North West Children's Major Trauma Network
Always Children First

North West Children's Major Trauma Pathway

Source Document:	North West Children's Major Trauma Operational Delivery Network (ODN) Clinical Guidelines
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The North West Children's Major Trauma Network

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Each Trauma Unit and Local Emergency Hospital is linked to a named designated Major Trauma Centre. Please see table below.

Designated Trauma Units & Local District Hospitals for each MTC

RMCH	AHCH
Cheshire and Mersey • Macclesfield District General Hospital (LEH) **Greater Manchester** • Stockport NHS Trust (TU) • Royal Albert and Edward Wigan (TU) • Royal Oldham (TU) • Salford Royal FT Trust (TU / Adult MTC) • Wythenshawe Hospital (TU) • Fairfield Hospital (LEH) • North Manchester General Hospital (LEH) • Royal Bolton Hospital (LEH) • Tameside Hospital (LEH) **Lancashire and South Cumbria** • Royal Preston Hospital (TU / Adult MTC) • Blackburn Royal Infirmary (TU) • Chorley and South Ribble Hospital (LEH) • Burnley General Hospital (LEH)	**Cheshire and Mersey** • Arrow Park Hospital (TU) • Leighton Hospital (TU) • Countess of Chester Hospital (TU) • Southport and Ormskirk Hospital (TU) • Whiston Hospital (TU) • Warrington Hospital (TU) **Isle of Man** • Noble's Hospital (LEH) **North West Midlands** • Leighton Hospital (Mid Cheshire NHS Trust) (TU) • Royal Stoke Hospital (North Staffs Only) (TU) **North Wales** • Ysbty Gwnedd (TU) • Glan Clwyd (TU) • Wrexham Maelor (TU) **Lancashire and South Cumbria** • Royal Lancaster Infirmary (TU) • Blackpool Victoria Hospital (TU) • Furness General Hospital (TU)

The North West Children's
Major Trauma Network

North West Ambulance Service NHS Trust

Paramedic Pathfinder - Major Trauma in Children

V 2.0 1 September 2015

This process applies to children who may have suffered major trauma

Complete Primary Survey
ABCD

Unmanageable airway
Unmanageable breathing
Unmanageable catastrophic haemorrhage

Yes → Activate Major Trauma Alert

Immediate transport to nearest Trauma Unit or Trauma Centre

No

AGE	RR	PULSE
< 2 y	30 - 40	110- 160
2 - 5 y	25 - 30	95 - 140
5-11 y	20 - 25	80 - 120
> 12 y	15 - 20	60 - 100

SEE NWAS PAEDIATRIC TAPE

Respiratory rate abnormal for age
Pulse abnormal for age or CRT > 3 sec
GCS 12 or less

Yes →

No

Request senior clinical support (AP, Consultant Paramedic) early.

However, do not delay transport.

Flail chest
Penetrating trauma to the head, neck, trunk or limbs proximal to elbow / knee
Fractures to two or more long bones (humerus/femur)
Amputation proximal to wrist/ankle
Ischaemic limbs
Suspected spinal injury with new onset motor deficit

Yes → Activate Major Trauma Alert

Prompt transport to nearest Trauma Centre if under 60 min drive otherwise proceed to nearest Trauma Unit

No

Inappropriate behaviour post injury (too quiet or inconsolable)
Dangerous or significant mechanism
Death in the same passenger compartment
Entrapment
Complete or partial ejection from a motor vehicle

Significant co-morbidities
Pregnancy of 20 weeks or more

Other clinician concern

Yes → Contact Trauma Cell for senior clinical advice

Proceed as advised

No

Not high major trauma risk

Apply Paramedic Pathfinder for Trauma

North West Major Trauma Children's Network
Pathway for Transferring a Major Trauma Child into a Major Trauma Centre

DO

1. Stabilise patient

- Stabilise airway
- Support breathing
- Stop catastrophic haemorrhage

2. Make calls to:

- Designated Children's Major Trauma Centre
- **Speak to the TTL and agree transfer**
- Use ASICHE Report to provide information (Age, Sex, History, Injuries, Condition, Estimated Time of Arrival
- NWTS if required for advice on stabilsation and transfer
- NWAS to arrange Category 2 Transfer - Major Trauma

3. Ensure:

- Transfer with local team
- Documentation sent with patient
- Inform TTL when the child leaves your hospital
- Inform TTL at MTC if safeguarding concerns
- Images are transferred with PACS

NWTS	Royal Manchester Children's Hospital	Alder Hey Children's Hospital	NWAS
0800 084 8382	0161 701 9191	0151 252 5401	0345 140 0144

DON'T

- Delay Transfer.
- Contact individual specialist/check bed availability (this will be done by the ED consultant at the MTC).
- Perform unnecessary procedures.
- Perform CT unless advised by MTC.

