MASSIVE TRANSFUSION PROTOCOL (MTP) - ST GEORGE HOSPITAL (SGH)

1. Purpose	A Business Rule to support the Massive Transfusion Protocol (MTP) This Business Rule outlines the appropriate use of blood component therapy in adult patients with critical bleeding requiring massive transfusion.
2. Risk Rating	Medium
3. National Standards	1 – Clinical Governance 5 – Comprehensive Care 6 – Communicating for Safety 7 – Blood Management 8 – Recognising and Responding to Acute Deterioration
4. Employees it Applies to	Medical Officers, Nurses/Midwives, Haematology Laboratory staff at SGH

Contents

5. PROCESS

Definitions

Critical bleeding: May be defined as major haemorrhage that is life threatening and likely to result in the need for massive transfusion.

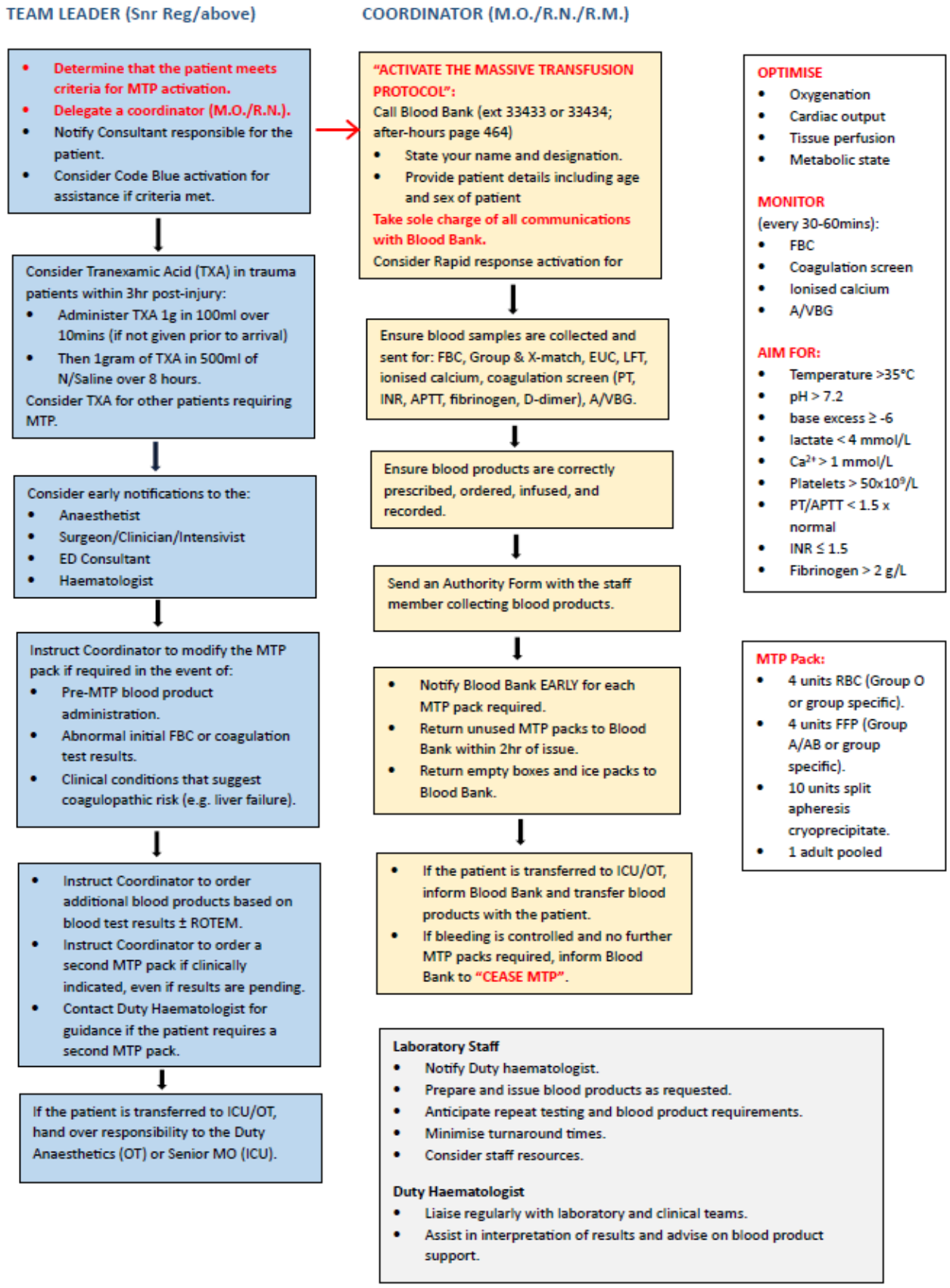
Massive transfusion: The need for greater than or equal to 5 units of red blood cells in 4 hours.

