

Major Trauma Quick Reference Guide (QRG)

Major trauma is the most frequent cause of death in the UK for children aged between 1 and 18 years. It is responsible for 31% of deaths in children aged 1–4 years, increasing to 48% of deaths in young people aged 15–18 years.¹ The most common mechanism of injury is high-energy blunt trauma from road traffic collisions. This mechanism is responsible for 41% of injury deaths in children (1–9 years old) and 77% among young people (10–18 years old).²

One of the great advances in outcomes for children has been the development of paediatric major trauma centres (MTCs) within trauma networks. Prehospital teams will follow defined algorithms to divert severely injured children to MTCs. However, 25% of severely injured children will be brought by their parents in their own vehicles to non-MTC hospitals.³

WHO DOES THIS QRG APPLY TO?

All children under 16 years with Major trauma or traumatic injuries because of suspected NAI.

These patients require a time critical transfer by the referring unit, after discussion and agreement with Trauma Team Leader (TTL) at the receiving Children's Major Trauma Centre (ChMTC). The child should be moved in a paramedic ambulance, accompanied by a senior clinician who is confident and competent in airway management (including intubation), ideally a consultant in anaesthesia/paediatrics/emergency medicine or a senior trainee with the appropriate competencies, and a PLS/APLS/EPLS (ideally) trained nurse, advanced practitioner or ODP. NWTS should be contacted if stabilization advice is required.

When phoning 999 for an ambulance for a major trauma transfer state that you need to transfer your patient as a **Category 1 Trauma Transfer** (i.e. as an emergency, not as an urgent case) which should mean the ambulance response time is short (i.e. less than 8 minutes).

Monitoring should include (as a minimum) continuous ECG, oxygen saturations, end-tidal carbon dioxide (if intubated and ventilated), non-invasive blood pressure, and ventilator observations recorded every 15 minutes (minimum) during transfer. In addition, as a minimum the patients' pupil size and reaction must be recorded just before and after the transfer to ChMTC.

Do not delay the transfer to place arterial or central lines or urinary catheter unless agreed with TTL. Ensure that patient has one good peripheral line +/- intraosseous line plus full non-invasive monitoring. Delaying transfer to place lines etc. increases risks to a patient that needs emergency potentially life/limb preserving surgery.

Transfer when able to maintain good oxygenation and age appropriate blood pressure – with measures to provide on-going stabilisation as needed e.g. fluid bolus and/or inotrope infusion to maintain BP. **There is no evidence to support hypotension in children with traumatic injuries.**

Children with significant injuries, including traumatic intracranial bleeding, that have occurred because of suspected non-accidental injury (NAI) also require a time critical transfer by the referring unit, after discussion and agreement with TTL at the receiving CHMTC. NWTS only need to be contacted if stabilization advice is required.

Children with major burns, it should be presumed that traumatic injury also exists, and these patients should be referred to the TTL, at the appropriate ChMTC, as per the North West Major Trauma Children's Network. The TTL and/or NWTS will be available for advice regarding management and transfer if required.

Safeguarding, school nurse, and/or health visitor referrals should be made by the local team if there are any concerns regarding non-accidental injury or concerning mechanism of injury. In addition, injuries sustained whilst riding an all-terrain vehicle (quad bike) or electric scooter on a public road should be reported to police as per local policy.

