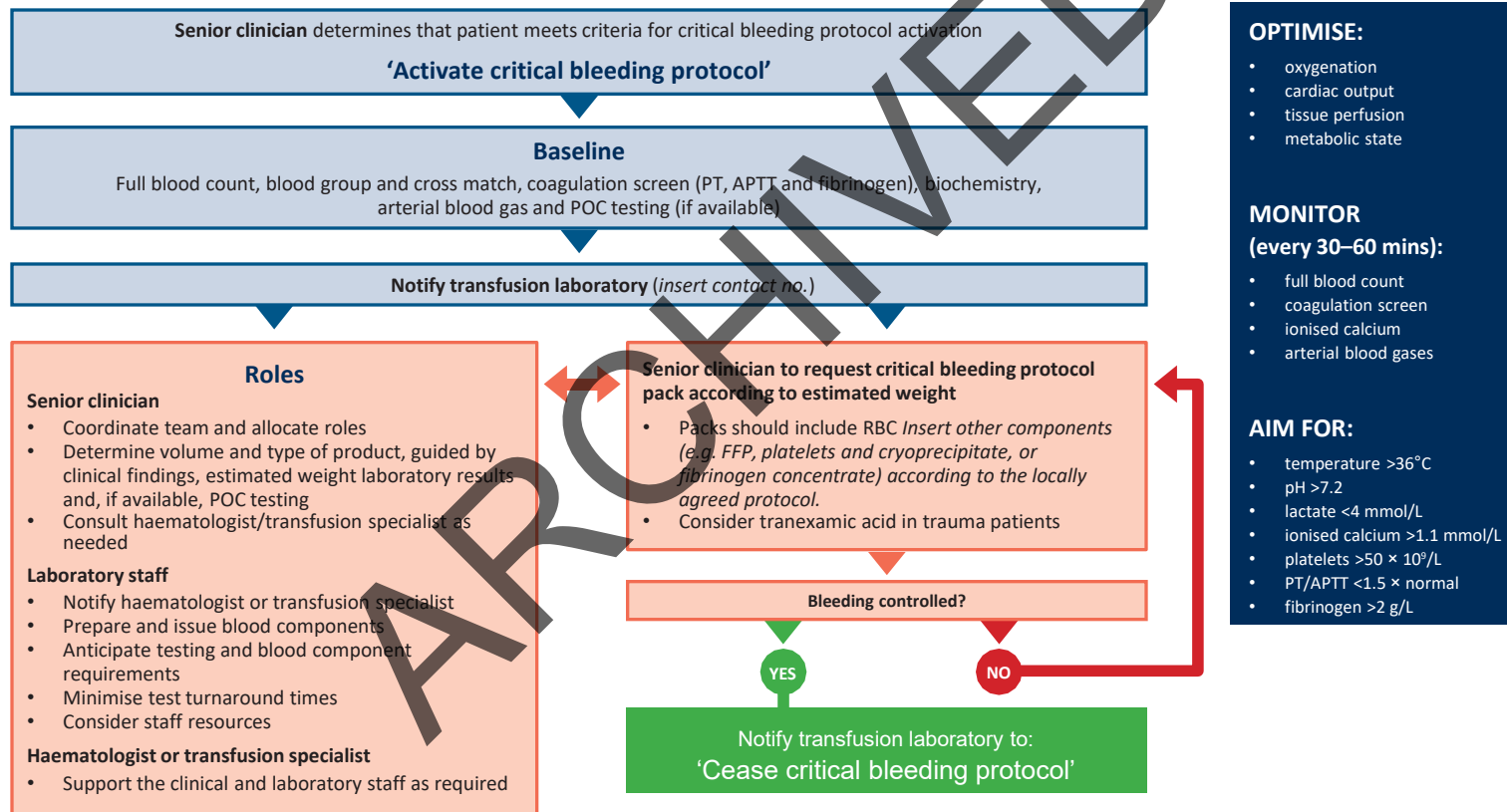


Critical bleeding protocol for infants and children

This template, developed by consensus, covers areas that should be included in a critical bleeding protocol. The template can be adapted to meet the local institution's patient population and resources.



Patient Blood Management Guidelines:

Module 6 Neonatal and Paediatrics

Suggested criteria for activation of critical bleeding protocol

- Actual or anticipated losses of $>35\text{--}40\text{ mL/kg}$ of RBC in <4 hours, + haemodynamically unstable, $\pm$ anticipated ongoing bleeding
- Severe thoracic, abdominal, pelvic or multiple long bone trauma, and head trauma
- Major gastrointestinal or surgical bleeding

Damage control resuscitation

- Identify cause and aggressively control bleeding
 - Compression, packing and tourniquet
 - Early surgical assessment and intervention
 - Angiography as needed
- Restore or maintain normal coagulation
- Avoid hypothermia (use active warming measures)
- Avoid excess crystalloid
- Tolerate permissive hypotension until bleeding is actively controlled
- Do not use haemoglobin alone as transfusion trigger

Cell salvage

Consider use of cell salvage where appropriate

Dosage

Optimise the use of each unit to minimise wastage

- RBC 20–25 mL/kg
- Platelet count $<50 \times 10^9/\text{L}$ platelets 10–15 mL/kg
- PT/APTT $>1.5 \times$ normal FFP 15 mL/kg^a
- Fibrinogen $<2\text{ g/L}$ Cryoprecipitate 5 mL/kg^a
- Tranexamic acid Loading dose 15 mg/kg (max 1 g) over 10 min, then infusion 2 mg/kg/hour for 8 or more hours, or until bleeding ceases

^a Local transfusion laboratory to advise dose of locally available preparation

Prevention of hypofibrinogenaemia

- Fibrinogen levels are reduced to a greater degree than other factors in large-volume bleeding. Dilution and hyperfibrinolysis (e.g. in trauma) further exacerbate low levels.
- In critical bleeding, maintaining fibrinogen at levels $>2\text{ g/L}$ is suggested.
- Include guidance for the use and timing of fibrinogen replacement in the protocol; this may include viscoelastometric POC testing.

Special clinical situations

Warfarin:

- add vitamin K, prothrombinex/FFP

Head injury:

- aim for platelet count $>100 \times 10^9/\text{L}$
- permissive hypotension contraindicated

Considerations for use of rFVIIa^a

Based on evidence from studies in adults, the *routine* use of rFVIIa in trauma patients is not recommended. However, institutions may choose to develop a process for the use of rFVIIa where the following apply:

- uncontrolled haemorrhage in salvageable patient, **and**
- failed surgical or radiological measures to control bleeding, **and**
- adequate blood component replacement, **and**
- pH >7.2 , temperature $>34^\circ\text{C}$.

Discuss dose with haematologist or transfusion specialist

^a rFVIIa is not licensed for use in this situation; all use must be part of practice review.

APTT, activated partial thromboplastin time; FFP, fresh frozen plasma; INR, international normalised ratio; POC, point of care; PT, prothrombin time; RBC, red blood cell; rFVIIa, activated recombinant factor VII

