Guideline for Management of Major Haemorrhage

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<td>Year 2020 Version 7</td>
<td>Hospital Transfusion Team</td>
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Key Points

- This document aims to give guidance about transfusion management of a patient who has major haemorrhage and is likely to need rapid infusion of substantial volumes of fluid, together with red cell and other blood component replacement.

- This document outlines the procedure to follow to ensure prompt laboratory response and issue of blood and blood components.
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1. **Introduction**

   Major haemorrhage jeopardises the survival of patients in many clinical settings. In major haemorrhage situations, a successful outcome requires early recognition, prompt action, and effective communication between the various clinical specialities, diagnostic laboratories, and blood bank staff.

   The guiding principles are:
   - Get Help
   - Give Fluid/Blood
   - Stop Bleeding
   - Reassess

   The British Committee for Standards in Haematology (BCSH 2015) has published practical guidelines on the management of major haemorrhage and it is on these guidelines this document is based.

2. **Purpose**

   This document aims to give guidance about transfusion management of a patient who has a major haemorrhage and is likely to need rapid infusion of blood components.

   For a detailed description of the procedure for requesting and administering blood components, refer to the Trust Blood Transfusion Policy available on the Intranet.

3. **Scope**

   As patients with major haemorrhage may present in a variety of clinical settings, from a range of specialities, this guidance applies to any clinician treating a patient with major haemorrhage.

4. **Definitions**

   **Major haemorrhage in adults**

   This may be defined as either:
   - ≥40% loss of total blood volume or
   - 1500-2000 mls loss or
   - 4 litres in 24 hours or
   - 2 litres in 3 hours or
   - Haemorrhage of >150ml/minute.

   Major Haemorrhage may manifest as
   - Pulse >110, RR >30, BP<90 systolic, urine<20mls/hr

   **Major haemorrhage in children**

   This may be defined as blood loss of
   - >80ml/kg in 24 hours
   - >40ml/kg in 3 hours
   - >3ml/kg/minute
Suspect 40% blood loss if significant source of bleeding suspected and clinical parameters as follows:

<table>
<thead>
<tr>
<th>Age</th>
<th>Heart rate</th>
<th>Systolic BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>&gt;160</td>
<td>&lt;70</td>
</tr>
<tr>
<td>1–2 years</td>
<td>&gt;150</td>
<td>&lt;80</td>
</tr>
<tr>
<td>3–5 years</td>
<td>&gt;140</td>
<td>&lt;80</td>
</tr>
<tr>
<td>6–12 years</td>
<td>&gt;120</td>
<td>&lt;90</td>
</tr>
<tr>
<td>&gt;12 years</td>
<td>&gt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Tachypnoea or increased work of breathing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine output</td>
<td>&lt;0.5ml/kg/hour</td>
<td></td>
</tr>
</tbody>
</table>

5. Priorities for treatment

Get Help.
- Early involvement of senior staff is essential- CALL FOR ASSISTANCE IMMEDIATELY
- Early recognition of significant haemorrhage, ideally before major increments in pulse rate and falls in blood pressure, allowing prompt action to pre-empt shock
- Early activation of Major Haemorrhage Protocol

Give Fluid/ Blood
- Restoration of circulating volume to maintain tissue perfusion and oxygen delivery.

Stop Bleeding
- Achieving haemostasis through surgical or other interventional procedures if indicated.
- Achieving haemostasis by correction of coagulopathy
- Consider use of Tranexamic acid (see Appendix 6)

Reassess
- Whenever possible, blood transfusion and blood component therapy should be guided by laboratory investigations interpreted with advice from a Haematologist. The on call Consultant Haematologist can be contacted via switchboard.