5.1 CRITERIA FOR ACTIVATING THE MTP

If transfusion of less than 4 PRBC units is anticipated, an urgent X-Match request may be more appropriate initially, prior to consideration for MTP activation

- The MTP should be activated for patients who have:
  1) Actual or anticipated transfusion of > 5 units RBC in < 4 hrs, who are haemodynamically unstable, with anticipated ongoing bleeding.
  2) Haemorrhaging patient already receiving blood products or intravenous fluids and despite ongoing efforts remain shocked and hemodynamically unstable.
  3) High risk patients could include but are not limited to trauma patients with severe thoracic, abdominal, pelvic injuries, multiple long bone trauma, O&G haemorrhaging emergencies, gastrointestinal bleeding or severe surgical blood loss.
- Pre-hospital notification of a Code Crimson or a request for MTP.
- The Consultant responsible for the patient / department must be notified if the MTP is activated.

5.2 MTP FLOWCHART



5.3 TEAM LEADER ROLE AND RESPONSIBILITIES

1) Determine that the patient fulfils criteria for activation of the MTP. (See Section 5.1 and Appendix 1).
2) Delegate a Coordinator (Medical Officer / Registered Nurse or Midwife) to "*Activate the Massive Transfusion Protocol*".
3) Notify the Consultant responsible for the patient.
4) In trauma patients with or at risk of significant haemorrhage presenting within 3 hours of injury, prescribe IV Tranexamic acid (TXA). Consider TXA for other patients requiring MTP.
   - Administer TXA 1gram in 100mL 0.9% sodium chloride over 10 minutes (if not given prior to arrival)
   - Then 1gram of TXA in 500mL of 0.9% sodium chloride over 8 hours
5) Consider early Senior Medical input to enable early decision making for operative intervention or radiological embolisation if required. Early notifications may include:
   - Anaesthetist
   - Surgeon / Clinician / Intensivist
   - Interventional Radiologist
   - ED Consultant
   - Haematologist
6) Instruct the Coordinator to modify the MTP pack if required in the event of:
   - Pre-MTP blood product administration
   - Abnormal initial FBC or coagulation test results
   - Clinical conditions that suggest coagulopathic risk (e.g. liver failure etc.)
7) Instruct the coordinator to order additional blood products based on blood test results ± ROTEM if available, guided by clinical evaluation and resuscitative end points. The Team Leader may instruct the Coordinator to order a second MTP pack if clinically indicated, even if test results are pending.
8) Contact the Duty Haematologist for guidance if the patient requires a second or additional MTP pack.
9) If the patient is transferred to ICU / OT, the Team Leader must hand over responsibility to the Duty Anaesthetist (OT) or Senior MO (ICU)
10) Ensure adherence to **damage control principles**:
    - Minimise macrovascular bleeding - direct pressure control of external bleeding points, haemostatic sutures over bleeding sites.
    - Minimise microvascular bleeding and coagulopathy by appropriate initial fluid volume resuscitation whilst determining site(s) of bleeding, active fluid ('Ranger/enFlow/hotline) and patient ("Bair Hugger") warming, and avoidance of hypothermia, acidosis and hypocalcaemia.
    - Haemorrhage control such as early identification of the cause of bleeding, and temporary control of bleeding using compression, packing, tourniquet or pelvic binding is recommended.
    - Patients with non-compressible penetrating trauma should be resuscitated to a target blood pressure of approximately 60-80mmHg, or maintenance of verbal responsiveness.
      - Patients with non-compressible blunt trauma should be resuscitated to a systolic blood pressure of 80-90mmHg.
      - Patients with BOTH non compressible haemorrhage and traumatic brain injury represent a difficult group with competing needs. In general resuscitation should target

