patient can be transferred onto the ED trolley following which the TTL will ask the Trauma Team for attention whilst the Paramedic Crew delivers an ATMIST handover. After handover, the horizontal primary survey can commence.

Responsibilities of the TTL:

- Briefing the trauma team and assigning clear roles within the team
- Overall co-ordination of patient care, including primary and secondary surveys
- Ensuring appropriate and timely investigation of suspected injuries
- Providing clinical leadership to the team and supervising practical interventions
- Delegating tasks appropriately
- Determining the injury management priorities
- Determining the need for transfer for MTC or other off-site specialist care
- Determining the appropriate destination (and admitting team)
- Training junior colleagues in trauma management and practical techniques as required
- Ensuring accurate documentation of ED care
- Ensuring the ED Consultant is notified out of hours

The TTL assumes overall responsibility for the patient's care, until they are formally handed over to the admitting team.

ED Trauma Patient Assessment

ATMIST Handover

The Trauma Team Leader should take handover from the Paramedic crew using an "ATMIST" approach. This is a standard handover tool which will be required at all points of patient handover, including all referrals from the Trauma Unit to the Major Trauma Centres.

Radiology

The care provided to the trauma patient in the first few hours can be critical to their long-term recovery. Diagnostic and therapeutic radiology plays a pivotal role in this management process and timely access to adequate imaging modalities is key to early diagnosis and instituting early definitive care.

The TTL (or delegate) will inform the on-call Radiologist and/or Radiographer of emergent imaging requirements directly.

Plain films & FAST Scanning

- Portable Chest and Pelvis plain films are acceptable adjuncts to the Primary Survey and should be immediately available 24/7 – deployment is at the discretion of the TTL
- Immediate portable CXR may still be considered following a decision to perform Trauma CT if there is doubt about the laterality or presence of a pneumothorax in an unstable patient
- Extended Focused Assessment with Sonography in Trauma (eFAST) is a standardized ultrasound examination aimed at identifying immediately life-threatening conditions and targeting resuscitative efforts
- In experienced hands, eFAST is a useful adjunct to clinical examination and may have a role in patients too unstable for immediate transfer to CT, and/or whilst simultaneously managing multiple casualties
- eFAST should not be performed if it would cause a delay to CT

Trauma CT

Trauma CT should be conducted as soon as possible and within 30 minutes of request submission

- Two CT scanners are co-located adjacent to the ED and available 24/7 at both ALX and WRH
- Priority is given to ED patients
- At WRH, at least one dedicated CT radiographer is resident 24/7
- At ALX, at least one dedicated CT radiographers is resident 0800-2000 hours and from 2000-0800 the radiographer in ED x-ray is available to perform urgent CT scans when required

Network Trauma CT Protocols

A Whole Body Trauma CT aims to rapidly identify severe injuries in polytrauma patients. Guidance is based on RCR guidance (Royal College of Radiologists, 2015). It consists of:

- Brain
- Cervical spine
- Arterial phase chest, abdomen and pelvis (to symphysis pubis)
- Portal-venous phase abdomen and pelvis

Indications for Trauma CT:

At least one of the following should be present:

1. Obvious severe injuries on clinical assessment
2. The mechanism of injury/presentation* suggests there may be occult severe injuries that cannot be excluded by clinical examination or plain films
3. eFAST scan positive for intra-abdominal fluid
4. Significant injury found on plain X-rays (e.g., pneumothorax/pelvic fracture)
5. Unexplained haemodynamic instability following trauma

*High risk mechanisms of injury/presentations include:

1. Injury to > 1 body region
2. Fatality at scene
3. Fall from > 3m
4. Gunshot wound
5. High speed RTC (pedestrian vs. car; ejection; rollover; entrapment > 30mins)

Simple penetrating injuries (e.g. isolated stab wounds) may be amenable to focused regional imaging

It is inappropriate to await results of renal function tests for Trauma CT and this should be waived by the Consultant Radiologist on-call. Departmental policy states that all major trauma patients should receive intravenous iodinated contrast. As a high dose examination, Trauma CT should not be used routinely in children (<16y) or pregnant women. A lower dose/targeted protocol may be used in these cases.

Haemodynamic Instability

- In general, patients undergoing Trauma CT should be haemodynamically stable (SBP>90)
- Some hypotensive patients (SBP 70-90mmHg) may benefit from a Trauma CT, following consultation between the TTL, Surgical Consultant/Registrar and the ICU Consultant/Registrar
- Unstable patients with a SBP < 70mmHg may be more appropriately managed by primary Damage Control Surgery (rather than CT)
- All cases for Trauma CT should be discussed with the TTL

Trauma CT Reporting

All Trauma CT scans should be reported by an appropriately trained on-call Radiologist. A 'Primary Survey report' giving an indication of the major life-threatening injuries should be provided immediately followed by a definitive written report within one hour of CT acquisition.

Where active contrast extravasation is seen, the Trauma Team Leader will be informed immediately. In the presence of traumatic haemorrhage, the decision to proceed with interventional radiology, open surgery, a hybrid-procedure, or non-operative management should be made by the TTL, General and/or Vascular Consultant Surgeons on-call and the Interventional Radiologist (with appropriate specialty liaison as required).

WRH

At WRH, resident Consultant (Diagnostic) Radiologist cover is available 0900-2100 hours Monday-Friday, and 0900-1700 at weekends. Non-resident on-call cover is provided 1700-2100 hours at weekends. From 2100-0900, Consultant Radiologist cover is outsourced to Medica Nighthawk. In all cases, the TTL (or delegate) will directly inform the on-call Radiologist at the time of a Trauma CT request so that reporting is not delayed.