When laboratory results available:-

<table>
<thead>
<tr>
<th>Adults</th>
<th>IF</th>
<th>GIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Falling Hb</td>
<td>Red cells</td>
</tr>
<tr>
<td></td>
<td>APPT and/or PT ratio &gt;1.5</td>
<td>FFP 15-20ml/kg</td>
</tr>
<tr>
<td></td>
<td>Fibrinogen &lt;1.5 g/L (Obstetrics &lt;2g/l)</td>
<td>Cryoprecipitate (2 pools)</td>
</tr>
<tr>
<td></td>
<td>Platelet count &lt;50 x 10^9</td>
<td>Platelets 1 adult dose</td>
</tr>
</tbody>
</table>
6. **Activation of major haemorrhage protocol**

Blood transfusion laboratory staff must be informed of major haemorrhage at the earliest opportunity so that emergency procedures can be activated in a timely manner.

The decision to activate the major haemorrhage protocol must be made by a senior member of the medical staff (Registrar or above).

The person activating the major haemorrhage protocol must nominate a communication lead. All contact with transfusion MUST be via this person, so this must be someone who is able to stay close to the phone to communicate with transfusion.

The communication lead will then contact switchboard on 2222, and state either

- **“Activate the major haemorrhage protocol – contact extension……”**
- **“Activate the major obstetric haemorrhage protocol- contact extension…..”**

**STAY BY THIS PHONE**

The transfusion laboratory will call back on that number immediately, and must be given the patient’s following information:-

- Full name and date of birth (if known) and
- Hospital number.
- Gender
- Details of the incident, for instance if this is a trauma call, if emergency group O red cells are required/already used, or if group-specific blood or fully cross matched blood is required (depending on availability and the patients clinical need).

**Emergency Group O red cell units** are available at all times (see section 7) or may be issued directly by the transfusion laboratory.

- Which major haemorrhage pack(s) are required (more than 1 pack may be issued at once depending on the clinical situation)
- The name and contact details of the communication lead.

To avoid the potential for miscommunication and repeated calls to the laboratory with varying messages, **all** contact with the laboratory must be through this person.
The communication lead must ensure that blood samples for
- **full blood count**
- **cross match** (transfusion laboratory staff will advise you of the patient’s Group and Save (G&S) requirements)
- **clotting screen** have been taken and are sent.
These samples must be labelled with the following information (as a minimum):
- Patient’s first name and surname (if known, or for unknown patients, use designated phonetic alphabet name)
- Patient’s Date of birth (if known).
- Hospital Number from ID band.
- Date and Time sample taken
Any samples which do not meet this minimum requirement will be rejected.

The samples should be sent directly to transfusion via the air tube
- **PCH-** Transfusion Lab station is 400.
- **HH** Tube automatically delivers samples directly to the laboratory

If for any reason the air tube system is not available, they should be hand delivered to transfusion.

7. **Location of Emergency Blood**

<table>
<thead>
<tr>
<th>PCH Emergency Group O blood</th>
<th>HH Emergency Group O blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 units Main Blood Bank, 4th floor Core B</td>
<td>2 units Main Blood Bank- Pathology</td>
</tr>
<tr>
<td>4 units Maternity Blood Bank</td>
<td></td>
</tr>
<tr>
<td>2 Neonatal units Maternity Blood Bank</td>
<td></td>
</tr>
</tbody>
</table>

*Please note: No emergency O negative units in PCH Theatre or Stamford Blood Bank*

Anyone taking any emergency O RhD Negative units must inform transfusion immediately.

8. **Issue of major haemorrhage packs – ADULTS**

On activation of the major haemorrhage protocol the transfusion laboratory staff will issue major haemorrhage packs in the following order:

<table>
<thead>
<tr>
<th>Pack 1</th>
<th>4 units red cells</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(either emergency Group O, group compatible or fully cross matched depending on availability and clinical need)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pack 2</th>
<th>5 units red blood cells, 4 units FFP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(For trauma- +1 unit platelets. These may not be immediately</td>
</tr>
</tbody>
</table>
Depending on the clinical situation, the decision may be taken to request any/all packs at the same time. Please inform transfusion if this is thought necessary.