a systolic blood pressure of 100-110mmHg depending on patient age, in order to prevent secondary brain injury.
- Refer to Section 4.11 for general principles of coagulopathy during massive transfusion.

11) Consider the use of Recombinant Factor VIIa (rFVIIa), obtained from Blood Bank, in the event of life-threatening bleeding and failed conventional support, in the absence of surgical causes of bleeding. Usage should be in accordance with SGH-TSH CLIN274Recombinant Factor VIIa (rFVIIa) for Life Threatening Bleeding, particularly with regard to the correction of hypothermia, acidosis, thrombocytopenia, and coagulation parameters prior to the use of rFVIIa. An initial dose of 90 microg/kg of rFVIIa is reasonable. The routine use of rFVIIa in trauma patients with critical bleeding requiring massive transfusion is not recommended because of its lack of effect on mortality and variable effect on morbidity.
12) Consider Prothrombinex, fresh frozen plasma (FFP) and Vitamin K1 in bleeding patients with an elevated INR of >1.5. See SGH-TSH CLIN016 Warfarin Reversal

5.4 COORDINATOR ROLE AND RESPONSIBILITIES

ALL BLOOD PRODUCTS MUST BE CHECKED BY 2 REGISTERED NURSES/MIDWIVES/MEDICAL OFFICERS

- For inpatient ward settings, a **Code Blue** should be called to facilitate timely ICU review and provision of ongoing care. (SGH BR 301 *CERS - Clinical Emergency Response System Management - St George Hospital*)
- This role is delegated by the MTP Team Leader.

1) The coordinator calls Blood Bank (ext 33433 or 33434; after-hours page 464) to “Activate the Massive Transfusion Protocol”:
   - State your name and designation.
   - Provide details of the patient.
   - **Provide patients age and sex to gauge appropriateness for O positive use (M>18Y & F>50Y are eligible for 0 Positive blood)**
   - Take sole charge of all communications with the Blood Bank. Communication with the Blood Bank must be restricted to the Coordinator at all times. Should this role be delegated, the Blood Bank must be clearly informed.
2) Call a **Code Blue** if not already called (inpatient setting).
3) Ensure blood samples are collected and sent to the laboratory for:
   - Baseline tests: FBC, group and cross-match, EUC, LFT, ionised calcium, coagulation screen (PT, INR, APTT, fibrinogen, D-dimer), A/VBG
   - Repeat blood tests every 30 to 60mins: FBC, EUC, ionised calcium, coagulation screen (PT, INR, APTT, fibrinogen, D-dimer), A/VBG
4) Ensure blood products are correctly prescribed, ordered, infused and recorded.
5) Send an Authority Form with the staff member collecting the blood products because more than one MTP may be activated at any time.
6) Notify Blood Bank EARLY for each MTP pack required. Arrange for the return to Blood Bank of:
   - Unused blood products within the specified time window (see section 5.5).
   - Empty boxes and ice packs.
7) If the patient is transferred to ICU or OT the Coordinator must inform Blood Bank, transfer unused blood products and hand over the Coordinator role. Please store products as per individual storage conditions:

- RBC & FFP/ELP in esky/fridge.
- PLT & cryoprecipitate not in esky/fridge.

8) If bleeding is controlled and no further MTP packs are required, the Coordinator must inform the Blood Bank immediately to "*Cease the Massive Transfusion Protocol*".