ALX

At ALX, resident Consultant (Diagnostic) Radiologist cover is available 0900-1700 Monday-Friday. Non-resident on-call cover is provided from 1700-2200 Monday-Friday and 0900-2200 at weekends. From 2200-0900, Consultant Radiologist cover is outsourced to Medica Nighthawk.

Night cover

During the hours that Medica Nighthawk are providing cover, clear protocols are in place for all CT scans at both sites (see appendices 3 and 4). Medica Nighthawk must be directly informed of a Trauma CT request by the TTL (or delegate). A rapid response Primary Survey report will be provided within minutes of Medica receiving images and the TTL notified. A detailed report will be available on ICE/PACS within 60 minutes.

In the event of any immediate provisional findings requiring intervention, the Radiologist will alert the Trauma Team Leader verbally and via an initial reporting proforma (see appendix 5).

Teleradiology Facilities

Both sites use the Image Exchange Portal (IEP link) to transfer images to a MTC. CT radiographers are trained to use this out of hours to enable its use 24/7.

Focused Imaging: Adults & Children

For isolated head and cervical spine injuries, use:
NICE Clinical Guideline (NG232) Head injury: assessment and early management. 2023
NICE Clinical Guidelines (NG41) Spinal injury: assessment and initial management 2016

Transfer of Adult Patients to the Major Trauma Centre

In the context of the Trauma Network, there will be four general categories of patient presenting to the Trauma Unit or Local Emergency Hospital who require emergency transfer for MTC care:

1. Patients meeting criteria for Life ± Limb Threatening (Hyperacute) Transfer to the MTC
2. Patients with injuries whose definitive care can only be provided at the MTC
3. Self-presenting or under-triaged patients with significant injuries detected on examination or CT
4. Patients whose ongoing care needs exceed the capability of the Trauma Unit

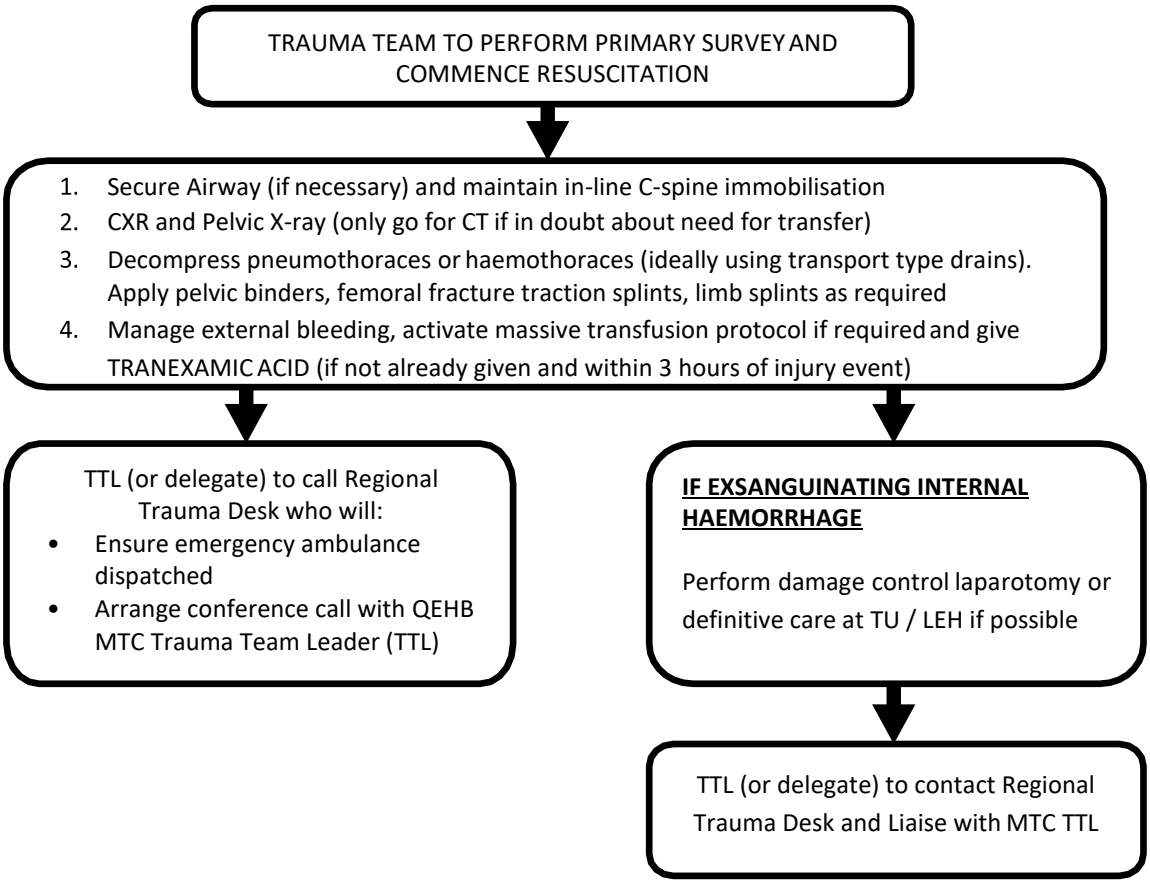
Transfers from WRH or ALX to the QEHB MTC should be implemented in line with the Trauma Network Protocol, as described below.

