

# Paediatric Major Trauma Guidelines

*Acknowledgements to BCH Trauma Group*

# Management of Traumatic Cardiac Arrest

Traumatic cardiac arrest caused by trauma has a very high mortality, with an overall survival of 5.6% (range 0-17%). The subgroup of patients who arrest after hypoxic insults, (e.g. hanging, drowning, c-spine injury), have a slightly increased chance of survival. The following guidance aims to maximise the chances of survival in this critically injured cohort and should proceed in a horizontal fashion according to the <C>ABC paradigm.

<b>&lt;C&gt; Catastrophic Haemorrhage</b>	<ul style="list-style-type: none"><li>-Activate Massive Transfusion Protocol</li><li>-Give 2 units O neg blood stat</li><li>-Catastrophic limb haemorrhage should be treated with a CAT tourniquet or fully inflated manual BP cuff until the bleeding stops</li><li>-Haemostatic agents are indicated when catastrophic haemorrhage is uncontrollable by any other means and the patient needs emergency surgery for their injuries</li></ul>
<b>&lt;A&gt; Airway</b>	<ul style="list-style-type: none"><li>-Secure the airway and ventilate with 100% O<sub>2</sub></li><li>-Consider a suxamethonium only intubation if the patient has just arrested</li><li>-Look for airway obstruction / disruption</li></ul>
<b>&lt;B&gt; Breathing</b>	<ul style="list-style-type: none"><li>-Perform bilateral thoracostomies</li><li>-Perform an emergency thoracotomy in penetrating trauma if there were vital signs &lt;10mins prior to cardiac arrest and no return of spontaneous circulation</li><li>-Exclude life-threatening chest injuries (e.g. cardiac tamponade, massive haemothorax etc.)</li></ul>
<b>&lt;C&gt; Circulation</b>	<ul style="list-style-type: none"><li>-Insert two wide-bore IV cannula</li><li>-Use IO access if unable to secure iv access</li><li>-Apply pelvic splint and realign limb fractures</li><li>-Check the heart for shockable VT or VF</li></ul>

CPR and chest compressions are unlikely to be effective in hypovolaemic cardiac arrest but most survivors do not have hypovolaemia-related arrest so a standard ALS approach can be life-saving. Standard CPR should not delay the treatment of reversible causes (e.g. thoracotomy for cardiac tamponade). Adrenaline should be used cautiously as it can worsen intracellular hypoxia and increase bleeding. If there is no response within 20 minutes despite the above measures, the patient should be pronounced dead.

Comotio Cordis is a rare condition where actual or near cardiac arrest is caused by a blunt impact to the chest wall over the heart. A blow to the chest during the vulnerable phase of the cardiac cycle may cause malignant arrhythmias, (usually VF). Comotio cordis occurs mostly during sports and victims are young males, (mean age 14 years). The overall survival rate from commotion cordis is 15%, but 25% if resuscitation is started within 3 minutes.

# Management of suspected cervical spine injuries

## Indications for cervical spine immobilisation: -

1. All patients with altered level of consciousness
  2. Patients in whom the mechanism of the injury could have resulted in injury to the spine
  3. All patients with signs and symptoms consistent with spinal cord injury:
- History of transient paraesthesia, dysaesthesia, shooting pains or paralysis
  - Complaints of neck pain or discomfort
  - Limited range of motion or tenderness over the spine
  - Presence of sensorimotor deficit

## Immobilisation of patients arriving by ambulance

*If an injured child arrives by ambulance and immobilisation is inadequate, the following steps should be taken: -*

- DO NOT transfer the child from ambulance stretcher to ED trolley until immobilisation is adequate.
- Ensure adequate manual in-line stabilisation is provided
- Replace all soft (or makeshift) collars with rigid collars.
- Move patient to ED trolley

Once applied, cervical spine immobilisation may be removed only by the order of the TTL. If collar, sandbags and tape are removed for any other reason before C-spines are cleared, document the reason and duration. The time that the C-spine is cleared must also be documented.

## Immobilisation of patient arriving by private vehicle:-

If an injured child arrives by private vehicle, and the potential for spinal injury exists, the following procedure should apply under the direction of a trained doctor:

- Instruct the parents NOT to move the child
- A nurse and a doctor with a rigid collar, long backboard, sandbags and tape are needed.
- The doctor should enter the vehicle and provide manual in-line stabilisation, while the nurse applies the rigid collar
- **Whilst maintaining in-line stabilisation**, the patient is rotated around and moved to the long board. Sandbags or head blocks are applied.

## If parents are already carrying the child into ED

- Instruct the parents to remain still.
- The doctor should apply in-line stabilisation while the child is being held.
- The nurse should obtain a stretcher and equipment.
- The doctor should then co-ordinate movement of the child onto the Vacu-Mattress.
- Apply collar, and either sandbags or headblocks once the child is on the mattress.