When pack 1 has been issued, the transfusion laboratory will request guidance from the communication lead as to whether packs 2 and/or pack 3 will be required. If necessary the laboratory will then

- Commence thawing plasma products
- Contact the NHSBT Cambridge blood transfusion centre to request platelets as an emergency delivery (if none already available on the premises).
- Inform a Consultant Haematologist that the major haemorrhage protocol has been activated.

9. **Issue of major haemorrhage packs – CHILDREN**

On activation of the major haemorrhage protocol for children the transfusion laboratory staff will issue major haemorrhage packs in the following order:

<table>
<thead>
<tr>
<th>Pack</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pack 1</td>
<td>Red blood cells 20ml/kg (up to 4 units)</td>
</tr>
<tr>
<td>Pack 2</td>
<td>Red blood cells 30ml/kg (up to 5 units)</td>
</tr>
<tr>
<td></td>
<td>FFP 20ml/kg (up to 4 units)</td>
</tr>
<tr>
<td>Pack 3</td>
<td>Red blood cells 30ml/kg (up to 5 units)</td>
</tr>
<tr>
<td></td>
<td>FFP 20ml/kg (up to 4 units)</td>
</tr>
<tr>
<td></td>
<td>Platelets 15ml/kg (up to 1 unit)</td>
</tr>
<tr>
<td></td>
<td>Cryoprecipitate 5ml/kg (up to 300ml)</td>
</tr>
</tbody>
</table>

Depending on the clinical situation, the decision may be taken to request any/all packs at the same time. Please inform transfusion if this is thought necessary.

When pack 1 has been issued, the transfusion laboratory will request guidance from the communication lead as to whether packs 2 and/or pack 3 will be required. If necessary the laboratory will then

- Commence thawing plasma products
- Contact the NHSBT Cambridge blood transfusion centre to request platelets as an emergency delivery (if none already available on the premises).
- Inform a Consultant Haematologist that the paediatric major haemorrhage protocol has been activated.

10. **Collecting the blood components**

As soon as the blood components are ready for collection, the laboratory staff will inform the communication lead. It is then the responsibility of the clinical staff at the incident to identify someone to act as a ‘runner’ to collect the components from the
transfusion laboratory. This must be a member of the clinical team who has completed training and assessment in collecting blood components, and has access to the blood bank.

The ‘runner’ may have to make several journeys to the transfusion laboratory as components become ready for issue.

**PCH Collecting units for obstetric haemorrhage or haemorrhage in the Emergency Department.**

For PCH obstetric haemorrhage and major haemorrhage in the PCH Emergency Department, a porter may be responsible for collecting components (see below).

- **In Major Obstetric Haemorrhage at PCH, the laboratory** will be responsible for arranging for the emergency blood porter to deliver blood to the Maternity unit blood bank, or in the case of non-refrigerated components, to the location of the incident.
- **In Major haemorrhage in PCH Emergency Department, the ED Coordinator** will arrange for an **ED porter** to collect a pre packed box of blood, and transport this unopened to the Resuscitation/ Majors area of ED

PCH Porters MUST NOT collect individual units to be taken directly to a specific patient.

**Hinchingbrooke Hospital Porters**

At Hinchingbrooke Hospital Porters must not be involved in collecting/transporting blood, it must be collected by a member of staff who has completed a competency assessment in collecting blood.