For clinical advice & co-ordination of all life ± limb threatening transfers, call the Regional Trauma Desk (RTD): 01384 215695

4.1 Life ± Limb Threatening (Hyperacute) Transfer - immediate (within 1 hour)

Patients eligible to undergo Life ± Limb Threatening Transfer are those needing immediate life or limb saving intervention at a MTC where it cannot be delivered at the TU or LEH or cannot be delivered within an appropriate timescale there

A principle of "**send and call**" will be used. The RTD will be the hub for communication; the TTL (or delegate) must state 'life/limb threatening transfer required'.



The Trauma Team under the direction of the TTL will be responsible for ensuring that the patient is safe/appropriate for transfer, following the above protocol and the Adult Life ± Limb Threatening Transfer Checklist (Appendix 6).

It will not be possible to ensure haemodynamic stability prior to transfer in all cases, as an intervention to achieve stability may be the reason for the transfer.
The TTL will ensure:

- A competent escort is provided for the transfer who must be able to manage ongoing patient needs prior to arrival at the MTC ED
  - Ventilated patients MUST be sent with an Anaesthetist or ITU doctor
- Fluids, drugs and equipment for transfer are immediately available.
- Blood products are only sent with the patient if they are to be transfused on route; do not routinely send blood products
- Do not delay transfer to insert invasive monitoring; use non-invasive methods
- All relevant imaging and reports must be transferred electronically to the receiving MTC

For Life ± Limb threatening transfers, the NORSe system for neurocritical care referrals to QEHB should NOT be used as it adds delays to patient care. Information regarding injury and ongoing management will be added to NORSe at a later time by UHB neurosciences as appropriate.

Unsurvivable injuries:
Some patients presenting to TU / LEH will have unsurvivable injuries and so transfer will be futile. However, this may not always be clear at initial presentation and the Trauma Network recognises that some patients transferred will die shortly after arrival at the MTC, but this situation should be rare and avoided if possible.

For this reason, it is acceptable to initiate a consultant-to-consultant discussion to consider correct treatment options and for this group of patients a short delay in transfer may be acceptable. This group may include a variety of traumatic injuries, however most patients in this group will have serious brain injury. Patients >75 years of age with large intracranial haematomas demonstrated on CT scanning should be discussed with the MTC prior to transfer.

Non-Life ± Limb Threatening Transfer for Definitive Care of Patients with Polytrauma

TTL should contact the QEHB Consultant Trauma Co-ordinator (CTC) by calling 0121 627 2000 and asking for the CTC on-Call. Following acceptance of a referral, the CTC will identify the receiving area within QEHB (usually Critical Care or a trauma ward rather than ED). The TTL at WRH/ALX must organise transport with an appropriate escort to QEHB.

As soon as practical following discussion of a case (whether accepted or not) the TTL (or delegate) must log onto the NORSe system to complete the referral.

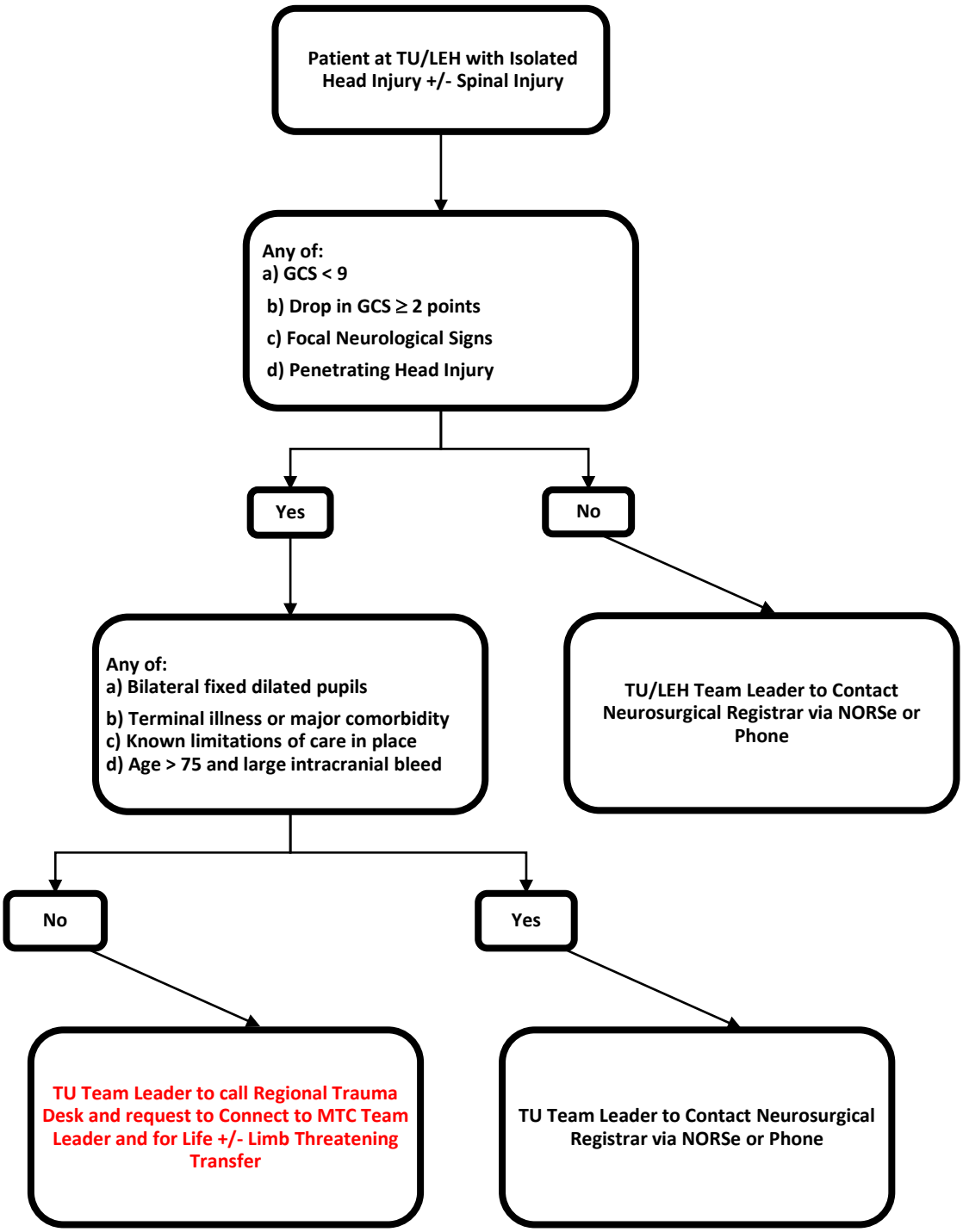
Single Specialty Referral (e.g., Burns/Plastics):
Haemodynamically stable patients requiring urgent single specialty management, unavailable at the TU/LEH will be referred directly to the appropriate specialty service at the MTC or Network-designated Specialty Centre.