The STOPP tool can be used by any DGH preparing for a time critical transfer. It provides guidance on what category the patient transfer will be, what staff and equipment are required, a transfer checklist and an on-route observation document.⁴

References

- 1) Royal College of Paediatrics and Child Health and CHR-UK Programme of Work at the MRC Centre of Epidemiology for Child Health, University College London Institute of Child Health. Child health reviews UK: overview of child deaths in the four UK countries. London: RCPCH, 2013. Google Scholar
- 2) Royal College of Paediatrics and Child Health, National Children's Bureau, and British Association for Child and Adolescent Public Health. Why children die: death in infants, children and young people in the UK, Part A. London: RCPCH, 2014. Google Scholar
- 3) The Trauma Audit & Research Network. 2 years of severe injury in children: January 2013—December 2014. Manchester: The University of Manchester, 2015. Google Scholar
- 4) STOPP tool NWTS 2018: https://www.nwts.nhs.uk/_file/i6eHVBjgVV_292753.pdf

North West Children's Major Trauma Network Algorithms

See North West Children's Major Trauma website for up to date guidelines

<http://nwchildrenstrauma.nhs.uk>

MAIN POINTS

Do.....

Stabilise the patient and stop major haemorrhage

Organise transfer

Documentation

Call.....

Trauma Team Leader (ChMTC AHCH or RMCH)

NWAS

Safeguarding Team

Don't.....

Delay

Undertake CT unless advised

Perform 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)
- Transfer should be undertaken by local team **not** NWTS
- Departure to ChMTC 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)

Discuss need for CT scan with Trauma Team Leader (TTL) at ChMTC

Identify appropriate transfer team (experienced anaesthetist and appropriate nurse/ODP)

Contact NWAS via 999 and ask for "**Category 1 Trauma**" or equivalent ambulance

Arrange PACS transfer **or** copies of unencrypted CD of all images to ChMTC

Refer to safeguarding team if appropriate

Undertake transfer

NWTS will....

Contact the TTL if not already done so by the local team

Advise DGH on stabilisation & transfer if required

NWTS: 08000 84 83 82

For drug calculations use www.crashcall.net

Alder Hey Major Trauma Team

0151 252 5401

RMCH Major Trauma Team

0161 701 9191

TOP TIPS FOR A SAFE TRAUMA TRANSFER

For drug calculations use www.crashcall.net Transfer documentation (STOPP tool)

https://www.nwts.nhs.uk/file/i6eHVBjgVV_292753.pdf

Equipment required - everything must be securely fixed onto trolley (check battery life)

- Use Critical care transfer trolley if available
- Appropriate portable ventilator
- Ensure enough oxygen for transfer
- Portable monitor (ECG, Sats, ETCO₂ (if ventilated) and non-invasive BP on 5 minute cycle)
- Battery powered infusion pumps

Documentation

- Copy notes/results/observations and prescription charts
- Any X-Rays & CT scans sent via PACS and/or un-encrypted CD

Parents

- Obtain parents' contact details
- Check they are safe to travel independently or arrange appropriate transport
- NWTS parent information leaflet has directions to both PICUs and direct phone numbers

A/B	Need for intubation: discuss with the TTL if uncertain
	Saturations > 98%
	Monitor and maintain end-tidal CO ₂ 34-37 mmHg or 4.5-5 kPa
	ETT secured: ORAL , uncut, with minimal leak & position (CXR).
	Consider manual in-line stabilization (MILS) of the c-spine and if necessary, with head blocks and straps: discuss with the TTL if uncertain
	Oro-gastric tube on free drainage

C	There is no evidence to support hypotensive resuscitation or hypotension in children with traumatic injuries. Maintain Mean BP (& Cerebral Perfusion Pressure): approximate targets for age (see table below)
	One good, well secured peripheral line plus ability to place intra-osseous or 2 nd line
	Do NOT delay transfer by placing arterial or central lines (or urinary catheter)
	Use fluid bolus and/or dopamine/noradrenaline via intra-osseous or peripheral line to support BP
	Appropriately package and transport any blood products with documentation

D		Age	Mean BP	Aim CPP
	Monitor pupil size & response every 15 minutes			
	Sedate adequately and paralyse for journey	< 1yr	55-60	>40
	30° head up if appropriate for head injured patients	1-5 yrs	70-80	>50
	Treat seizures: phenytoin	6-11 yrs	80-90	>60
	Treat hyperthermia/avoid hypothermia.	12-14 yrs	85-95	>70
	Target temperature 36-37 °C			
	Maintain normal blood glucose (treat if < 3)			
	Maintenance fluid: if essential			