5.5 MTP PACK

- The MTP pack consists of:
  - 4 units RBC (Group O or group specific)
  - 4 units FFP (Group A/AB or group specific)
  - 10 units split apheresis cryoprecipitate
  - 1 unit pooled platelets
- The issue of some blood products may be delayed, depending on thawing (FFP, ELP, cryoprecipitate) or availability (platelets).
- The blood products in the MTP esky must be administered within 2 hours from the time the products leave Blood Bank. (*Note: this time in written on the top of the MTP box*). Any unused MTP products must be notified to Blood Bank and returned to Blood Bank within this 2-hour window.

5.6 RESUSCITATIVE END-POINTS IN MASSIVE TRANSFUSION

- Temperature > 35^{o}C
- pH > 7.2
- Base excess > -6 ***
- Lactate < 4 mmol/L
- Ca^{2+} > 1 mmol/L
- Platelets > 50x10^{9}/L
- PT/APTT < 1.5 x normal
- INR ≤ 1.5
- Fibrinogen > 2 g/L

- Poor prognostic values:
  - SBP < 70
  - Temp < 34 ^{o}C
  - Base Deficit > -6
  - pH < 7.1
  - lactate > 4mmol/L
  - Ionised calcium < 1.1mmol/L

***The normal range for base excess is -2 to +2. A base excess of ≥-6 refers to a base excess of -5, -4, -3 and so forth. A base excess of -7, -8, -9 and so on is associated with worsening prognosis.

5.7 BLOOD BANK AND HAEMATOLOGIST ROLE

- If the MTP is activated:
  - Note the requestor's name (Coordinator) and contact phone number.
  - Note the patient's details (Name, MRN, DOB).
  - Ask patients age and sex to gauge appropriateness for O +ve use (M>18Y & F>50Y)
  - Obtain from the Coordinator the name of the Team Leader.

  - Prepare and issue blood components as requested.
  - Inform the Coordinator once cross matched blood is available.
  - Maintain close communication with the Coordinator (NB: The Duty Anaesthetist can be an alternate point of contact on mobile 0438 803 447 or ext. 8009).
- If the MTP is activated, the Duty Haematologist/ Advanced Trainee is available to provide advice and guidance on appropriate use of products and laboratory testing. The Team Leader should contact the Duty Haematologist for guidance if a second or further MTP pack is required.

5.8 MTP: NURSING AND MIDWIFERY CONSIDERATIONS

- A Registered Nurse (RN) or Registered Midwife (RM) may act in the role of the Coordinator (see section 5.4).
- A blood warmer should be considered for all patients receiving MTP with aim to maintain patients core temperature ≥ 35℃. The following products can be placed through the blood warmer:
  - Red cells
  - Plasma
  - Cryoprecipitate
  - Note: Platelets should NOT be infused through a warmer.
  - For further information on blood warmers, refer to SGH-TSH CLIN148 Blood Products - Administration of Blood and Blood Products
- Blood and blood product compatibility during infusion:
  - Administration of group specific blood components should occur as soon as possible.
  - The use of O positive red blood cells should be used where possible (for females > 50 years and all adult males > 18 years). *National Blood Authority National statement for the emergency use of group O red blood cells* - accessed Feb 2024.
  - Platelets must be transfused through a separate and new blood administration set unless a second line is not available for infusion, in which case the same administration set may need to be used.
  - It is ideal to infuse red cells via their own administration set. However, in MTP situations, red cells may follow platelets, if necessary, through the same blood administration set, but not precede platelets.
- Administration set frequency of change:
  - Any number of red cell units may be transfused using the same giving set in a 12-hour period, provided the flow rate remains adequate, and the products are compatible/interchangeable (see dot point above).
  - The blood administration set should be changed at least every 12 hours or if there is to be an infusion of another fluid, medication or platelets after the current transfusion. This reduces the risk of bacterial growth and incompatible fluids or drugs causing haemolysis of residual red cells in the administration set or drip chamber.
- Ensure products are correctly stored for transfer as in section 5.4.7.
- If a near miss or adverse event occurs due to the transfusion this MUST be reported in
- IMS+. Please follow guideline for management in SGH-TSH BR273 *Blood Management of transfusion Related Adverse Events*.