Transfer of Patients with Head Injuries

The Queen Elizabeth (QE) Hospital Birmingham is the MTC for the BBCHW Trauma Network and provides neurosurgical services and advice for ALL patients with traumatic head injuries at Worcestershire Acute Hospitals NHS Trust.

University Hospital Coventry and Warwickshire (UHCW) only provides direct neurosurgical support for NON-TRAUMATIC neurosurgical problems.

The referral pathway to Neurosurgery at QEHB is dependent on the time critical nature of the presentation. The flow diagram below should be used to aid decision making:



Life / Limb Threatening Traumatic Intracranial Injuries

Patient with time critical head injuries must be transferred to the MTC without delay, even when a bed is not available. The TU/LEH TTL should contact the RTD and request a Life/Limb Threatening Transfer. The RTD will arrange transfer and connect the TTL to the MTC Team Leader.

ALL OTHER TRAUMATIC INTRACRANIAL INJURIES

All other traumatic intracranial injuries should be referred to the Neurosurgical Registrar at QEHB using the NORSe system. Where there is concern that a time critical intervention may be required, the Neurosurgical Registrar should be bleeped via QEHB switchboard.

The NORSe referral should be made by the ED team if there is a clinically significant intracranial bleed, if the GCS is < 15 or if the patient is anti-coagulated. In all other circumstances, the referral should be made by the T&O clinician admitting the patient.

Non-traumatic neurosurgical problems should be referred to University Hospitals Coventry & Warwickshire (UHCW). Where there is doubt as to whether an abnormality is traumatic or non-traumatic in the context of a traumatic event, the patient should be referred to QEHB.

REFUSAL OF TRANSFER INTO QEHB WHERE CAPACITY CANNOT BE CREATED

When there is no capacity at QEHB, the QEHB Neurosurgical Registrar and the referrer will jointly determine whether the patient can be safely managed in the TU until capacity becomes available or whether they need to be transferred to another neurosurgical unit within or out of region.

Where the patient requires transferring to another neurosurgical unit:

- the QEHB Neurosurgical Registrar is responsible for directly liaising with their neurosurgical colleagues in other units to facilitate the transfer.
- **THIS DOES NOT APPLY TO TIME CRITICAL TRANSFER WHICH MUST GO TO QEHB REGARDLESS OF CAPACITY.**

Any Issues related to transfers should be submitted as a Trauma Incident (TRID), either online https://www.mcctn.org.uk/trid.html or by emailing the Network Office on sarah.vickers3@nhs.net

Paediatric Transfers

ALL children (< 16 years old) with traumatic injuries requiring potential transfer to the Children's MTC (Birmingham Children's Hospital) should be referred via KIDS (Kids Critical Care and Intensive Support). Do not phone the ED or a Specialty area at BCH or the Regional Trauma Desk.

The Paediatric call arrangements are:

- KIDS tel: **0300 200 1100** will be the hub for communication for all paediatric patients who require transfer to BCH
- KIDS will facilitate the call and provide advice when required
- NON-TIME CRITICAL TRANSFERS: KIDS will act to coordinate transfer - they will not necessarily transfer the child but will assist with sorting out an alternative where required
- TIME-CRITICAL TRANSFER: If the injuries are time critical, it is the responsibility of the WRH or ALX Trauma Team to transfer the patient

Paediatric Imaging within the TU/LEH

If a CT is considered, refer to the following guidelines:
RCR guidelines for imaging in paediatric trauma
NICE Clinical Guideline (NG232) Head injury: assessment and early management 2023.

Appropriate imaging may be done prior to transfer (e.g., chest / pelvic x-ray) which should be context specific, e.g., blunt trauma vs penetrating injury. If transfer is indicated based on existing clinical information, it should not be delayed by performing further imaging within the TU/LEH (e.g., clear traumatic brain injury does not require a CT scan in the TU/LEH).

Where imaging is required to aid decision making, it should be performed without delay, using the same CT imaging protocol as the local MTC (see Appendix 3) when required. A full radiologist report must be obtained and sent with the patient or direct to the MTC.

See appendix 3 for the Checklist for transfer of children with neurosurgical emergencies.