11. **Issue of components**

**PCH Major obstetric haemorrhage**

Refrigerated products (red cells and FFP) **must always** be placed in the maternity blood bank location 1 OBD.045. All non-refrigerated components (i.e.: platelets and cryoprecipitate) should be handed over to an appropriate member of staff, never put them into the fridge. **Please note:- the communication lead must ensure that someone is available to receive these non refrigerated products from the emergency blood porter, in order that transfusion is not delayed. The person receiving them should sign, date and time the FRONT of the pink and yellow compatibility form as a record of receipt.**

12. **Major Haemorrhage in Theatre**

Refrigerated products (red cells and FFP) for major haemorrhage if the patient is in theatre should be must be placed in the theatre blood fridge location 1.THE.113. All non-refrigerated components (i.e.: platelets and cryoprecipitate) should be handed over to an appropriate member of staff, never put them into the fridge.
All other clinical areas (including the Emergency Department)

Blood will be issued in a validated transport box. Please inform transfusion if these units are transferred with the patient to another department within the hospital. The box must not be taken out of the hospital - contact transfusion if a patient needs blood on transfer to another hospital.

Hinchingbrooke Hospital

Collect all components directly from the blood bank, as guided by transfusion laboratory staff.

For all sites

The transfusion laboratory will keep a record of the times products were requested, issued and used (see Appendix 7).

To comply with the legal framework of the Blood Safety & Quality Regulations 2005:

- No blood components must be taken from the hospital unless transfusion have been informed, and have completed the necessary documentation and cold chain arrangements.
- All units must be signed for as used, and traceability tags completed.

12. Major Haemorrhage at Stamford Hospital

There are no emergency O negative units at Stamford Hospital Blood Bank. In case of major haemorrhage at Stamford Hospital, arrangements should be made to transfer the patient to PCH immediately by emergency ambulance. Give crystalloid/colloid fluids to support the patient's circulation.

Transfusion at PCH should be contacted on 8451/2 or bleep 1151 out of hours to inform them that the patient is being transferred to PCH (they may need transfusion support on arrival).

13. Use of Tranexamic acid

Tranexamic acid is an anti fibrinolytic agent and inhibits the activation of plasminogen to plasmin. Trial data (CRASH-2) showed that the administration of Tranexamic acid to adult trauma patients with, or at risk of, significant haemorrhage significantly reduces all-cause mortality with no apparent increase in vascular occlusive events (CRASH 2 2010).

Recent evidence from the CRASH 3 Trial shows that Tranexamic acid should also be considered in patients with Traumatic Brain Injury (CRASH 3 2019).

Adult trauma patients with suspected bleeding in the context of major trauma where the patient has either a heart rate >110 or systolic BP <90 in whom antifibrinolytics are not contraindicated, should be given Tranexamic acid as soon as possible after injury, at a dose of 1g intravenously over 10 min followed by a maintenance infusion of 1g over 8 hours (BCSH 2015). It is recommended that Tranexamic acid is used within 3 hours of injury.
Initial use of Tranexamic acid should be avoided when time from injury is known or suspected to be greater than 3 hours.

For more information on dose and administration, please refer to Appendix 6 (NHS East of England Trauma Network TEMPO guidelines 2014).

The use of Tranexamic acid should be considered in non-traumatic major bleeding (BCSH 2015). NICE (2015) recommend that Tranexamic acid is offered to adults undergoing surgery who are expected to have at least moderate blood loss (greater than 500 ml).

14. Conclusion of the incident
At the conclusion of the incident, a senior member of the medical staff (registrar or above) must notify the transfusion laboratory that they may stand down, as routine Laboratory work may have been de prioritised for the duration of the incident, and extra staff may have been asked to report for duty, depending on the time of day.

A monthly review of incidents will be prepared by the Transfusion Operational Management Team. Any adverse events will be identified and reported via DATIX, and corrective and preventative actions recorded on the laboratory Q pulse system.

15. Endorsement
The guideline will be approved by the Hospital Transfusion Committee & endorsed by the Quality Governance Operational Committee.

16. Distribution
The guideline will be recorded on the trust intranet.

17. References


18. Associated documents
Blood Transfusion Policy (C0160).
Appendix 1

Procedure for activating ADULT major haemorrhage protocol

The decision to activate the major haemorrhage protocol is made by a senior member of
the medical staff (Registrar or above)

1. Nominate a ‘communication lead’, who should be able to stay close to the phone to
communicate with transfusion. All contact with transfusion MUST be via this person.