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PAEDIATRIC TIME-CRITICAL TRANSFER GUIDELINES

WHO DOES THIS APPLY TO?

All children under 16 years with one of:

- **Major trauma – see NWAS pathfinder**
- **Suspicion of raised intracranial pressure or a space-occupying intracranial lesion**
- **Acute surgical abdomen/limb injury with suspected ischaemia**

MAIN POINTS

4 Do's.....
Stabilise the patient
Stop major haemorrhage
Organise transfer
Documentation

4 Calls
Children's Major Trauma Centre
(AHCH or RMCH)
NWTS
NWAS
Safeguarding Team

4 Don't's.....
Delay
Undertake CT unless advised
Forget C-spine immobilisation
Do unnecessary procedures

- **SAFE but RAPID transfer**
- **AVOID HYPOXIA , HYPOTENSION or HYPOGLYCAEMIA to prevent secondary injury**
- Do not delay transfer to ChMTC (Alder Hey or Royal Manchester Children's Hospital) or specialist surgical centre as this increases risk of serious injury or death
- Transfer should be undertaken by local team not NWTS
- Departure to ChMTC or specialist surgical centre should occur within 1 hour of arrival in hospital

Responsibilities of Trauma Team

Stabilise child
Intubate and ventilate child if required
Stop major haemorrhage and treat circulatory instability
Contact ChMTC (for telephone numbers see below)
Contact NWTS (08000 848382) for advice if PICU/PHDU level patient
Discuss need for CT scan with ChMTC
Identify appropriate transfer team (experienced anaesthetist and appropriate nurse/ODP)
Contact NWAS via 999 and ask for a "**Category 2 Major Trauma Transfer**" or equivalent ambulance
Arrange PACS transfer **and** copies of unencrypted CD of all images to ChMTC
Refer to safeguarding team if appropriate
Undertake transfer

NWTS: 08000 84 83 82

Alder Hey Major Trauma Team
0151 252 5401

NWTS will....

Liaise with any specialists required
Advise DGH on stabilisation & transfer
Inform PICU team about incoming transfer
Encourage swift departure from DGH
Inform transferring team which clinical area they should be taking child to (PED, PIC, PHD, theatres)

RMCH Major Trauma Team
0161 701 9191

For drug calculations use *www.crashcall.net*

NWTS Referral line number: 08000 84 83 82

NWTS Major Trauma Transfer Guideline v4 11.03.13.

TOP TIPS FOR A SAFE TRANSFER

For drug calculations use www.crashcall.net

Equipment required - everything must be securely fixed onto trolley (check battery life)
Use Critical care transfer trolley if available
Appropriate portable ventilator (Babypac under 10kg, Ventipac >10kg, Breas LTV or Oxylog 3000+ for >5kg)
Ensure enough oxygen for transfer
Portable monitor (ECG, sats, $ETCO_2$ (if ventilated) and non-invasive BP on 5 minute cycle)
Battery powered infusion pumps
Vacuum mattress or spinal board and collar/blocks for transfer plus means to fix onto trolley

A/B

	Need for intubation: GCS < 8/15 or fluctuating LOC
	Aim Saturations > 98%
	Monitor and maintain end-tidal CO_2 34-37 mmHg or 4.5-5 kPa
	ETT secured: **ORAL**, correct size (min leak) & position (check on CXR). Do NOT cut ET tube
	C spine immobilisation for all major trauma patients regardless of CT spine findings
	Oro-gastric tube on free drainage

C

	Maintain Mean BP (& Cerebral Perfusion Pressure): approximate targets for age
	One good, well secured peripheral line plus ability to place intra-osseous or 2nd line
	Do NOT delay transfer by placing arterial or central lines (or urinary catheter)
	Use fluid bolus and dopamine or noradrenaline via intra-osseous or peripheral line to support BP
	Major bleeding? Trigger local major haemorrhage guidelines (children) including Tranexamic acid

D

	Monitor pupil size & response every 15 minutes
	Sedate adequately (morphine and midazolam) and paralyse for journey
	Nurse 30° head up if possible for Head Injuries
	Identify & treat seizures give phenytoin
	Target temperature 36-37 °C. Treat hyperthermia/avoid hypothermia.
	Maintain normal blood glucose (treat if low i.e. < 3)
	Maintenance fluid: 0.9% saline (+ dextrose if glucose low)
	Aim: sodium > 140 – if Na < 135 consider 2.7% saline bolus
	Identify any associated injuries/problems