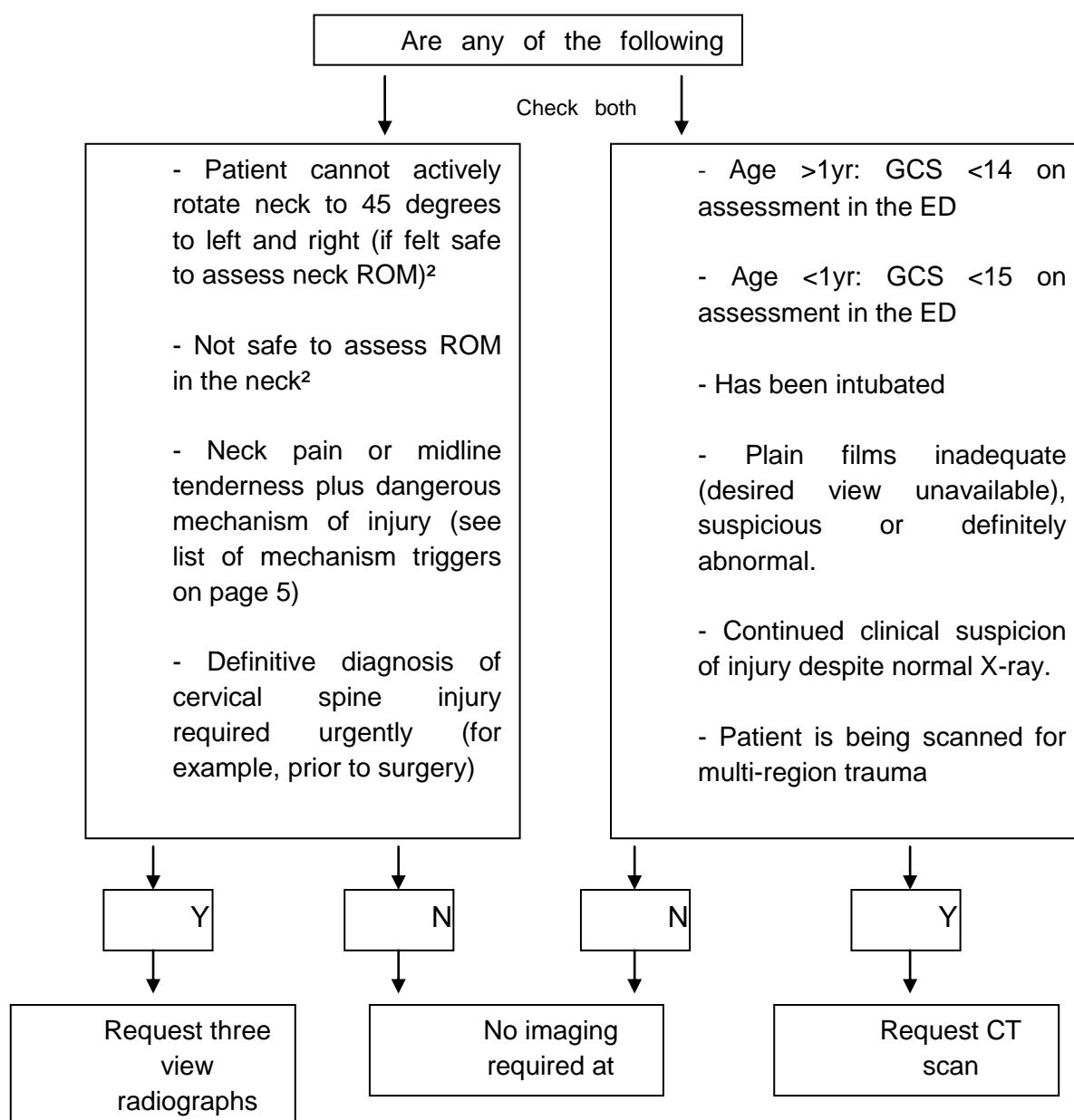
**Full and correct immobilisation includes all of the following: -**

- Vacu-Mattress with torso and extremity restraints
- If child is more than 3 years of age, use hard collar re-enforced by blocks
- If child is less than 3 years of age, blocks or sandbags and tape.
- Where above not available, manual in-line immobilisation must be used.

## **Cervical Spine**

### **NICE Guideline 56 - Investigation in the ED**

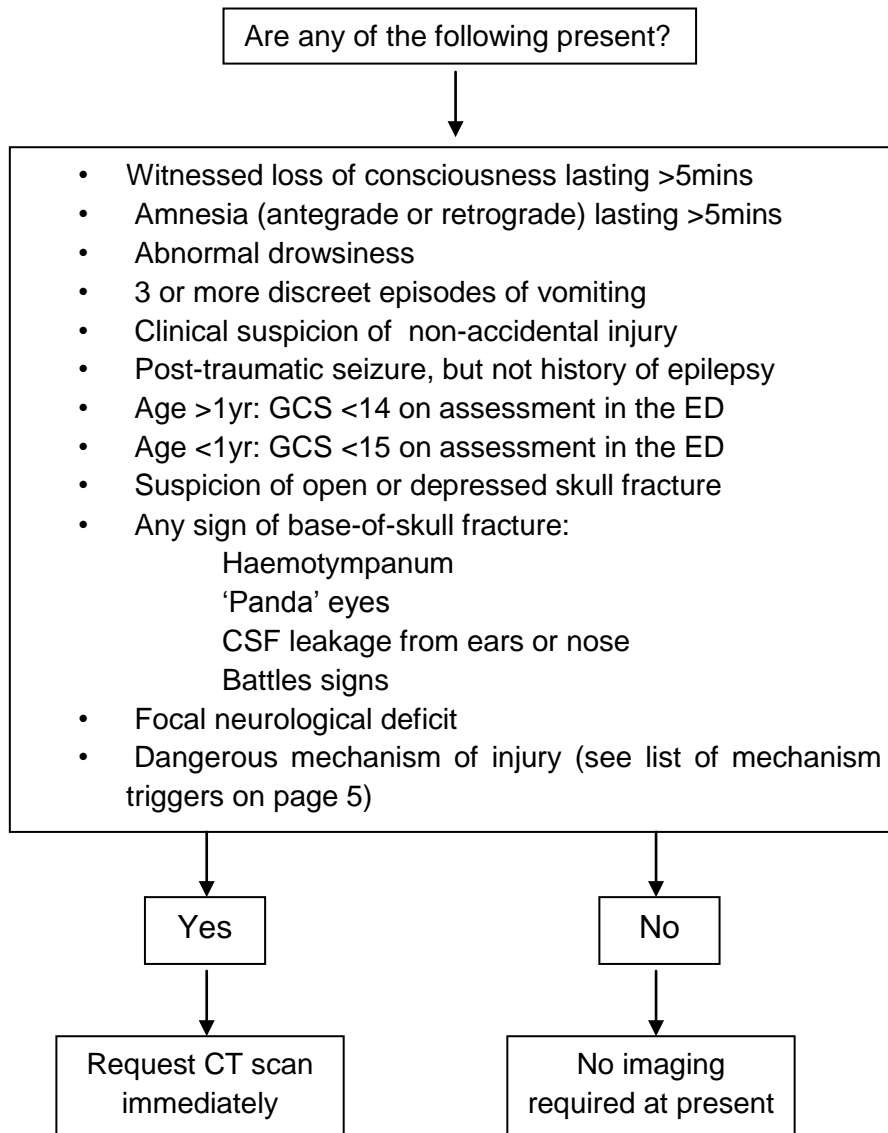
Children who require imaging of the cervical spine:



<sup>2</sup> Safe assessment can be carried out if the patient was involved in a simple rear-end motor vehicle collision; is comfortable in a sitting position in the ED; has been ambulatory at any time since injury and there is no midline cervical spine tenderness; or if the patient presents with delayed onset of neck pain

# Management of Head Injuries

Children who require CT scanning of the head:



A clinician with expertise in non-accidental injuries should be involved in any suspected case of NAI.

## **When to involve the Neurosurgeon:-**

Discuss the care of children with any of the following with the neurosurgeons at BCH:

- GCS <14
- Unexplained confusion for >4hrs
- Progressive, focal neurological signs
- Seizure, without full recovery
- Definite or suspected penetrating injury
- CSF leak
- Abnormal findings on CT Head scan

# Secondary survey

## **This should include:-**

- Top to toe examination of the patient listing all injuries found and diagnoses confirmed by investigations to date.
- Listing all neurology – ideally before intubation and paralysing drugs administered.
- Examining fundi, pupils and tympanic membranes.
- Documenting a temperature – both core and peripheral in serious burns cases.
- Ensuring the back is examined with log roll, and PR whenever possible.
- Clear documentation if anything is *unable* to be done e.g. spinal clearance / logroll so this can be included in subsequent management plans when the clinical condition allows.