Speciality Staffing

The following medical staff are available on the WRH site:

General Surgery:

- SHO and Registrar (ST3+ or equivalent): Resident 24/7
- Consultant: Available 24/7, non-resident cover out of hours (< 30-minute response time)

Trauma and Orthopaedics:

- SHO and Registrar: Resident 24/7
- Consultant: Available 24/7, non-resident cover out of hours (< 30-minute response time)

Vascular:

- Registrar: Resident 08-17 Monday to Friday and 08-12 at weekends, non-resident cover out of hours (< 30-minute response time)
- Consultant: Resident 09-17 Monday to Friday, non-resident cover out of hours (< 30-minute response time)

Critical Care (ITU):

- SHO and Registrar (ST3+ or equivalent): Resident 24/7
- Consultant: Extended daytime resident cover, non-resident cover out of hours (< 30-minute response time)

Anaesthetics

- SHO Resident 24/7
- Registrar 18:00 – 08:00 24/7
- Consultant
    - 08:00 – 21:00 Resident Monday to Friday, 08:00 – 18:00 Saturday & Sunday
    - 21:00 – 08:00 Oncall (<30mins response time)

The following medical staff are available on the ALX site:

General Surgery:

- SHO: Resident 24/7
- Registrar (ST3+ or equivalent: Resident 09-17, non-resident cover out of hours (< 30-minute response time)
- Consultant: No on-site cover. Patients requiring direct input from the on-call Consultant General Surgeon will require emergency transfer to WRH as per local policy (see Appendices 11 & 12).

- T&O:
    - Registrar: Resident 08–17, non-resident cover (< 30-minute response time) out of hours (7 days per week)
    - Consultant cover: Available 24/7, non-resident cover out of hours (< 30-minute response time)
- ITU:
    - Registrar (ST3+ or equivalent): Resident 24/7
    - Consultant: Resident 08–18 Monday to Friday, non-resident cover out of hours (< 30-minute response time)

Anaesthetics

- Consultant
    - 18:00 – 21:00 Resident Monday to Friday, 08:00 – 18:00 Saturday & Sunday
    - 21:00 – 08:00 Oncall (<45mins response time)

Dedicated Emergency/Trauma Operating Theatre

Worcestershire Royal Hospital

This hospital is a designated Trauma Unit. It has the following capabilities:

- 24/7 CEPOD Emergency Theatre.
- 2 dedicated Orthopaedic Trauma theatres available between 08:00 and 18:00, 7 days a week: 1 theatre primarily for patients with fracture neck of femur and another theatre for other trauma cases.
- Capacity for a third theatre on an adhoc basis available Monday to Friday 08:00 to 18:00.
- The trauma lists are staffed by appropriately trained T&O theatre staff. Theatre availability is discussed with the on call consultant and Trauma Nurse Practitioner.
- Out-of-hours hours trauma cases may be conducted on the mixed CEPOD list along with other surgical emergencies.
- There is an on call theatre practitioner for trauma (6PM – 8AM Monday to Friday and 2PM – 8AM Saturday, Sunday and Bank Holidays).

Alexandra Hospital

This hospital is a designated Local Emergency Hospital. Patients with trauma are not conveyed to this hospital but instead are conveyed to Worcestershire Royal Hospital.

Transfusion

Transfusion Lead Clinician

Dr Sangham Hebballi (Chair of Blood Transfusion Committee, WRH)

Haematology Advice

Consultant Haematology transfusion advice is available 24/7; contact on-call consultant via switchboard

Massive Haemorrhage Policy

See WHAT-KD-001 (5th May 2023) for the Massive Transfusion protocol. This document includes the following information:

- Activation of the Major Haemorrhage protocol
- Immediate clinical response
- Major haemorrhage pack 1
- Aims for therapy and drug reversal
- Major haemorrhage pack 2
- Stand down
- Complications of major haemorrhage
- Adult & Paediatric Major Haemorrhage in Trauma Flowchart

On rare occasions, trauma patients requiring transfer to an MTC may need to be transferred with blood products. It is essential that the blood bank technician is made aware in advance, as a special transport pack must be brought to the ED with transfer forms. Blood products must not be transferred without this pack or relevant forms .

Administration of Tranexamic Acid

Tranexamic acid should be administered **within 3 hours from the time of injury** (not time of arrival in ED) in the following circumstances;

- Any patient who has significant bleeding
- Any patient who is believed to be at risk of significant bleeding when considering the mechanism of injury, apparent injuries and vital signs.
- Any patient requiring blood transfusion for bleeding related to traumatic injury

Tranexamic Acid Administration in Paediatric Trauma

TXA is administered based upon the same criteria as for adult trauma.

The Royal College of Paediatrics and Child Health have agreed the following dosages:
Loading Dose: – 15mg/kg (max 1g) diluted in a convenient volume of Sodium Chloride 0.9%
or Glucose 5% and given over 10 minutes

Maintenance infusion: – 2mg/kg/hour. Suggested dilution 500mg in 500ml of sodium chloride 0.9% or glucose 5% given at a rate of 2mls/kg/hour. For at least 8 hours or until bleeding stops.

Emergency Transfer of Blood Products

A compelling need to transfer blood is rare in modern practice. In exceptional circumstances e.g. the transfer to MTC of a patient who is actively bleeding for surgical haemostasis (which exceeds the capacity of the TU) and in whom the risk of transfer to a specialist unit was considered significant; blood transfer may be appropriate. The following are requirements of any transfer of blood products:

- Blood is only transferred in the appropriate clinical scenario
- Blood is transported and packaged in accordance with WAHNT validated procedures to ensure product quality and safety
- The transfer is correctly documented to maintain proof of the cold chain of blood storage
- Vein-to-vein traceability is maintained
- The roles and responsibilities of the dispatching and receiving hospitals are clearly defined
- Wastage of blood is minimised
- Transport of blood is optimally managed by transfer from one transfusion laboratory to another transfusion laboratory

When a patient needs ongoing transfusion during transfer to the MTC, this should be coordinated via the dispatching and receiving transfusion laboratories.