2. The communication lead calls switchboard on 2222 and states
   “Activate the major haemorrhage protocol – contact extension ……”
   or
   “Activate the major obstetric haemorrhage protocol- contact extension ……”
   STAY BY THIS PHONE
   Transfusion will call you back immediately

3. When transfusion calls back, tell them your name and contact number and
   • The patients name, date of birth (if known) and hospital number
   • Details of the incident (for instance is this a trauma call, if emergency group O red
cells are required/already used or if group-specific blood is required).
   • Which major haemorrhage pack(s) are required (more than 1 pack at a time may be
     issued according to clinical need)

   Pack 1
   4 units red cells
   (either emergency group O, group compatible or fully cross
   matched )

   Pack 2
   5 units red blood cells, 4 units FFP
   (For trauma- 1 unit platelets. These may not be immediately
   available, therefore trauma cases must be identified on activation)

   Pack 3
   5 units red blood cells, 4 units FFP,
   1 unit platelets, 2 pools cryoprecipitate.

4. The communication lead must ensure that blood samples for full blood count, cross
match (as directed) and clotting screen have been taken and where possible sent via
air tube
   PCH - Station 400 / HH - automatically directs to Laboratory

5. When the components are ready for collection, transfusion will contact the communication
lead, who should make sure a ‘runner’ collects the units
   (Transfusion will organise this for PCH Major Obstetric Haemorrhage)

Don’t forget to tell transfusion to ‘stand down’ once the incident is resolved
PCH Transfusion ☏️ 8451/2 or Bleep 1151 out of hours
HH Transfusion ☏️ 6157 or Bleep 1257 out of hours
Appendix 2

Procedure for activating the major haemorrhage protocol for CHILDREN

The decision to activate the major haemorrhage protocol is made by a senior member of the medical staff (Registrar or above)

1. Nominate a “communication lead”, who should be able to stay close to the phone to communicate with transfusion. All contact with transfusion MUST be via this person.

2. The communication lead should call switchboard on 2222 and state

   “Activate the major haemorrhage protocol for children– contact extension ……”

   **STAY BY THIS PHONE**

   Transfusion will call you back immediately

3. When transfusion calls back, tell them your name and contact number and
   - The patient’s name, date of birth (if known) and hospital number
   - Details of the incident (for instance is this trauma call, if emergency group O red cells are required/already used or if group-specific blood is required).
   - Which major haemorrhage pack(s) are required (more than 1 pack at a time may be issued according to clinical need)

<table>
<thead>
<tr>
<th>Pack 1</th>
<th>Red blood cells 20ml/kg (up to 4 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pack 2</td>
<td>Red blood cells 30ml/kg (up to 5 units)</td>
</tr>
<tr>
<td></td>
<td>FFP 20ml/kg (up to 4 units)</td>
</tr>
<tr>
<td>Pack 3</td>
<td>Red blood cells 30ml/kg (up to 5 units)</td>
</tr>
<tr>
<td></td>
<td>FFP 20ml/kg (up to 4 units)</td>
</tr>
<tr>
<td></td>
<td>Platelets 15ml/kg (up to 1 unit)</td>
</tr>
<tr>
<td></td>
<td>Cryoprecipitate 5ml/kg (up to 300ml)</td>
</tr>
</tbody>
</table>

4. The communication lead must ensure that blood samples for full blood, count, cross match (as directed) and clotting screen have been taken and where possible sent via air tube

   *PCH - Station 400 / HH - automatically directs to Laboratory*

5. When the components are ready for collection, transfusion will contact the communication lead, who should make sure a ‘runner’ collects the units

   **Don’t forget to** tell transfusion to ‘stand down’ once the incident is resolved

   *PCH Transfusion ☎ 8451/2 or Bleep 1151 out of hours*
   *HH Transfusion ☎ 6157 or Bleep 1257 out of hours*
Appendix 3