*Consider urinary catheter, arterial lines (and timing of), tetanus, and antibiotic cover.*

## **The TTL Will Allocate a Clinician Who is responsible for the secondary survey of the limbs:-**

They will:

- Evaluate each joint and long-bone for dislocation / stability / fracture.
- Undertake neurovascular examination of all limbs.
- Record presence or absence of key peripheral pulses & neurological findings.
- Assist with splinting fractures.
- Repeat neurovascular examination after splinting.
- Arrange appropriate x-rays (**peripheral x-rays must not delay trauma CT scan**).
- In some cases it may be best to delay x-rays until the patient is in theatre and good quality traction x-rays can be obtained.

# Use of CT in Paediatric Patients

## **Whole Body CT in Major Trauma:-**

- CT should be obtained as soon as possible, ideally with the provisional report by 30 minutes after arrival in ED if indicated
- All WBCT requests should be discussed with the ED Consultant and the Radiology SpR / Consultant On Call
- If a patient with **hypotension** is to go to CT, this must be approved by the trauma team leader as the patient may benefit from the diagnostic accuracy of a scan but the decision is difficult:
  - If high volumes of fluid are needed to maintain BP a CT may not be safe.
  - If intra-abdominal bleeding suspected, Consultant General Surgeon must be aware.
  - Trauma team should accompany patient to CT
- Patients with **hypotension not responding to fluids** should probably go to theatre, not CT.

## Considerations for WBCT:-

1. High mechanism of injury (high speed RTC > 30mph; pedestrian vs vehicle; prolonged entrapment > 30mins; ejection from vehicle including bicycle)
2. Injury > 1 body region
3. Fractured pelvis
4. Haemodynamically unstable

## Management of pelvic fractures

**Beware! – paediatric patients are not always tachycardic at presentation.**  
**Apply pelvic splint if there is suspicion of potential injury.**

### The initial management aims to:

- Splint the pelvis to provide tamponade and prevent movement.
- Detect the presence of a pelvic fracture with an early x-ray / CT.
- Differentiate between pelvic and intra-abdominal bleeding.

### The following is the Standard Operating Procedure:

- Apply pelvic binder with history of blunt trauma and hypotension
- The Binder should be placed around the trochanters, not the iliac crests.
- If Binder applied pre-hospital leave it. Check position and x-ray.
- If hypotensive, begin fluid resuscitation
- Do NOT examine the pelvis for mechanical stability
- Do NOT logroll the patient until the pelvis is cleared.
- Obtain an early pelvic x-ray (or immediate CT) to clear the pelvis.

If this x-ray is normal, remove the binder and then repeat x-ray before clearing the pelvis.

### Application of the SAM Splint:

This is a two-person technique and should be performed by people trained in the application of the splint

1. Unroll splint and place underneath the patients feet
2. Slide towards the patient's head and if necessary, elevate buttocks to facilitate correct placement
3. The splint should be at the level of the greater trochanters and no higher.
4. One person holds the orange handle and the other tightens the splint until a click is heard.
5. The splint is fastened using the Velcro.

### If a pelvic fracture is present:

- You can leave binder in place for up to 24 hours unless patient has severe neurological deficit
- Examine carefully for open wounds, especially in the perineum.
- If there is an open wound, including vaginal lacerations, antibiotics must be administered.
- If unilateral pelvic injury: log-roll to opposite side
- If bilateral pelvic injury: avoid log-roll

**In the presence of pelvic injury / fracture, refer the patient via the Trauma Desk to the Trauma Team Leader at BCH.**

# Management of Compound Fractures

## Wound management

- Remove gross contamination e.g. leaves.
- Do **NOT** wash out wound
- Cover wound with saline soaked gauze
- Leave wound and dressing undisturbed
- Check tetanus status
- Give intravenous antibiotics:

Augmentin and Gentamicin  
(Farm / river, etc add Metronidazole)

## Fracture Management

- Neurovascular exam and documentation
- Align and splint fracture
- Repeat neurovascular examination
- Xray
- Document all findings

## Definitive management

- Consider referring open lower limb fractures via the Trauma Desk to BCH
- Debridement, wound closure and definitive fixation should be within 24 hours
- Severely contaminated injuries, farm and aquatic remain a surgical emergency and must be debrided ASAP



# Management of penetrating torso trauma

## Chest injury – cardiac origin:-

If penetrating cardiac injury is suspected, the following actions should be taken:

**Put out a trauma call, and pre-alert:**

**Consultant Thoracic surgeon on-call  
Emergency Department consultant on-call  
ITU/Anaesthetic consultant on-call  
General surgery consultant on-call  
Theatres**

There is an emergency thoracotomy set kept in the resus room in the ED. A thoracotomy should only be performed if:

1. The patient arrests in ED
2. The patient is peri-arrest
3. The patient has arrested within 5 minutes of hospital arrival.

Ideally, the patient should not be anaesthetised, intubated and ventilated until the cardiac / operating surgeon is present, as this is often the point at which cardiovascular decompensation occurs

**Transfer patient to theatre immediately.**

## Chest injury – non cardiac origin:-

Senior, experienced staff may be expected to perform thoracostomies / place chest drains in patients with diagnosed or suspected haemothorax in the trauma resuscitation.

## Abdominal injury – gunshot wound (GSW):-

GSW's are rare in the UK, and laparotomy is the most appropriate investigation. CT occasionally has a role in stable patients to assess for associated fractures, foreign body retention and track of the bullet.

Always check THOROUGHLY for an exit wound.

## Abdominal injury – stab wound:-

'Stable' patients with stab wounds to the torso may undergo CT. This is a good investigation for stab wounds to the back

With a **completely normal** CT the patient can be observed with regular clinical evaluation.

- Development of peritonitis requires a laparotomy
- Abnormal CT (free air, fluid etc) requires a laparotomy
- Evisceration or omental herniation requires a laparotomy

**Do NOT remove weapons from the torso (or neck) in ED**

# **Reporting knife wounds**

The police are responsible for assessing the risk posed by members of the public who are armed with knives. They need to consider:

- the risk of a further attack on the patient
- risks to staff, patients and visitors in the ED or hospital
- the risk of a further incident near to, or at, the site of the original incident.