The Cold Chain and Blood Product Transfer

The cold-chain is a temperature controlled supply-chain of storage and distribution activities which maintain blood products within a given temperature range. Inappropriate breach of the cold-chain will lead to wastage of blood products. Records must be kept to ensure an audit trail of the cold chain.

Procedure for ED Staff and Escort Staff

All patients must have a wristband in place and any checks prior to transfusion of blood components must be done according to locally determined policy. The escort team must be informed that the **transport box must only be opened if the patient requires ongoing transfusion.**

Designated Specialty

The receiving specialty is determined by the priority of injuries sustained by the major trauma patient, using an ABC approach.

Once stabilised, pre- or post-operative patients (who do not require transfer to MTC) with airway compromise, respiratory distress or significant physiological instability will be managed within a critical care setting, with timely and regular input from the appropriate surgical specialties.

Patients who do not require critical care services will be admitted under the surgical division, to the specialty most suitable for the management of sustained injuries. Medical input will be available where required.

All patients admitted within WorcsAcute Hospitals NHS Trust require a base speciality. Patients admitted to the critical care unit also require a base speciality in addition to critical care.

Trauma & Orthopaedics:	Pelvic and extremity trauma Spinal fracture Isolated Head injuries
General Surgery	Thoracic and abdominal injuries
Emergency Medicine:	Isolated head injuries (if only a brief period of observation required)
Burns:	If not for transfer to a burns centre then admission based on anatomy of burn - General surgery: thoracic & abdominal - Trauma & Orthopaedics: extremities - ENT: Airway / head and neck

Communication between receiving surgical specialties at a senior level (Registrar or Consultant grade) is crucial in all cases. It is appropriate to determine the patients' needs in relation to their location (Alexandra Hospital or Worcestershire Royal Hospital) and the capabilities at each site.

On-going care of medical morbidities (unrelated to trauma) may be facilitated by referral to the appropriate medical specialty once the patient has been cleared from a trauma perspective

Trauma & Orthopaedics

Musculoskeletal Trauma

These injuries are managed by Trauma & Orthopaedics. Mobile patients with extremity injuries may be suitable for follow-up in the next available fracture clinic. Fracture clinics at WRH and Alexandra Hospital run every weekday morning from 9AM (on bank holidays Fracture Clinics run at the discretion of the on-call consultant). ED can book patients directly to New Trauma clinic.

Each evening by 8pm, the Trauma Service Coordinators (with liaison with the on-call Trauma Consultant), establishes the priorities of patients to be operated on the next day. The 'Golden Patients' are established. These patients are planned to be first on the operative list the next day. They are seen overnight by an anaesthetic doctor for a handover with the planned trauma anaesthetist the following morning.

Trauma Meetings (multidisciplinary) are held every morning at 8AM at WRH under the supervision of On Call Trauma Consultant. During this meeting there is a finalisation of the operative lists The trauma list order/priority of patients is established and finalised.

All admitted cases and ward referrals are discussed at the trauma meetings. Postoperative imaging or other relevant clinical data are also discussed at this time. This meeting has an educational component. Attendance is recommended for all middle grades and juniors. Access to PACS medical imaging is essential for the Trauma MDT.

Operative Trauma lists run only at WRH. There are always 2 list as day (2 sessions), 7-days per week. As demand and theatre / staffing capacity allows there is the possiblility of a third list during the weekdays. If overnight trauma operations are required, theatre capacity within the general emergency theatre (CEPOD) can be arranged through discussion with the on-call Consultant Anaesthetist and on-call Consultant Surgeons who have patients listed for emergency theatre.

The majority of inpatient work load at Worcestershire Royal Hospital involve management of patient with hip fractures within a hip fracture pathway.

There is no admission of trauma patients to the Alexandra Hospital for operative procedures as all Trauma theatre activity is solely carried out at the Worcestershire Royal Hospital as part of a countywide plan to centralise acute and elective orthopaedic services.

Trauma Service Coordinators

WRH There are 3 whole time equivalent Band 7 Trauma Nurse Practitioners in post at WRH. They cover 7AM-9PM seven days a week (7AM-9PM Monday-Friday with early cover Saturday / Sunday when 1 Trauma Practitioner on Annual Leave) and assume the role of Trauma co-ordinator during these times (act as the link to the Major Trauma centre at UHB for repatriation of patients).

Names: Tracy Newey, Kirsty Jones, Clair Cole

ALX There is 1 Band 7 Trauma nurse practitioner and 1 Trauma Coordinator at ALX who cover Mon-Fri 7AM-9PM with occasional weekend cover. Trauma co-ordinators are members of the trauma team and attend ED for all trauma alerts during hours of work.

Names: Wendy Hill, Vicky Hopkins

Long Bone / Periarticular Fractures are admitted directly to Trauma wards from ED and appropriate facilities exist for their management. Displaced fractures are routinely offered surgical management.

Patients are assessed and monitored clinically for potential **compartment syndrome**. Pressure monitoring can be set up using arterial line monitors but does not delay treatment of clinically diagnosed compartment syndrome. Nerve blocks are avoided for injuries at risk of developing compartment syndrome. Facilities for internal fixation, IM nailing and External Fixation are available at WRH. Surgeons at WRH are fully trained in the operative management of the majority of long bone fractures and familiar with use of modern internal fixation and IM nail implants. Use of External fixation is recommended for initial management of periarticular fracture and complex open fractures.

Open Fractures are managed according to BOAST Guidelines and NICE guidance. All such cases are discussed with the on call orthopaedic and plastics teams at UHB. Facilities for external fixation, IM nailing and Internal Fixation are

available at WRH.