5.9 SPECIAL CONSIDERATIONS IN MATERNITY

- The MTP must be activated early in obstetric bleeding, as bleeding is often underestimated.

- In maternity patients, fibrinogen levels increase to an average of 5–6 g/L by term. Hypofibrinogenaemia is < 2.0g/L in maternity patients, so consideration to correcting hypofibrinogenaemia should be made at this level or if levels are rapidly falling.
- Otherwise the use of platelets, FFP, tranexamic acid and recombinant factor VIIa should be as per the non-obstetric patient.
- See also SGH-TSH WCH BR 009 *Postpartum Haemorrhage*.

5.10 SPECIAL CONSIDERATIONS IN TRAUMA

- Haemorrhaging trauma patients who have already received blood products or intravenous fluids from the ambulance / retrieval and despite ongoing efforts, remain shocked and hemodynamically unstable, must be considered for the MTP.
- Consider administering Intravenous (IV) Tranexamic Acid (TXA) if < 3 hours post-injury:
  - Administer TXA 1g diluted in 100mL 0.9% sodium chloride and infuse via IV route over 10 minutes (if not given prior to arrival).
  - Following this, administer 1g TXA in 500mL 0.9% sodium chloride and infuse via IV route over 8 hours.

5.11 PRINCIPLES OF COAGULOPATHY DURING MASSIVE TRANSFUSION

- **Fresh Frozen Plasma:** It is prudent to be aggressive with FFP early rather than to wait for an abnormal result as a trigger to replace coagulation factors. Coagulation factors are often at inadequate levels in patients suffering non-compressible or microvascular bleeds, despite normal APTT and PT. These measurements are also underestimated in the presence of coexistent hypothermia. Once the APTT, PT are abnormal, coagulation factor levels may be only 30 – 40% of normal levels.
- **Cryoprecipitate:** Fibrinogen is the first clotting factor to deplete to critical levels in massive haemorrhage. Hypofibrinogenaemia should be corrected early with cryoprecipitate, which takes approximately 15 min to thaw.
  - Crystalloids should be avoided as hypofibrinogenaemia may be worsened by prior infusion of crystalloids or colloids to maintain normovolaemia.
  - Low-grade Disseminated Intravascular Coagulopathy (DIC) may occur in many massive transfusion settings.
  - The endpoint of the coagulation cascade is the conversion of fibrinogen to fibrin. Even with adequate factor replacement, haemostasis will be impaired unless sufficient fibrinogen is present.
  - It is recommended that the plasma fibrinogen level be maintained at > 2g/L during massive transfusion, as determined by laboratory testing or monitored by ROTEM. For post-partum haemorrhage, see section 4.9.
  - In accordance with the Patient blood management guideline for adults with critical bleeding (Aug 2023)1, the current recommended adult replacement dose of fibrinogen is 3 to 4g, which is stated as being achievable with either 10 units of whole blood derived cryoprecipitate, or 4 units of apheresis derived cryoprecipitate.
- **Platelets:** Significant thrombocytopenia is usually a late occurrence. Platelets fall to < $50x10^9$/L from normal levels after approximately two exchanges of blood volume, unless there is significant DIC or other causes of platelet consumption. Despite adequate levels, platelet function is affected by hypothermia and acidosis. Damage control resuscitation to minimise hypothermia and acidosis is therefore critical to platelet function and overall haemorrhage control.