Flowchart for management of major haemorrhage in adults

Major haemorrhage in adults
≥ 40% loss of total blood volume
4 litres in 24 hours  
2 litres in 3 hours  
> 150ml/min

Get senior help
Contact senior member of clinical team
Contact senior ward nurses
Contact portering services

Assess ABC
Check patient identification
2 large cannula
Send blood samples, cross-match, FBC, coagulation, biochemistry
Consider arterial blood gas measurement

IV access

Resuscitate
IV warm fluids – crystalloid or colloid
Give oxygen

Give blood
Blood loss >40% blood volume is immediately life-threatening
Give 4 units via fluid warmer. Aim for Hb > 80g/l
Give Group O if immediate need and/or blood group unknown

Prevent coagulopathy
Anticipate need for platelets and FFP after 4 units blood replacement and continuing bleeding
Give Primary Major Haemorrhage (MH) Pack
Order Secondary Major Haemorrhage (MH) Pack
Correct hypothermia
Correct hypocalcaemia (keep ionised Ca > 1.33mmol/L)
Send FBC and coagulation samples after every 3–5 units of blood given
Give tranexamic acid for trauma patients and consider it’s use in non-traumatic bleeding
Dose: 1g iv over 10 minutes then 1g over 8 hours
Contact Haematologist

Get help to stop bleeding

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Appendix 4 Flowchart for management of major haemorrhage in adult trauma

**Major haemorrhage in adult trauma**
≥ 40% loss of total blood volume
4 litres in 24 hours  2 litres in 3 hours  >150ml/min

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**Get senior help**
Contact senior member of clinical team.
Contact senior ward nurses
Contact portering services
Contact Transfusion Laboratory

**Assess ABC**
Check if tranexamic acid given, if not give as soon as possible at a dose of:
• 1g intravenously over 10 minutes followed by
• 1g over 8 hours

**IV access**
Check patient identification
2 large cannula
Send blood samples, cross-match, FBC, coagulation, biochemistry
Consider arterial blood gas measurement

**Resuscitate**
IV warm fluids – crystalloid or colloid
Give oxygen

**Give blood**
Blood loss >40% blood volume is immediately life-threatening
Give 4 units via fluid warmer. Aim for Hb>80g/l
Give Group O if immediate need and/or blood group unknown

**Prevent coagulopathy**
Anticipate need for platelets and FFP after 4 units blood replacement and continuing bleeding
Give Trauma Primary Major Haemorrhage (MH) Pack
Order Secondary Major Haemorrhage (MH) Pack
Correct hypothermia
Correct hypocalcaemia
(keep ionised Ca >1.13mmol/L)
Send FBC and coagulation samples after every 3–5 units of blood given
Contact Haematologist

**Secondary MH pack**
• RBC 5 units
• FFP 4 units
• Platelets
• Cryoprecipitate
If bleeding continues repeat secondary pack

**Trauma Primary MH pack**
• RBC 5 units
• FFP 4 units
• Platelets 1 unit
Aim for RBC: FFP of 1:1

**Standard MH Primary pack**
• RBC 5 units
• FFP 4 units
Aim for RBC:FFP of 2:1

---

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Appendix 5 Flowchart for management of major haemorrhage in children

**Major Haemorrhage in children**

Clinical suspicion of MH with signs of hypovolaemia

- > 80 ml/kg 24 hours
- > 40 ml/kg in 3 hours
- > 3 ml/kg/min

*Please see guideline for age/weight blood loss estimates

---

**Get help**

- Contact senior member of clinical team
- Contact senior ward nurses
- Contact portering services

**Assess ABC**

Stop overt bleeding where possible

**IV access**

- 2 cannulae (largest possible)
- Send blood samples - crossmatch, INR, PT, aPTT, fibrinogen, Biochemistry (BUN, U&L, ionised Ca, phosphate)
- Arterial / venous blood gas measurement