For this reason, the police should be told whenever a person arrives at hospital with a wound inflicted in a violent attack with a knife, blade or other sharp instrument. Police should not be informed where the injury to the patient is accidental, or a result of self-harm. If you have responsibility for the patient, you should ensure that the police are contacted, but you may delegate this task to any member of staff. Identifying details, such as the patient's name and address, should not usually be disclosed at the stage of initial contact with the police.

## **Make the care of your patient your first concern**

When the police arrive, you should not allow them access to the patient if this will delay or hamper treatment or compromise the patient's recovery. If the patient's treatment and condition allow them to speak to the police, you or another member of the health care team should ask the patient whether they are willing to do so. You, the rest of the health care team and the police must abide by the patient's decision.

## **Disclosing personal information without consent**

Where it is probable that a crime has been committed, the police will seek further information. If the patient cannot give consent (because they are unconscious, for example), or refuses to disclose information or to allow health professionals to do so, information can still be disclosed if there are grounds for believing that this is justified in the public interest or disclosure is required by law. Disclosures in the public interest are justified where:

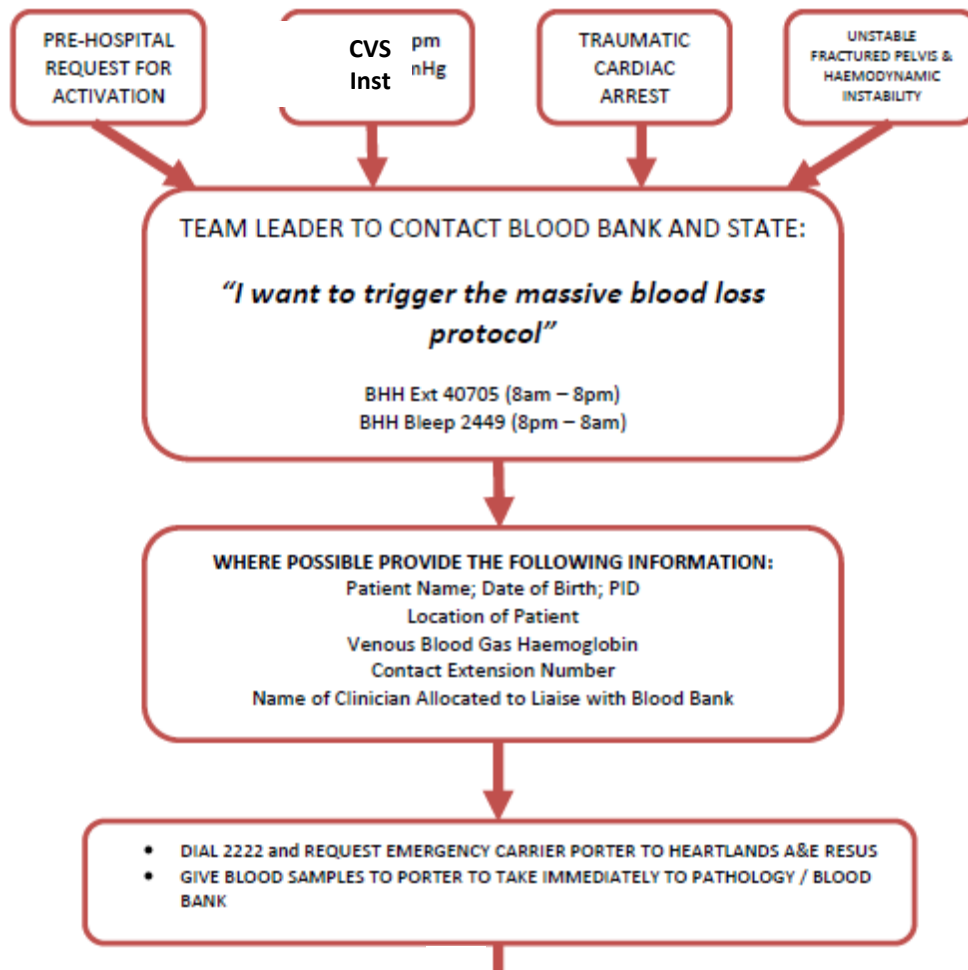
- failure to disclose information may put the patient, or someone else, at risk of death or serious harm.
- disclosure would be likely to assist in the prevention, detection or prosecution of a serious crime and failure to disclose would be prejudicial to those purposes.

If there is any doubt about whether disclosure is justified, the decision to disclose information without consent should be made by, or with the agreement of, the consultant in charge, or the Trust's Caldicott Guardian. Wherever practicable, you should seek the patient's consent to the disclosure or tell them that a disclosure has been made unless for example it may put you or others at risk of serious harm, or may be likely to undermine the purpose of the disclosure, by prejudicing the prevention, detection or prosecution of crime. The reasons for disclosure should be recorded in the patient's notes.

# Massive Transfusion Guidelines

## Indications for use:-

- Severe traumatic haemorrhagic shock, i.e. hypotensive despite fluid resuscitation



- If any patient meets the criteria for massive transfusion activation, the ED/ITU/General Surgery Consultants must be informed immediately