WRH will often perform initial debridement and stabilisation and discuss with plastics regarding on-going care. Mr Chester (UHB Plastic Surgeon) undertakes some work at WRH providing a useful local interface with plastic surgery.
Severe Pelvic Fractures Approximately 90% of patients with severe pelvic fractures will exhibit multiple additional injuries. Any patient with a pelvic fracture, (excluding neck of femur fractures age >65 years), should be assumed to have additional injuries until proven otherwise. Up to 60% of patients with such fractures will be in hypovolaemic shock and are eight times more likely to have aortic disruption.

Pelvic injury with signs of shock should be treated in the same way as vascular injury. Moving the patient can provoke intra-peritoneal and extra-peritoneal bleeding and the mortality rate for patients with pelvic fractures presenting with haemorrhagic shock is 30- 50%.

Treatment options:
ED Resuscitation
Immediate Surgery (extra-peritoneal packing +/- damage control laparotomy)
Angio-emobilsation (requires early discussion with the interventional radiologist).
Hyperacute transfer to Major Trauma Centre

Spinal Injuries Spinal Injury refers to injury to the vertebral column and associated soft tissues. Spinal Cord Injury (SCI) refers to neurological deficit as a result of injury to the spinal cord. SCI may be present with or without obvious bony spinal injury.

For the management of patients with spinal injuries see the following guidance documents:

- WAHT ED Junior Doctors Quick Reference Guide (Intranet: WhitsWeb/KeyDocs/KeyDocs/DownloadFile/1252)
- WAHT How to Perform a Log roll (WAHT-A&E-T&O-036)
- NICE Guideline: Spinal Injury, assessment and management (NG41)
- Midlands Critical Care and Trauma Network (https://www.mcctn.org.uk/guidelines-and-protocols.html)
    - Adult & Paediatric Traumatic Spinal Cord Injury Best Practice Guide
    - Adult Traumatic Spinal Cord Injury Pathway
    - Nat. Spinal Cord Injury Strategy Board protocols for the initial management of adults with SCI's

Hyperacute Transfer
Traumatic spinal cord injuries (SCI) associated with additional major injuries requiring immediate MTC level care, will be stabilised in line with the Hyperacute Transfer protocol (4.1) and transferred to the QEHB.

This must be done via the RTD using 'send and call' policy.
Following initiation of transfer, a call is to be placed to the Consultant Trauma Clinician (CTC) at QEHB to discuss suspected injuries and facilitate ongoing care.

Non-hyperacute transfer
Patients with traumatic spinal injury requiring non-hyperacute transfer or specialty referral for definitive care will be discussed with the on-call Spinal Surgeon at the MTC (QEHB) to co-ordinate ongoing management.

Transfer to the Spinal Cord Injury Centre at Oswestry
Previously existing pathways to the Spinal Cord Injury Centre at Oswestry (RJAH) for isolated spinal cord injury (vertebral fractures / ligamentous or disc trauma) are only to be activated with the approval of the Spinal Surgeon

on-call at the MTC.

The RJAH Spinal Cord Injury Centre at Oswestry is primarily a rehabilitation centre. Although orthopaedic spinal surgeons are available, RJAH does not have critical care support or facilities for dealing with any associated injuries. If requested by the MTC spinal surgeon on-call, the SCI patient should be discussed with the Spinal Injuries Fellow (not the Spinal Fellow) at RJAH, at middle grade or consultant level, and a joint management plan formulated within 4 hours (SCIC Consultant should be involved). This plan must be documented in the medical records. Completion of an ASIA Chart (Appendix 5) (http://www.asia-spinalinjury.org/elearning/ISNCSCI.php) is essential to aid referral and assess progression of SCI. Pressure area care is vital. An outreach nursing +/- therapy service for patients with SCI should be provided by the SCI centre within 5 days of referral. If this is not happening the case should be discussed with the SCI centre.

Spinal Stabilisation for transfer
All spinal cord injury patients must be managed and transferred with in-line spinal stabilisation (and 3-point c-spine immobilisation) on a scoop.

Please see the BOAST-8 (Appendix 17) Guidelines for the management of Spinal Cord Injuries, (agreed by the BBCHW Trauma Network) for further information.

Rib Fractures Rib fractures may be seen in the multiple trauma patient as well as those patients with more isolated injuries.

General Surgery

Patients with significant chest injuries are admitted under the care of the General Surgical team at WRH site only. Patients who self-present to the ALX with such injuries must be transferred to WRH via the existing emergency surgical pathway.

Clinical discussion
Patients with displaced rib #, multiple rib # or flail segment should be discussed with Consultant Trauma Co-Ordinator (CTC) at MTC and a specialist opinion sought from a Consultant experienced in Rib Fixation, as internal fixation may be appropriate.

Patients with flail chest or multiple rib fractures should be discussed with Anaesthetics/ICU Registrar or Consultant to determine need for regional anaesthesia and appropriate level of care.

Specialist Burn Care

WRH follows the "Burns Management in the Emergency Department" guidance provided by the Midlands Burn Care Network (January 2015). Burns patients are clerked using the Referral Proforma (Appendix 15) and this is used both as a clinical guideline for the treatment of burns, and a prompt for when referral to the specialist burns centre is appropriate.

Adult: UHB - 0121 627 2000
Paediatric: BCH - 0121 333 9999

Further advice is available from the on-call burns registrar at the specialist burns centre.