**Resuscitate**

- IV fluids - crystalloid or colloid – 10–20ml/kg Give stepping

**Give blood**

- Blood loss >40% blood volume (ie. >30ml/kg) is immediately life-threatening
- Give 20ml/kg red cells (up to four units). Aim for Hb >8g/dL
- Give Group O D negative if immediate need and/or blood group unknown
- Blood transfusion lab will provide group specific crossmatched red cells as required

**Prevent coagulopathy**

- Anticipate need for platelets and FFP after 20-30ml/kg blood replacement and continuing bleeding
- Give Primary Children’s Major Haemorrhage (C-MH) Pack
- Order Secondary Children’s Major Haemorrhage (C-MH) Pack (secondary pack to be given if bleeding continues)
- Correct hypothermia and use fluid warmer
- Correct hypocalcaemia (1000iu x 1ml/kg)
- Contact Haematologist

**Maintain stability**

- Report blood gas (including Hb, ionised Ca, Na, K, glucose) every 30 minutes
- Repeat FBC, coagulation after every 40ml/kg blood components given
- Monitor HR, BP, capillary refill, saturation, temperature, urine output

**Get more help to stop bleeding**

- Contact paediatric surgeons, paediatric gastroenterologists, PICU, radiology as appropriate

---

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Massive blood loss (C-MBL) packs for children

**Red cells**
- Use O RhD negative until group is known – then use ABO and RhD suitable
- Move to crossmatch compatible as soon as all investigations are complete
- Consider age of patient to inform component specification (eg. paediatric red cells)

**Platelets**
- Use group A High Titre Negative (HTN) until group is known – then use ABO suitable (A HTN for AB patients)
- Use apheresis if possible

**Fresh frozen plasma**
- Use group AB until group is known – then use ABO suitable
- **Order of preference:**
  1. Non-UK methylene blue treated (MB-FFP)
  2. Octaplas (SD-FFP)
  3. Standard FFP

**Cryoprecipitate**
- Use group A until group is known – then use ABO suitable (A for AB patients)
- **Order of preference:**
  1. Non-UK methylene blue treated cryoprecipitate
  2. Standard cryoprecipitate

---

**For platelets, FFP and cryoprecipitate**

_Avoid Group O for non-O patients where possible_

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<th>&lt; 10–40kg</th>
<th>&gt; 40kg</th>
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<tr>
<td><strong>Primary pack</strong></td>
<td>2 x Red cells</td>
<td>4 x Red cells</td>
<td>5 x Red cells</td>
</tr>
<tr>
<td></td>
<td>2 x FFP (400ml)</td>
<td>4 x FFP (800ml)</td>
<td>4 x FFP</td>
</tr>
<tr>
<td><strong>Secondary pack</strong></td>
<td>2 x Red cells</td>
<td>4 x Red cells</td>
<td>5 x Red cells</td>
</tr>
<tr>
<td></td>
<td>2 x FFP (400ml)</td>
<td>4 x FFP (800ml)</td>
<td>4 x FFP</td>
</tr>
<tr>
<td></td>
<td>1 x Adult platelet dose</td>
<td>1 x Adult platelet dose</td>
<td>1 x Adult platelet dose</td>
</tr>
<tr>
<td></td>
<td>3 x MB Cryoprecipitate (50ml) or 1 adult pool</td>
<td>10 x MB Cryoprecipitate (160ml) or 2 adult pools</td>
<td>10 x MB Cryoprecipitate (160ml) or 2 adult pools</td>
</tr>
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Appendix 6
Information for use of Tranexamic acid (Ref: NHS East of England Trauma Network TEMPO Guidelines 2014, section 11a)

### Tranexamic acid (TXA)

- **Drug notes**
  - Inhibits fibrinolysis, therefore can be used to reduce bleeding