MANAGEMENT OF SUSPECTED RAISED INTRACRANIAL PRESSURE

- **WARNING SIGNS:** Cardiovascular instability +/- urticarial or fleeting rashes
- **DEFINITE SIGNS:** BRADYCARDIA/HYPERTENSION/PUPIL DILATATION
- **MANAGEMENT:**
 - Ensure end-tidal CO₂ 4.5-5kPa (34-37mmHg)
 - Give Hypertonic saline 2.7%, 3ml/kg over 10 minutes OR Mannitol 20%, 0.5ml/kg over 30 minutes
 - Increase sedation

KEEP MOVING



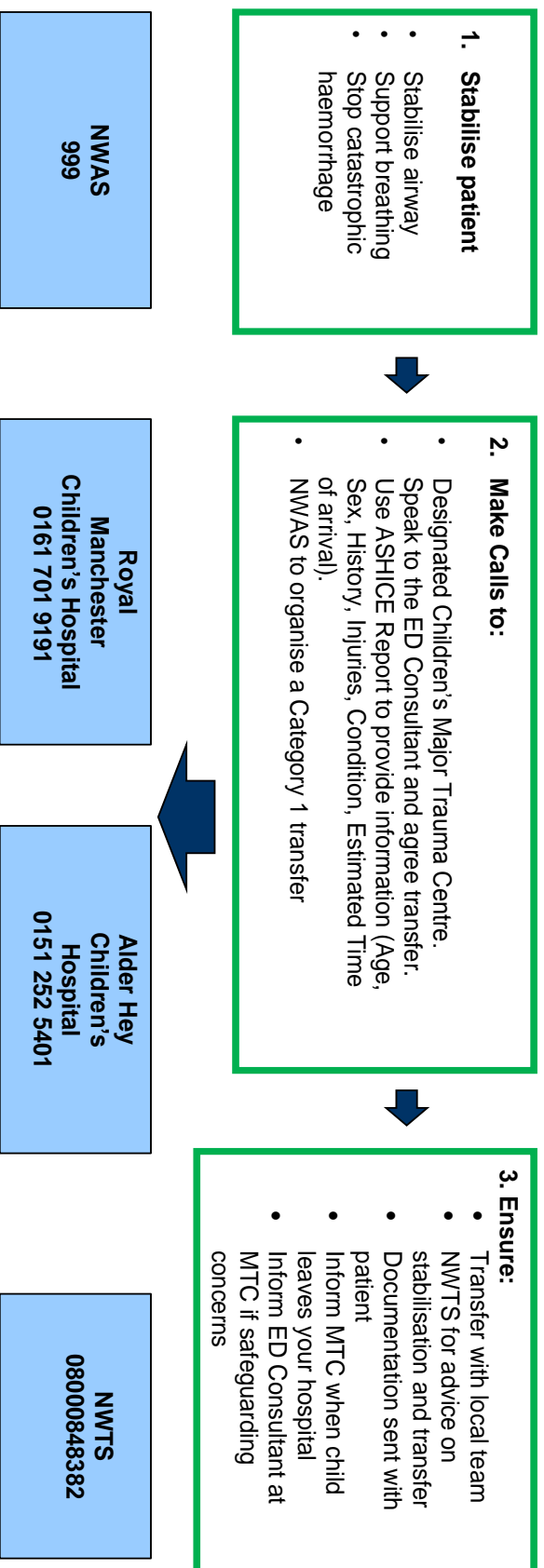
Central Manchester University Hospitals **NHS**

Alder Hey Children's **NHS**
NHS Foundation Trust

North West Major Trauma Children's Network

Pathway for Transferring a Major Trauma Child into a Major Trauma Centre

DO



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 agreed with MTC