Age	Mean BP	Aim CPP
< 1 yr	55-65	> 40
1-5 yrs	70-80	> 50
6-11 yrs	80-90	>60
12-14 yrs	85-95	>70

MANAGEMENT OF SUSPECTED INTRACRANIAL PRESSURE SPIKES
WARNING signs: cardiovascular instability +/- urticarial/fleeting rashes
DEFINITE signs: BRADYCARDIA/HYPERTENSION/PUPIL DILATATION
Ensure end-tidal CO_2 34-37 mmHg or 4.5-5 kPa
Give Mannitol OR Hypertonic saline (2.7% NaCl)
Increase sedation (e.g. morphine/midazolam or fentanyl/propofol)

Documentation
Copy of notes/results/observation and prescription charts
X-ray & CT scans sent via PACS and un-encrypted CD

Parents
Give them a copy of NWTS parent information leaflet (www.nwts.nhs.uk) which has directions to both regional paediatric neurosurgical/major trauma centres plus the direct phone number of relevant PICU
Make sure transfer team have parents' contact details
Ensure parents are safe to travel in their own vehicle: if not organise taxi

References: NICE Head Injury Guidelines, NW Major Trauma Network, STRS guidelines

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Please use the following link for the NWTS STOPP Tool http://www.nwts.nhs.uk/clinicalguidelines

Sharing of Information in the Event of Family Separation

Protocol for the sharing of information where families are split between MTC's/TU's.

This protocol should be used by MTC's and TU's to ensure that information is shared in the safest way between hospitals in the event a family becomes split due their age/trauma injuries.

MTC's

A&E Call received relating to the required transfer of an injured child into your hospital where multiple members of the family were injured.

↓

A&E Ensure information is taken on the other members of the family and where they are going to be transferred to.

↓

A&E During normal working hours ****-**** contact your Trauma Coordinator on Bleep *** or Ext ****.

Relay all the information you have gathered on the other family members and where they are being transferred

↓

The Trauma Coordinator will then liaise with the Ward where the patient is going to be admitted to, on arrival, and provide them with a password that will be required in the event any enquiries are made in relation to the patient.

The Trauma Coordinator will ring the other MTC's/TU's where other family members have been admitted to and relay the necessary contact information (Ext numbers/personnel) to their Trauma Coordinator or equivalent.

A&E If the call is taken out of hours, take no further action until the patient has arrived.

↓

When the patient arrives the Trauma Lead will ensure that they liaise with the ward where the patient is going to be admitted at the earliest possible convenience. They will provide them with the password that will be required in the event any enquiries are made in relation to the patient.

A member of the trauma team will ring the other MTC's/TU's where family members have been admitted and relay the necessary contact information (Ext numbers/personnel) to their Trauma Lead.

TU's

Call made to MTC relating to the required transfer of an injured child. If other family members are being transferred to alternative MTC's or they are staying at your TU.

↓

Ensure information is relayed to the admitting MTC on the other members of the family and where they are going to be transferred to.

The North West Children's Major Trauma Network

Trauma Team Triggers:

1) On receipt of Major Trauma pre-alert from NWAS or Trauma Unit, self-presentation of trauma patient with or later presentation of:

Anatomical triggers:
Unmanageable airway (not protecting own)
Unsupportable inadequate breathing
Unstoppable haemorrhage (not controlled by simple pressure)

Physiological triggers: GCS 12 or less
Abnormal physiology: (guide values):

Age	Heart Rate beats/min		Respiratory Rate breaths/min	Systolic BP mmHg
	Tachycardia	***Bradycardia***		
0-7 days	>180	<100	<30 or >60	<60
7-28 days	>180	<100	<30 or >60	<80
1 month – 1 year	>180	<90	<30 or >40	<75
2-5 years	>140	<60	<25 or >30	<75
6-12 years	>130	<60	<20 or >25	<85
>12 years	>110	<60	<15 or >20	<90

Clinical signs triggers
Flail chest
Penetrating trauma to head, neck, trunk, or limbs proximal to elbow or knees
Fractures of 2 or more long bones (humerus/femur/tibia) or fractured pelvis
Amputation proximal to wrist or ankle
Crushed, mangled or degloved extremities
New onset sensory or motor deficits (whole limb or partial)
Rigid abdomen
Severe burns >20%

Mechanism of injury triggers
Falls over 3 times patient's own height
Entrapment
Complete or partial ejection from a motor vehicle
Death in the same passenger compartment

Other triggers
Significant comorbidities
Pregnancy of 20 or more weeks
Other clinician concern