#### Use

- **Indications**
  - Suspected bleeding in the context of major trauma (excluding isolated head injury) where the patient has either a heart rate >110 or systolic BP <90

<table>
<thead>
<tr>
<th>Cautions</th>
<th>Dose 1 – within 3hrs of incident</th>
<th>Dose 2 – during 8hrs following incident</th>
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<tbody>
<tr>
<td>Known allergy to Tranexamic acid</td>
<td><strong>Adults</strong>: 1g IV/IO over 10 mins</td>
<td><strong>Adults</strong>: 1g IV at 60ml/hr over 8hrs</td>
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<tr>
<td></td>
<td><strong>Children</strong>: 15mg/kg IV/IO over 10 mins (max 1g)</td>
<td><strong>Children</strong>: 2mg/kg/hr over 8hrs</td>
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</tbody>
</table>

- **Special groups**
  - No evidence of harm in pregnancy

- **Side effects**
  - Nausea, vomiting
  - Hypotension on rapid injection

- **Presentation**
  - 500mg in 5ml, glass vial (100mg/ml)

- **Administration – dose 1**
  - Required volume (dose) into 100ml 5% dextrose (in trauma bag) or 100ml N/Saline. Administer IV/IO over 5–10 mins

- **Administration – dose 2**
  - 1g tranexamic acid in 500ml of N/Saline over 8hrs at rate of 60ml/hr.

#### Drug information

- Not a controlled drug
- Can be kept at room temperature

### Further information

- BNF: section 2.11
Appendix 7 Laboratory form for monitoring major haemorrhage protocol

Patient Details: Hospital number………………………………… Gender: Male □ Female □

First Name…………………………………Surname………………………………………………

DOB…………………………………or estimated age group (yrs): 0-1 □ 1-18 □ 18-30 □ 30-60 □ 60+ □

Major Haemorrhage protocol activated: Date………………………Time……………………

Not activated but Emergency O neg used □

Reason for activation ………………………………………………………………………………………………

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<thead>
<tr>
<th>Patient Location 1</th>
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<th>Patient Location 3</th>
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<tr>
<td>Clinical Contact 1 Name</td>
<td>Clinical Contact 2 Name</td>
<td>Clinical Contact 3 Name</td>
</tr>
<tr>
<td>Contact Ext/Bleep</td>
<td>Contact Ext/Bleep</td>
<td>Contact Ext/Bleep</td>
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Transfusion Urgency

| Emergency O Neg (Immediate) | Group compatible (~15 minutes) | Full XM (~50 minutes) |

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Transfusion History

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<th>BMS DETAILS</th>
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<td>Electronic Issue allowed?</td>
<td>Y / N</td>
<td>Consultant Haematologist contacted:</td>
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<tr>
<td>Incident Stood Down</td>
<td>Date:</td>
<td>Time:</td>
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<td>Title of document</td>
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<td>3</td>
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<td>Are the key points identified? (Policies only)</td>
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If answers to any of the above questions is “no”, then this document is not ready for endorsement, it needs further review.
Compliance Team:

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<td>2.</td>
<td>Comments to author for any amendments</td>
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<tr>
<td>3.</td>
<td>Name of compliance lead</td>
<td>Stanley Balachander, Quality Governance and Policies Administrator.</td>
</tr>
</tbody>
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Approval Committee: Hospital Transfusion Committee

If the committee/group is happy to approve this document would the chair please sign below and send the document and the minutes from the approval committee to the author. To aid distribution all documentation should be sent electronically wherever possible.

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
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<tr>
<td>Dr M Stoker</td>
<td>03/08/2020</td>
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</tbody>
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Signature

Endorsing Committee: Quality Governance Operational Committee

If the committee/group is happy to endorse this document would the chair please sign below and send the document and the minutes from the endorsing committee to the author. To aid distribution all documentation should be sent electronically wherever possible.

<table>
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<tr>
<td>Dr Suzanne Hamilton</td>
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Signature