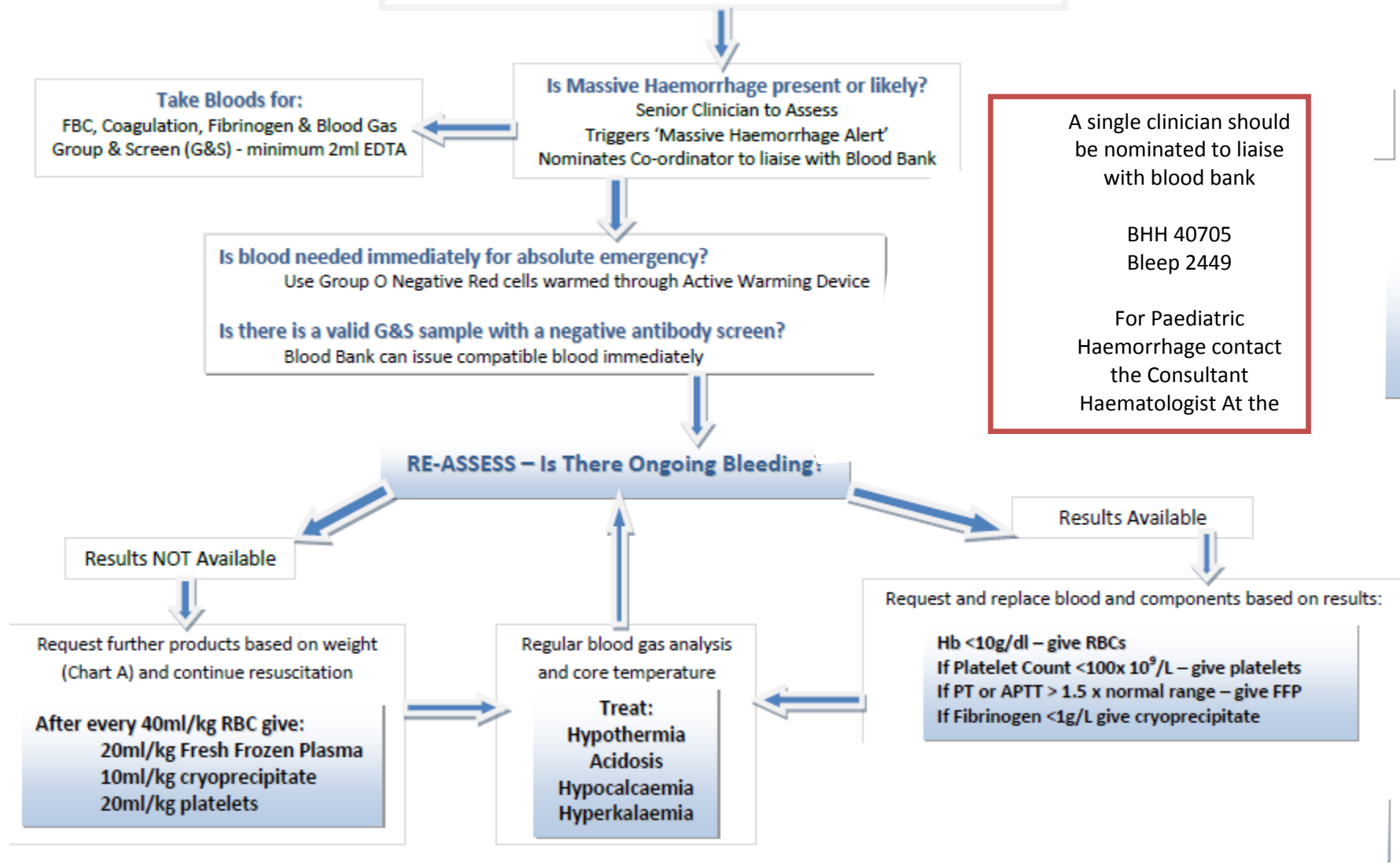
## Provision of Blood Products and Estimation by Child's Weight

The following table provides advice on the amount of blood products required given the patient's weight:

**Chart A**  
**Blood Products to request by weight**

	up to 10kg	10-20kg	20-50kg	over 50kg
Packed Cells	One Unit	Two Units	Three Units	Four Units
FFP	One Unit	Two Units	Three Units	Four Units
Platelets	One Unit	Two Units	Three Units	Four Units
Cryoprecipitate	Five Units	Eight Units	Twelve Units	Fifteen Units

## The Management of Paediatric Massive Haemorrhage



# Jehovah's Witness and Blood Products

A child is defined as anyone under the age of 18. Anyone under the age of 18 must not be allowed to die as the result of a lack of blood transfusion and in common law, clinicians are open to prosecution if this occurs. Children aged 16 to 17 years have a legal right to consent to their own treatment, even if it is against the wishes of their parents. Furthermore, there is no necessity to seek consent from their parents regarding treatment. Conversely, a child under the age of 18 does not have the legal right to refuse treatment and lawful consent to life saving procedures can be given by the parents or by the courts.

If a child is under the age of 16, they can consent to treatment provided they are Gillick competent, hence must satisfy the following test:

1. Can the child understand the nature, purpose and hazards of the treatment?
2. Can the child make a value judgment and balance the risks and benefits?

If a child under the age of 16 is Gillick competent and agrees to a transfusion, this over-rides any parental objections. However, if the child is not Gillick competent and parental consent is not forthcoming, it may be necessary to obtain consent through the courts.

**In emergency situations, such as patients fulfilling the criteria for massive transfusion protocol activation, blood transfusion should be given without waiting for a court order. In these circumstances, two doctors of consultant status should make a written, unambiguous entry in the patient's notes that blood transfusion is essential to save life or prevent serious permanent harm. At the same time, the Trusts solicitors should be contacted in order to obtain a court order.**

The 1989 Children's Act outlines who may have parental responsibility and this includes:

- The Mother
- The Father provided he is married to the mother when the child was born or has acquired legal responsibility by: *Parental responsibility order made by the mother; Parental responsibility order made by the court; Jointly registering the birth of the child with the mother*
- Legally appointed guardian – court appointed or appointed by parent in the event of their death
- A person in whose favour a court has made a residence order concerning the child
- A local authority designated in a care order in respect of the child (but not where the child is being looked after under section 20 of the Children Act, also known as being 'accommodated' or in 'voluntary care').
- A local authority or other authorised person who holds an emergency protection order in respect of the child

# **Tetanus Prevention**

## **USUAL TETANUS IMMUNISATION SCHEDULE**

Tetanus immunisation is given at:

<b>Age</b>	<b>Components</b>
2 months	Primary immunisation -3 doses As DTaP/IPV/Hib
3 months	
4 months	
3 years 4 months – 5 years	Booster as DTaP/IPV or dTaP/IPV
13 – 18 years	Booster as Td/IPV

## **MANAGEMENT OF TETANUS-PRONE WOUNDS**

All wounds require thorough cleaning, whatever the tetanus status.

<b>IMMUNISATION STATUS</b>	<b>CLEAN WOUND</b>	<b>TETANUS-PRONE WOUND</b>	
	<b>Vaccine</b>	<b>Vaccine</b>	<b>Human Tetanus Immunoglobulin</b>
Fully immunised, i.e. has received a total of 5 doses of vaccine at appropriate intervals	None required	None required	Only if high risk
Primary immunisation complete, boosters incomplete but up to date	None required (unless next dose due soon and convenient to give now)	None required (unless next dose due soon and convenient to give now)	Only if high risk
Primary immunisation incomplete or boosters not up to date	A reinforcing dose of vaccine and further doses as required to complete the recommended schedule (to ensure future immunity)	A reinforcing dose of vaccine and further doses as required to complete the recommended schedule (to ensure future immunity)	Yes: one dose of human tetanus immunoglobulin in a different site
Not immunised or immunisation status not known or uncertain	An immediate dose of vaccine followed, if records confirm the need, by completion of a full 5-dose course to ensure future immunity	An immediate dose of vaccine followed, if records confirm the need, by completion of a full 5-dose course to ensure future immunity	Yes: one dose of human tetanus immunoglobulin in a different site

**Tetanus-prone wounds** include:

- Wounds or burns that require surgical intervention that is delayed for more than six hours.
- Wounds or burns that show a significant degree of devitalised tissue.
- Puncture-type injuries, particularly where there has been contact with soil or manure.
- Wounds containing foreign bodies.
- Open fractures.
- Wounds or burns in patients who have systemic sepsis.