Table 3 Summary of Referral Criteria for Adults with Burn Injuries

Service Type	% TBSA	Comment
Burn Facility	< 10 % TBSA	Non complex burn injuries
Burn Unit	>25% TBSA >25% TBSA + inhalation injury < 40 % TBSA < 50 % TBSA	Inform BC Discuss with BC and consider referral Deep dermal or full thickness burns With no inhalation injury
Burn Centre	All	All ages and severity of burn injury including those requiring complex intensive care

Table 2 Summary of Referral Criteria for Children with Burn Injuries

Service Type	Age	% TBSA	Comment
Burn Facility	 6 months – 1Year 1 – 10 Years 10 – 16 Years	 < 5 % TBSA < 5 % TBSA < 5 % TBSA	Refer to BU or BC if: > 1%TBSA FTB > 2%TBSA FTB > 5%TBSA FTB
Burn Unit	< 1 Year > 1 Year > 1 year	< 10 % TBSA < 30 % TBSA < 20% FTB	A child with non-blanching / FTB over 20% TBSA is to be referred to a BC.
Burn Centre	0 -16 Years	All	To manage children and adolescents (0 to 16 years). Neonates[3] are to be discussed with the Burn Consultant and the neonatal service. BC will manage children with all severities of burn injuries including those that require complex paediatric intensive care.

Moderate burns are followed up after 24-48 hours in an ED Consultant-led Review Clinic (9:15-11AM Mon-Fri). Minor burns are followed up by the GP.

Rehabilitation Measures

Rehabilitation Coordinator

Helen Hawkes is the Trustwide Rehabilitation Coordinator and Lead T&O Physiotherapist; responsible for coordination and communication regarding a patient's current and future rehabilitation.

Trauma Unit Agreement to the Network Repatriation Policy

The trust has agreed and implements the revised 2018 Repatriation Referral Process/Memorandum of Undersatnding with the Trauma Network. Patients may be repatriated for care closer to home once they have been stabilised and received definitive care at the MTC. Notification from an MTC for patients due to be repatriated will involve a clinical handover to the on-call Consultant within the receiving specialty at either WRH or the ALX (LEH). Bed allocation will occur following MTC representative contacting the Site Lead (Bed manager) at the relevant site.

A bed for repatriation should be allocated within 48h of referral

In the event of delayed transfer for repatriation >48h from referral the following escalation process will occur:

- For challenges consequent to bed-pressures (esp. during Level 4 Bed Alert activation):
    - 1st-line Contact: Robin Snead (Deputy COO)
    - 2nd-line Contact: Amanda Markall (Operations Manager-Surgery)
    - 3rd-line Contact: Paul Brennan (Chief Operations Officer [Exec])

- For challenges consequent to clinical discord/disagreement:
    - 1st-line Contact: Dr David Freeman (Major Trauma Lead WAHNT)
    - 2nd-line Contact: Paul Rajjayabun (Medical Director-Surgery)
    - 3rd-line Contact: Dr Christine Blanshard (Chief Medical Officer [Exec])

For repatriated patients, the rehabilitation co-ordinator will ensure rehabilitation in the acute hospital setting can continue. Advice can also be sought from the rehabilitation co-ordinator for repatriated patients not requiring an acute hospital bed, but in need of off-site services.

Physiotherapy Services

Physiotherapy service is Monday to Friday 8.30–16.30 (Weekend 8.30 –14.30 Saturday / Sunday at WRH and 8.30 – 12.30 at ALX - a reduced service whereby trauma patients have to fulfil the weekend criteria:

- These patients must be able to go home without OT equipment or other services
- If they will be remaining in hospital until Monday due to other reasons they are not a priority and can be seen by the appropriate ward team on a Monday morning

Out of hours service operates 24/7 for those patients that fulfil the on-call criteria (only for respiratory conditions)

Access to Rehabilitation Specialists

The occupational therapy team work across trauma and orthopaedics prioritising the caseload by clinical need and Expected Date of Discharge (EDD). More complex trauma patients are seen by senior staff with a Band 7 leading the head injury work and accessing the rehab prescriptions via the generic email address for patients being transferred back to the unit. OT also offers a Head injury Therapy Service (HITS) to minor head injuries with referrals being sent to the OT outpatient service from A&E.

Elective patients for major joint replacement are seen pre operatively via the joint school (for hips and knee replacements) and individually. Patients are often therefore discharged from occupational therapy before admission for surgery.

Hand surgery elective or trauma patients can be seen on any of the three sites at outpatient clinics. The service offers on-going treatment, assessment and bespoke hand splinting.

There is no dedicated time for trauma patients from SLT. The service operates 8.30AM - 4.30PM Mondays to Fridays. SLT department has 9 WTE qualified staff across in and out patients for the 3 acute hospital sites. Referrals for acute inpatients are prioritised by urgency and assessed within professional targets of 2 working days from receipt of referral.

Rehabilitation Prescriptions

All orthopaedic trauma patients are treated by the ward therapists on a daily basis and their needs for physiotherapy are assessed. There is a blanket referral system in place so the therapists will review all patients under an orthopaedic consultant. Plese note that Occupational Therapy referral have to have an electronic referral through Sunrise.

General surgical patients have a similar system by the surgical physiotherapy team.
For repatriated patients, a rehabilitation prescription will accompany the patient

Direct admissions with an ISS > 9 who remain in hospital longer than 72 hours have a rehab prescription started by the ward therapists (since November 2014 work has been done to screen patients who are likely to have an ISS score > 9 to ensure as many patients as possible are identified, including use of ISS Calculators and Body Charts). However we are now trialling new paperwork which would mean all patients receive a rehab prescription regardless of their ISS, which would negate the need to try and work out who needs them.