

# Massive blood loss in children

>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

Contact transfusion

Contact transfusion

Ask transfusion to 'Initiate children's massive blood loss (C-MBL) protocol' Give the weight, age and location of the child

## Assess ABC

Stop overt bleeding where possible

## IV access

**2 cannula (largest possible)**  
Send blood samples – crossmatch, FBC, PT / APTT / Fibrinogen, Biochemistry (U&E, LFT, ionised Ca, phosphate)  
Arterial / venous blood gas measurement

In trauma or surgical bleeding consider **Tranexamic Acid** Initial bolus 15mg/kg (max 1g) followed by maintenance infusion

## Resuscitate

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

## 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>80g/L  
Give Group O RhD negative if immediate need and/or blood group unknown

Blood transfusion lab will provide group specific/crossmatched red cells as required

**Before transfusion**

- Check patient ID
- Use wristbands
- Ask parent if present

### Therapeutic aims

Hb	>80g/L
Platelets	>75 x 10 <sup>9</sup> /L
Fibrinogen	>1g/L
APTT/PT	<1.5x midpoint of normal range
Ionised calcium (on ABG)	>1mmol/L
pH	>7.2
Core temperature	>35°C

## Prevent coagulopathy

Anticipate need for platelets and FFP after 20–30ml/kg blood replacement and continuing bleeding  
Give Primary Children's Massive Blood Loss (C-MBL) Pack  
Order Secondary Children's Massive Blood Loss (C-MBL) Pack (Secondary pack to be given if bleeding continues)  
Correct hypothermia and use fluid warmer  
Correct hypocalcaemia (keep ionised Ca>1 mmol/L)  
**Contact Haematologist**

**Primary C-MBL pack**

- Blood 30ml/kg (up to 5 units)
- FFP 20ml/kg FFP (up to 4 units)

### Secondary C-MBL pack

- Blood 30ml/kg (up to 5 units)
- FFP 20ml/kg (up to 4 units)
- Platelets 15ml/kg (up to 1 unit)
- Cryoprecipitate 5ml/kg (up to 300ml)

## Maintain stability

Repeat 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

**Reassess**

- Re-assess ABC and clinical parameters regularly
- Document status

## Get more help to stop bleeding

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

Suspect 40% blood loss if significant source of bleeding suspected and clinical parameters as follows:

Age	Heart rate	Systolic BP
<1 year	>160	<70
1–2 years	>150	<80
3–5 years	>140	<80
6–12 years	>120	<90
>12 years	>100	<100

Tachypnoea or increased work of breathing

Urine output <0.5ml/kg/hour

# Massive blood loss (C-MBL) packs for children

<b>Red cells</b>	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)
<b>Platelets</b>	Use group A High Titre Negative (HTN) until group is known – then use ABO suitable (A HTN for AB patients) Use apheresis if possible
<b>Fresh frozen plasma</b>	Use group AB until group is known – then use ABO suitable <b>Order of preference:</b> <ol style="list-style-type: none"> <li>1. Non-UK methylene blue treated (MB-FFP)</li> <li>2. Octaplas (SD-FFP)</li> <li>3. Standard FFP</li> </ol>
<b>Cryoprecipitate</b>	Use group A until group is known – then use ABO suitable (A for AB patients) <b>Order of preference:</b> <ol style="list-style-type: none"> <li>1. Non-UK methylene blue treated cryoprecipitate</li> <li>2. Standard cryoprecipitate</li> </ol>

## For platelets, FFP and cryoprecipitate

Avoid Group O for non-O patients where possible

	Weight		
	< 10kg	< 10–40kg	> 40kg
<b>Primary pack</b>	2 x Red cells 2 x FFP (~400ml)	4 x Red cells 4 x FFP (~800ml)	5 x Red cells 4 x FFP
<b>Secondary pack</b>	2 x Red cells 2 x FFP (~400ml) 1 x Adult platelet dose 3 x MB Cryoprecipitate (~50ml) or 1 adult pool	4 x Red cells 4 x FFP (~800ml) 1 x Adult platelet dose 10 x MB Cryoprecipitate (~160ml) or 2 adult pools	5 x Red cells 4 x FFP 1 x Adult platelet dose 10 x MB Cryoprecipitate (~160ml) or 2 adult pools