**High-risk** is regarded as heavy contamination with material likely to contain tetanus spores and/or extensive devitalised tissue.

**Immunosuppressed patients** may not be adequately protected against tetanus, despite having been fully immunised – they should be managed as if they were incompletely immunised.

## WHICH VACCINE TO USE?

Age	Components	Dose
Primary immunisation for children < 10 years	DTaP/IPV/Hib	0.5 ml IM
Booster for children 3 – 10 years	dTaP/IPV	0.5 ml IM
Primary immunisation for children ≥ 10 years	Td/IPV	0.5 ml IM
Booster for children ≥ 10 years		

## HUMAN TETANUS IMMUNOGLOBULIN

Standard dose: 250 units IM

If > 24 hours since injury or heavy contamination or following burns: 500 units IM.

## Transfers to BCH

For a paediatric patient(s) in a trauma unit (TU) or local emergency hospital (LEH) that requires paediatric MTC level of care for immediate intervention, there should be no delays to transfer. A principle of “call and send” will be used. The regional trauma coordinating desk (RTD) will be the hub for communication via the KIDS office.

The TU / LEH will be responsible for ensuring that the paediatric patient(s) are safe to transfer. It will not be possible to ensure that all patients are completely stable as the intervention to achieve stability may also be the reason for the transfer.

As a basic principle, the TU / LEH should be satisfied that:

The airway is safe for the duration of transfer or secured  
That life threatening chest injuries have been excluded or treated  
That appropriate haemorrhage control has been achieved  
That the cervical spine immobilisation is maintained.  
That an escort is provided who is clinically capable of dealing with the patient’s condition.  
That all relevant imaging is transferred electronically to the receiving MTC

The selected MTC is responsible for ensuring that the patient is received in an appropriate clinical area (as per discussion with BCH TTL and KIDS for paediatrics) and that the trauma team is alerted to the arrival of the patient.

BCH will:

- Be available to offer advice to the TU TTL if necessary or requested.
- Review the TU images on the Imaging Exchange Portal prior to patient arrival if possible.
- Notify relevant tertiary services as necessary.
- Assemble the trauma team

The Regional Trauma desk is responsible for coordinating the communication between MTC, TU and transporting ambulance provider. Specifically the RTD will:

- Take the call from the TU and note basic details of transfer
- Set up “conference call” with BCH TTL and KIDS, and monitor the call.
- Task appropriate vehicle to TU.
- Update MTC on departure of transport vehicle from TU and expected time of arrival
- Coordinate calls between vehicle and MTC TTL when advice or updated information needs to be passed.

### **Standards for service.**

1. That from call to RTD to transfer commencing should be less than 30 minutes
2. That 90% patients are transferred to nearest MTC
3. That all patients are received in an MTC by a consultant led trauma team.

*A trauma unit should refer patients for hyper-acute transfer when the patient meets the criteria for needing immediate MTC level of care.*



## Criteria for Immediate MTC Level Transfer

- A: Airway injury or compromise
- B: Respiratory distress or failure
- C: Clinical evidence of hypovolaemia
- D: GCS <14
- E: •Penetrating trauma (except a limb)
  - Spinal cord injury
  - Traumatic extremity amputation (proximal to wrist or ankle)
  - 2 or more long bone fractures
  - Abdominal or pelvic injury
  - Peripheral neurovascular signs
  - Depressed or open skull #
  - CSF leak
  - Significant burn
- M: •Traumatic death in same passenger compartment
  - Fall > 3m or twice patient's height
  - Patient trapped under vehicle or ejected from vehicle
  - Bull's-eye windscreen
  - Enclosure with fire
  - All motorcycle or quad bike incidents

## Pre-Transfer Actions to be Taken at TU

1. Undertake full Primary Survey
2. Secure airway if necessary
3. Radiological Investigations as Indicated
4. Decompress pneumothoraces or haemothoraces
5. Control haemorrhage
  - Apply pelvic binder
  - Activate massive transfusion protocol if required
  - If exsanguinating haemorrhage provide damage control laparotomy / angio-embolisation
6. Splint all fractures with splints or plaster

Do not delay transfer to insert invasive monitoring

## Escort

If KIDS are not retrieving the paediatric patient, the appropriate escort should be determined by the TU TTL.

For intubated and ventilated patients this will normally be an anaesthetist or ITU doctor however there may be some centres that have advanced nurse practitioners providing this level of care.

For non intubated patients the escort must be capable of dealing with the anticipated complications on route.

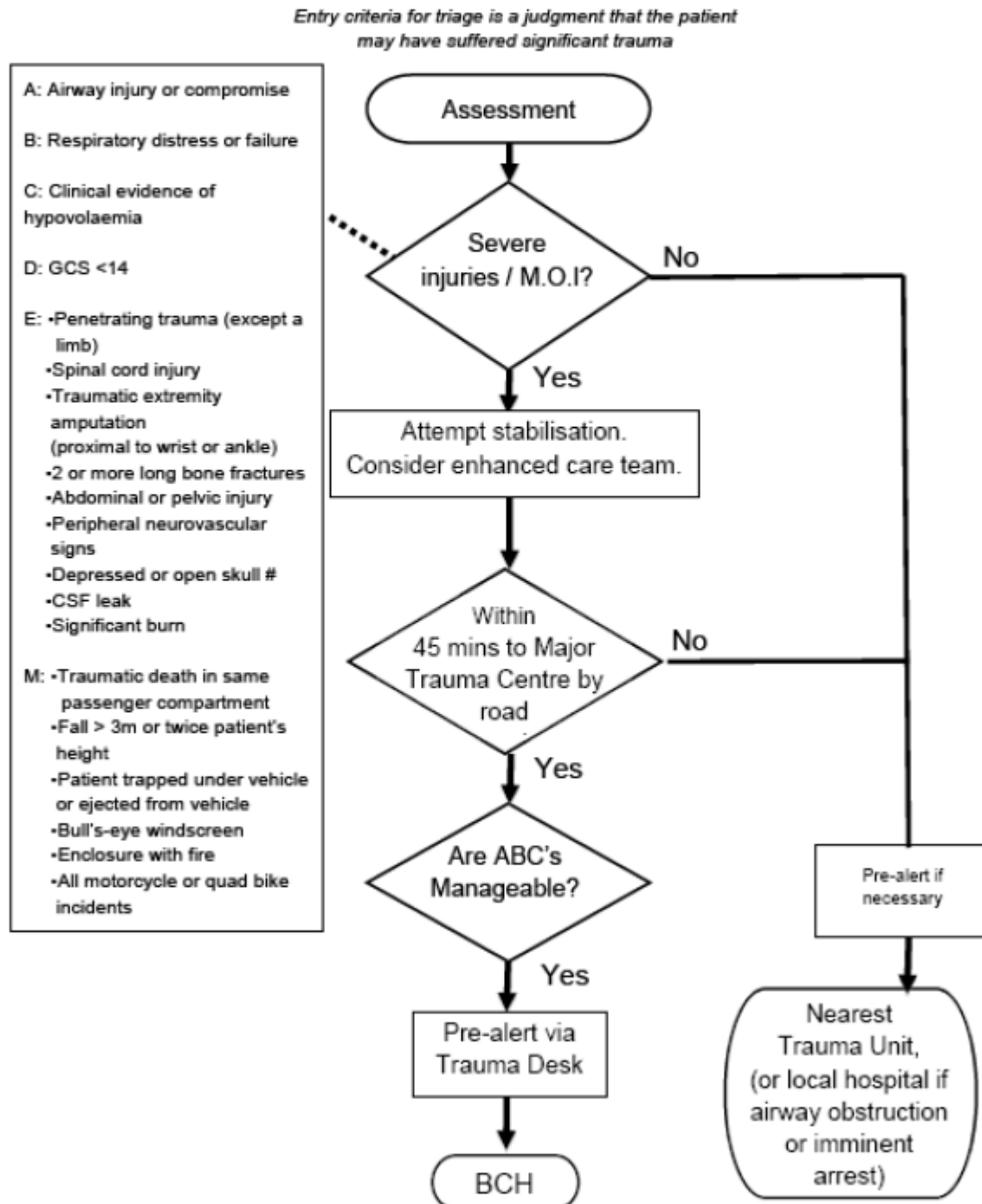
The ambulance service will not routinely return escorts to the referring TU. The MTC will arrange taxi transfers to return the escort and their equipment.

