Birmingham Children's Hospital NHS
NHS Foundation Trust

Massive Haemorrhage Guideline (CODE RED)

Version:	*2.2.1*
Author(s) and contact details:	*Hospital Transfusion Committee*
Purpose of the guideline:	*Management of patients who suffer massive, sudden and unexpected blood loss*
Who should use the guideline?	*Clinical personnel managing the patient*
How was the guideline developed?	*Through literature review and clinical experience of senior clinicians involved in massive haemorrhage situations*
How will the guideline be monitored?	*Audit of Code Red activations and review of the paperwork*
Approved by:	*Joint Hospital Transfusion Committee*
Date Approved:	*September 2019*
Review Date:	*September 2021*

CODE RED GUIDELINE

NOTES

Patient information

Name:
Age:
Weight:
Sex:
Diagnosis:
Location:

- Consider **CODE RED** activation in any clinical situation in which there is suspected or known unexpected, uncontrolled, on-going blood loss that will require resuscitation with blood products to restore and maintain circulating blood volume

IF IN DOUBT CALL IT OUT

- For medical, surgical or traumatic bleeding – call switchboard on 2222 and activate

CODE RED in…

- Make sure you name the location. The Trauma Team will be fast bleeped accordingly.
- Switchboard will additionally fast bleep the Blood Bank Technician, Haematology Consultant, Anaesthetic Blue Bleep holders and Theatre Co-ordinator for any **CODE RED** activation

- For excessive bleeding in a controlled environment such as Theatre or PICU where an emergency response team is not required but blood products are, you can activate as **CODE RED THEATRE xxx NO TRAUMA**

If you need to contact Blood Bank or the technician directly, use the following numbers:

Blood Bank
Extension 9874 (9am-5pm)
Bleep 55034 (all other times)

O-neg blood is stored in fridges in Blood Bank, PICU, ED, and F-block and R-block Theatres

CODE RED FLOWCHART

Assess patient for active bleeding/shock
Attempt to control haemorrhage if possible
Establish IV access and take blood for **cross-match**, FBC, clotting, U&E, ABG ± ROTEM
Commence IV fluid resuscitation with crystalloid 20mls/kg

Activate **CODE RED**

Other Actions

- Nominate **Co-ordinator**
- Request first **shock-pack** and platelets
- Send **runner** to Blood Bank for red cells (with **communication device**)
- Inform Theatres to stand-by if indicated
- Commence **transfusion worksheet**

Give **tranexamic acid** 15mg/kg over 10 minutes and commence infusion at 2mg/kg/hr

Cross-matched red cells available?

Y

Collect cross-matched red cells

N

Collect O-negative* or type-specific red cells

Give **warmed** red cells in 10ml/kg boluses (max. 250ml bolus)

- After every 20mls/kg or 500mls of red cells or Octaplas give **calcium chloride** 0.1mls/kg (or if ionised calcium <1.0mmols/L)

When **Octaplas** available give in **1:1 ratio** with red cells
Give **platelets** 5mls/kg (max. 250ml bolus) - keep >100 × 10^9/L
Give **cryoprecipitate** 5mls/kg (max. 125ml bolus) if fibrinogen <1g/L**

- Send **second runner** (with **communication device**) to collect shock-pack

Follow Worksheet until bleeding stops or patient goes to Theatre for **haemorrhage control surgery** (prepare **Belmont** and consider **cell saver**)

- **Stand down CODE RED** when haemorrhage controlled or active bleeding stops

*Collect only number of units appropriate for size of child
**Octaplas may provide enough fibrinogen in 1:1 ratio initially, but thaw cryo in readiness

CODE RED TRANSFUSION WORKSHEET

Surname: Forename:

Patient ID: Age:

Weight: Estimated Y N

Weight formulae : 0-1= (Age/2)+4 (in months)
1-5 = (Agex2)+8 (in years)
5-12 = (Agex3)+7 (in years)

Bolus size: RBC ..... Octaplas ..... Plts .....

(Max. 250mls) (10mls/kg) (10-20mls/kg)* (10-20mls/kg)*

*Larger volume if blood results known

Shock packs			
	<10kg 1 year	**10-20kg 1-5 years**	**>20kg >5 years**
Red cells	One unit	Two units	Four units
Octaplas	One unit	Two units	Four units
Platelets	One paed unit	Two paed units	One adult unit

Time	Bolus count	RBC	FFP	Platelets	Cryo	Blood result	Think about
:	1	[ ]	[ ]				TxA (15mg/kg)
:	2	[ ]	[ ]				Cell saver Gas/Hemocue
:	3	[ ]	[ ]				ROTEM/ clotting
:	4	[ ]	[ ]				Call for Plts±cryo
:	5	[ ]	[ ]				Calcium (0.3ml/kg CaGlu or 0.1ml/kg CaCl)
:	6	[ ]	[ ]				TxA infusion
:	7	[ ]	[ ]	[ ]	[ ]		ROTEM/ clotting
:	8	[ ]	[ ]				Blood gas Hemocue
:	9	[ ]	[ ]				Calcium (0.3ml/kg CaGlu or 0.1ml/kg CaCl)
:	10	[ ]	[ ]				Call for Plts±cryo
:	11	[ ]	[ ]				TxA infusion
:	12	[ ]	[ ]				ROTEM/ clotting
:	13	[ ]	[ ]				Blood gas Hemocue
:	14	[ ]	[ ]	[ ]	[ ]		Calcium (0.3ml/kg CaGlu or 0.1ml/kg CaCl)
:	15	[ ]	[ ]				Call for Plts±cryo

Paediatric Major Trauma?
Paediatric Major Haemorrhage? Then...

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T	**Tranexamic Acid**	• If not administered already:
		  • 15 mg/kg bolus (max 1g), followed by
		  • 2 mg/kg/hr over 8 hours

R	**Resuscitation**	• Code Red, Dial 9874 / Bleep 55034 & consider:
		  • Belmont/Level one rapid infuser
		  • Cell salvage
		  • Hypotensive resuscitation (if post-pubertal)
		  • Pelvic binder/splint #s/tourniquet
		• Limit crystalloid and colloid use

A	**Avoid Hypothermia**	• Target temperature > 36^0C
		  • Remove wet clothing and sheets
		  • Warm fluids
		  • Warming blanket/mattress

U	**Unstable? Damage Control Surgery**	• If unstable, coagulopathic, hypothermic or acidotic, perform damage control surgery • Aim surgery time < 90 minutes • Haemorrhage control, decompression, decontamination and splintage
M	**Metabolic**	• Avoid acidosis • Base excess guides resuscitation • If lactate > 5mmol/L or rising, consider stopping surgery, splint and transfer to ICU
A	**Avoid Vasoconstrictors**	• Inappropriate use of vasoconstrictors doubles mortality • However, use may be required in cases of spinal cord or traumatic brain injury
T	**Test Clotting**	• Consider TEG/ROTEM • Check clotting every 15ml PRBC/kg BW • Aim platelets > $100x10^9$/L • Aim INR & aPTT ≤ 1.5 • Aim fibrinogen > 1.5g/L

I	**Imaging**	• Consider:
		  • FAST (Not to delay CT)
		  • CT:
		  Most severely injured/haemodynamically unstable patients gain most from CT
		  • Interventional radiology

C	**Calcium**	• Maintain ionised Ca^{2+} > 1.0 mmol/L • Administer 0.3ml/kg 10% Calcium Gluconate or 0.1ml/kg Calcium Chloride over 10 mins as required

Version 2.2.1 – Ratified by Hospital Transfusion Committee – September 2019