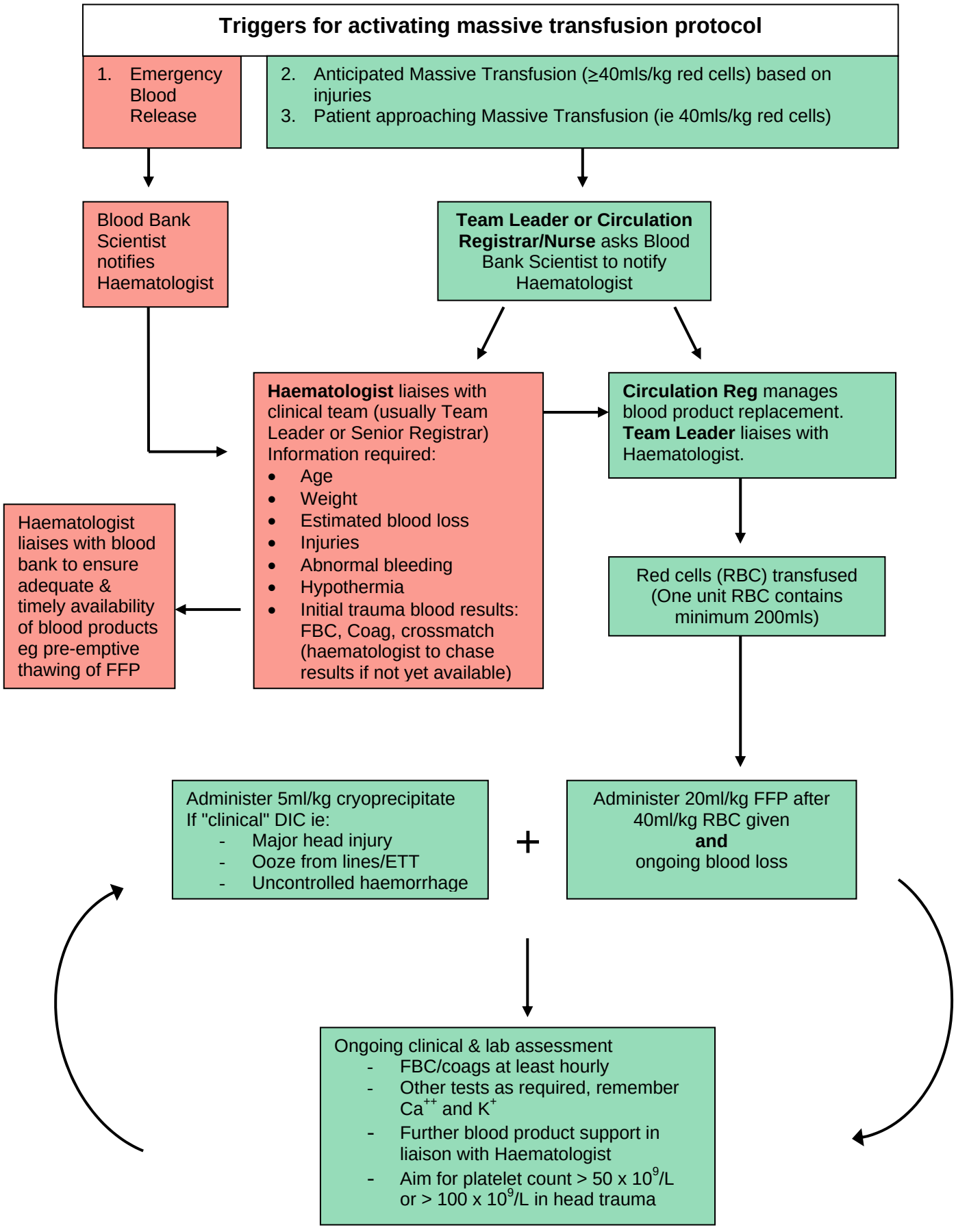
Massive Transfusion Protocol - Royal Children's Hospital



Acute Massive Blood Loss in Children

This guideline considers the steps involved in management of massive blood loss. Such management should occur in conjunction with the primary and secondary survey and definitive management. Clinical staff including surgeons, anaesthetists, haematologists and blood bank staff need to communicate closely in order to achieve the goals of secure haemostasis, restoration of circulating volume, and effective management of blood component replacement.

Goal	Procedure	Comments
Request laboratory investigations	Initial: FBC, INR, APTT, fibrinogen, crossmatch, biochemical profile, glucose, blood gases Ongoing: Repeat FBC, INR, APTT, fibrinogen at least hourly to assess response to blood products. Check Ca^{++} and K^{+}.	Take samples at earliest opportunity. Blood bank samples are used for retrospective crossmatch. Patient misidentification is the commonest transfusion risk; ensure patient identification and immediate labelling of laboratory specimens
Request suitable red cells	If a third 20ml/kg fluid bolus is required, give red cells. Activate 'Emergency Blood Release' protocol. *(see emergency blood release flow chart)* Use a blood warmer and/or rapid infusion device.	Urgency dictates type of red cells. Immediate: O Neg uncrossmatched (universal red cell donor) 10-15 min: Group compatible uncrossmatched 30 min: Emergency crossmatch Laboratory will switch from O Neg to Group compatible as results become available. Blood is retrospectively crossmatched.
Request FFP	Automatically give 20ml/kg once 40mls/kg red cells given (half the patient's normal blood volume) and there is ongoing bleeding. Also indicated when there is diffuse microvascular bleeding and abnormal INR/APTT. Aim for INR < 1.5, APTT < 1.5 control mean.	Allow 20 minutes for thawing. Issued in patient blood group or group AB (universal plasma donor).
Request Cryoprecipitate	Automatically give 5mls/kg (or one pack per 10kg body weight) if fibrinogen <1 or "clinical" DIC ie: - Major head injury - Ooze from lines/ETT - Uncontrolled haemorrhage Cryoprecipitate replaces fibrinogen and Factor VIII. Aim for fibrinogen > 1.0g/L	Allow 20 minutes for thawing. Available in group O and A.
Request Platelets	Anticipate platelet count < 50 x 10^9/L after 2 x blood volume replacement. Aim for platelet count > 50 x 10^9/L or > 100 x 10^9/L in head trauma.	Use 1 platelet (40ml) or paediatric apheresis pack per 10kg. Use pool for patients > 30kg.
General	Keep the patient warm (normothermic) Anticipate and treat hyperkalaemia and hypocalcaemia.	0.1ml/kg 10% calcium gluconate can be given to correct hypocalcaemia (do not mix with blood)
Suspect DIC	Treat underlying cause if possible. In the presence of DIC, more aggressive component therapy and frequent laboratory measurement is required.	Shock, hypothermia, acidosis increase the risk of DIC. Mortality from DIC is high.
Recombinant Factor VIIa (Novoseven)	Use of rFVIIa may be considered in patients where bleeding is uncontrolled by conventional therapy - use of this therapy must be discussed with Haematologist.	A haemostatic effect has been demonstrated following the administration of rFVIIa (Novoseven) in a limited number of patients after trauma and bleeding. Optimal dose is not known and controlled studies are required to prove any beneficial effect and safety profile of rFVIIa in these patients.