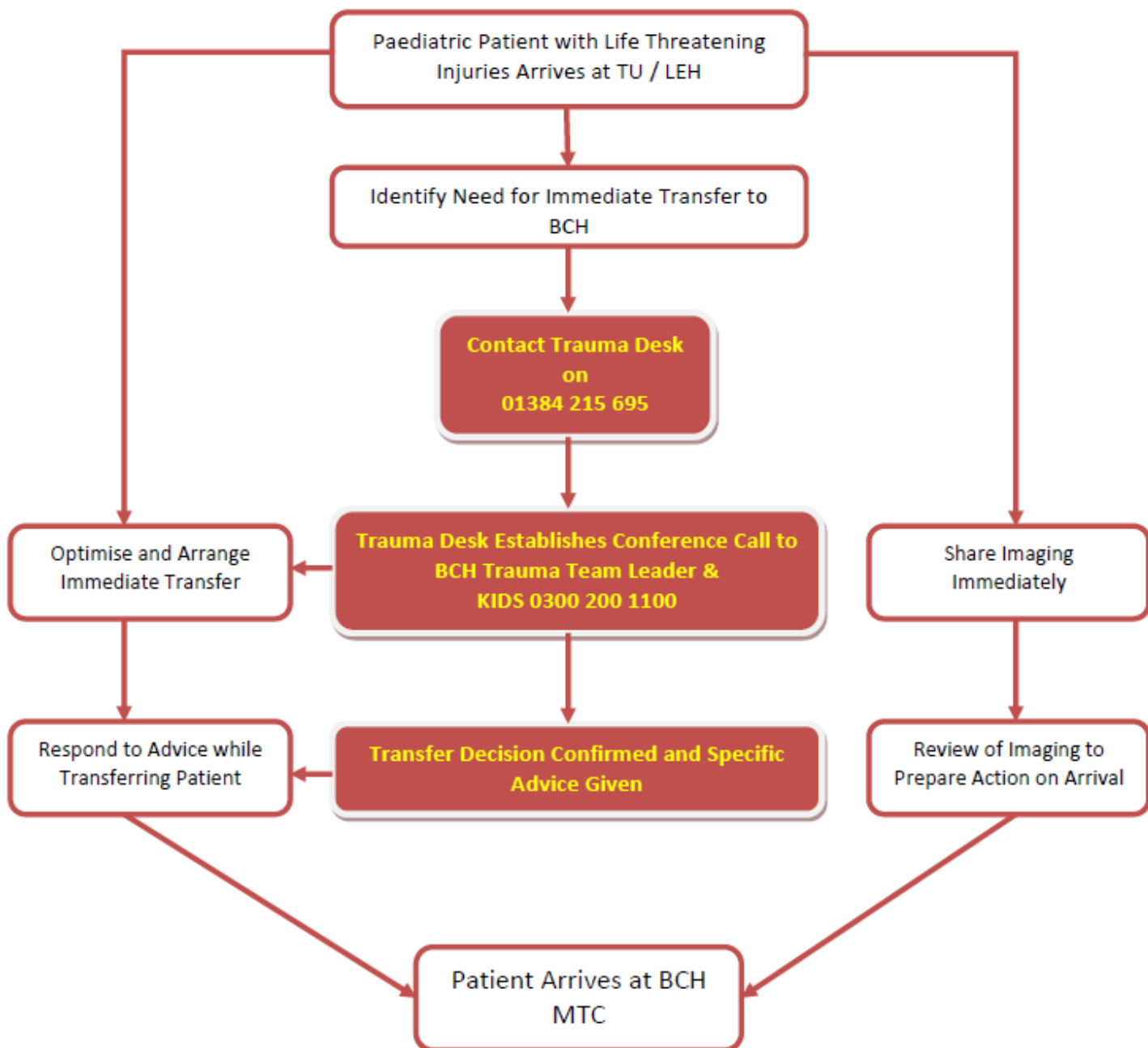
## Ambulance Transport

West Midlands Ambulance Service (WMAS) will be the provider for most hyper acute transfers, (although for paediatric patients, KIDS may be the secondary provider). WMAS will provide a double manned ambulance from the emergency fleet. It will be equipped with a defibrillator and portable ventilator. The crew may not always contain a paramedic, if there is no paramedic the senior clinician on board will be an emergency medical technician (EMT). When a doctor escort is being provided by the TU it is not necessary to insist on a paramedic crew as the EMT will be more than capable of providing the support required.

## Birmingham Childrens Hospital Major Trauma Centre / TU Interface

Birmingham Childrens' Hospital is the regional Major Trauma Centre for any significantly injured child below the age of 16 years. The paediatric pre-hospital tool differs from the adult tool and is described below:





Number:

## BBCCCN/CNet/NWMCCN Transfer Form

**Patient Details**

Name: \_\_\_\_\_

DOB: \_\_\_\_\_

NHS Number: \_\_\_\_\_ Postcode: \_\_\_\_\_

### Staff Arranging Transfer

Referring Doctor: \_\_\_\_\_

Name: \_\_\_\_\_

Speciality: \_\_\_\_\_ Grade: \_\_\_\_\_

Receiving Hospital: \_\_\_\_\_

ITU Clinician: \_\_\_\_\_ Grade: \_\_\_\_\_

Specialist Clinician: \_\_\_\_\_ Speciality: \_\_\_\_\_

### Escorting Personnel

Escort 1: Doctor / Nurse / ODP / Other (please circle)

Name: \_\_\_\_\_ GMC/NMC: \_\_\_\_\_

Signed: \_\_\_\_\_ Grade: \_\_\_\_\_

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Escort 2: Doctor / Nurse / ODP / Other (please circle)

Name: \_\_\_\_\_ GMC/NMC: \_\_\_\_\_

Signed: \_\_\_\_\_ Grade: \_\_\_\_\_

### Airway & Ventilation

Mechanical ☐ Spont ☐ Vent Mode: \_\_\_\_\_ PEEP: \_\_\_\_\_  
ETT size: \_\_\_\_\_ @ \_\_\_\_\_ cm Tidal Vol: \_\_\_\_\_ FIO<sub>2</sub>: \_\_\_\_\_  
Trachy: Size \_\_\_\_\_ Peak Press: \_\_\_\_\_ Resp Rate: \_\_\_\_\_

### Transfer Details

Transferring Hospital: \_\_\_\_\_  
(please circle)

Transferring from: ICU / HDU / ASE / Theatre / Ward / Other \_\_\_\_\_

Speciality: Cardiac / Renal / Neuro / Resp / Liver / Other \_\_\_\_\_

Recipient Hospital: \_\_\_\_\_

Recipient Unit: ICU / HDU / TH / WD / Other \_\_\_\_\_

Reason: Tertiary referral / No ICU bed / Repat / Other \_\_\_\_\_

Date of Transfer: \_\_\_\_\_ Time: \_\_\_\_\_

## Monitors

ECG:	<input type="checkbox"/>	EtCO <sub>2</sub> :	<input type="checkbox"/>
BP:	<input type="checkbox"/>	CVP:	<input type="checkbox"/>
NBP:	<input type="checkbox"/>	Other:	
SpO <sub>2</sub> :	<input type="checkbox"/>		

### Spinal Immobilisation?

Yes: ☐

No: ☐

### Lines and Catheters

	Site	Insertion date
Arterial Line:		
CVP:		
Cannula 1:		
2:		
NGT:		
Urinary Cath:		
Chest Drain:		
Other:		

## Start Time:

[illegible]

White copy: File in patient notes. Blue copy: Post to Network Office. Yellow copy: File on receiving unit

## KIDS Clinical Guideline:

### Checklist for transfer of children with neurosurgical emergency

<p><b>Checklist:</b></p> <ul style="list-style-type: none"> <li>✓ Use this checklist to assist in ensuring adequate therapy and monitoring are in place prior to and during transfer</li> </ul>	<p><b>Identify and consult:</b></p> <ul style="list-style-type: none"> <li>• <i>Identify acute neurosurgical emergency:</i> (eg. Mode of injury or history, focal neurological deficits, reduced GCS, dilated/unequal pupils, bradycardia &amp; hypertension)</li> <li>• <i>Urgent conference call with KIDS consultant and Neurosurgeon if time-critical, likely to require primary transfer by referring team</i></li> <li>• <i>If immediately life-threatening, may require primary transfer to neurosurgery theatre (theatre 1 at BCH) or local neurosurgical</i></li> </ul>
<p><b>Airway and Breathing:</b></p> <ul style="list-style-type: none"> <li>• Oral ETT, firmly taped, T2 on CXR</li> <li>• Cervical spine immobilisation if trauma</li> <li>• PaCO<sub>2</sub> 4.5-5.3 kPa</li> <li>• Orogastric tube on free drainage</li> </ul>	<p><b>Circulation:</b></p> <ul style="list-style-type: none"> <li>• 2 peripheral iv lines</li> <li>• Request crossmatch (Aim Hb&gt;10gms)</li> <li>• Aim for normovolemia</li> <li>• Avoid hypotension</li> <li>• 0.9% Saline maintenance (+dextrose if hypoglycaemia)</li> <li>• Volume expansion 0.9% Saline 10ml/kg boluses</li> <li>• Consider noradrenaline infusion to maintain BP (see KIDS drug calculator)</li> <li>• CVL and arterial line if sufficient time</li> </ul> <p><b>Disability and other management:</b></p> <ul style="list-style-type: none"> <li>• 15 mins Neuro Obs</li> <li>• CT scan (discuss with Neurosurgeon/KIDS)</li> <li>• Normothermia (36-37° C)</li> <li>• Phenytoin 18 mg/kg over 20 mins if seizures</li> <li>• Maintain plasma Na &gt;140mmol</li> <li>• Hyperosmolar therapy (discuss with Neurosurgeon/KIDS see KIDS drug calculator)</li> <li>• Secondary survey if trauma</li> </ul>
<p><b>Preparing for transfer:</b></p> <ul style="list-style-type: none"> <li>• Adequate sedation and analgesia with morphine/midazolam infusion – see <a href="#">KIDS drug calculator</a> for dosing</li> <li>• Muscle relaxant infusion – see <a href="#">KIDS drug calculator</a> for dosing</li> <li>• Urinary catheterisation – especially if mannitol used</li> <li>• Strategy for managing raised ICP: (discuss with Neurosurgeon/KIDS regarding sedation, pCO<sub>2</sub>, ABP target for cerebral perfusion, hyperosmolar therapy)</li> <li>• Secure child to trolley (not on spinal board)</li> <li>• Connect long extension to allow additional drug and fluid administration en route</li> <li>• Sufficient portable oxygen for whole journey x2</li> <li>• Sufficient battery life on monitor and infusion pumps</li> <li>• Use ambulance oxygen gas and electricity supply where possible</li> <li>• Transfer documentation, radiology, blood results</li> <li>• Regular observations (at least once every 15mins) – including pupillary reactions, heart rate, blood pressure ET/CO<sub>2</sub>, SpO<sub>2</sub></li> <li>• Seat belts at all times</li> <li>• Travel safe – Lights/Sirens only when necessary to manage traffic congestion or unstable patient or time critical</li> </ul>	<p><b>References:</b></p> <p>APLS 4<sup>th</sup> edition 2004</p> <p>Joint statement from the Society of British Neurological Surgeons (SBNS) and the Royal College of Anaesthetists (RCoA) Regarding the Provision of Emergency Paediatric Neurosurgical Services (<a href="#">document</a>)</p>