6. Cross References	NSW Health GL2021_01 Postpartum Haemorrhage (PPH) SGH-TSH CLIN148 *Blood Products - Administration of Blood and Blood Products* SGH-TSH BR149 *Blood Products – Storage of Outside of Blood Bank* SGH-TSH Blood- *Management of Transfusion-related Adverse Events* SGH-TSH CLIN274 *Haematology/Blood Products - Recombinant Factor VIIa for Life Threatening Bleeding* SGH-TSH BR016 *Warfarin Reversal* SGH-TSH WCH BR009 *Postpartum Haemorrhage*
7. Keywords	massive, transfusion, blood
8. BR Location	SGH-TSH Business Rule Webpage Blood and Blood Products
9. External References	1. National Blood Authority. Patient Blood Management Guideline for adults with critical bleeding. 2023. *https://blood.gov.au/best-practice/patient-blood-management/pbm-guidelines/patient-blood-management-guideline-adults* 2. Australian Red Cross Blood Service. Massive Transfusion. *http://www.transfusion.com.au/disease_therapeutics/transfusion* 3. CRASH-2 collaborators, Roberts I, Shakur H, Afolabi A, Brohi K, Coats T, Dewan Y, Gando S, Guyatt G, Hunt BJ, Morales C, Perel P, Prieto-Merino D, Woolley T. The importance of early treatment with tranexamic acid in bleeding trauma patients: an exploratory analysis of the CRASH-2 randomised controlled trial. Lancet. Mar 26;377(9771):1096-101. 2011. 4. Levy JH, Welsby I, Goodnough LT. Fibrinogen as a therapeutic target for bleeding: a review of critical levels and replacement therapy. Transfusion. 2014 May;54(5):1389-405 5. Leibner E, Andreae M, Galvagno SM, Scalea T. Damage control resuscitation. Clinical and experimental emergency medicine. 2020 March;7(1): 5-13. 6. Clinical Excellence Commission. Safety Information 001/18: ABO Compatibility for Blood Products in an Emergency. 19th June 2018 7. *National Blood Authority National statement for the emergency use of group O red blood cells - accessed Feb 2024.* *https://blood.gov.au/sites/default/files/National%20Statement%20for%20the%20Emergency%20Use%20of%20Group%20O%20Red%20Blood%20Cells_1.pdf*
10. Consumer Advisory Group (CAG) Approval	Not applicable
11. Aboriginal Health Impact Statement	The Aboriginal Health Impact Statement does not require completion because there is no direct or indirect impact on Aboriginal people. This BR outlines a process that is applicable to all population groups.
12. Implementation and Evaluation Plan	**Implementation:** The document will be published on the SGH-TSH business rule webpage and distributed via the monthly SGH-TSH CGD report. Established process. **Evaluation:**

	Evaluation by clinical review of patients requiring massive transfusion and monitoring of ims+.
13. Knowledge Evaluation	*1. When should the MTP be activated?* The MTP should be activated for patients who have: Actual or anticipated transfusion of ≥4 units RBC in < 4 hrs, who are haemodynamically unstable, with anticipated ongoing bleeding Haemorrhaging patient already receiving blood products or intravenous fluids and despite ongoing efforts remain shocked and hemodynamically unstable. Pre-hospital notification of a Code Crimson or a request for MTP. *2. Who is responsible for activating the MTP and how is it activated?* The Team Leader (Senior Registrar / above) delegates a Coordinator (Medical Officer / Registered Nurse or Midwife) to activate the MTP. Call Blood Bank (ext 33433 or 33434 (after hours page 464) State your name and designation. Provide patient details. *3. Which is the first coagulation factor to fall to critically low levels during massive haemorrhage?* Fibrinogen. Hypofibrinogenaemia should be corrected early with cryoprecipitate, which takes approximately 15min to thaw. It is recommended that the plasma fibrinogen level be maintained at > 2g during massive transfusion, as determined by laboratory testing or monitored by ROTEM.
14. Who is Responsible	Director of Medical Services SGH Director of Haematology SGH Blood Bank Senior Scientific Officer in charge, SGH Director of Emergency, SGH Director of Anaesthetics, SGH Director of Trauma, SGH Director of Surgery, SGH Director of Intensive Care, SGH Director of Gastroenterology, SGH Director of Obstetrics and Gynaecology, SGH Director of Cardiothoracic Surgery, SGH

Approval for: Massive Transfusion, SGH	
Specialty/Department Committee	Committee title: Blood Transfusion Committee, SGH Chairperson name/position: Nina Dhondy, Haematopathologist, Department of Haematology SGH Date: 30.04.2024
Nurse Manager / Divisional Director (SGH)	Hayley Smithwick, DDON&M SGH Date: 01.05.2024
Medical Head of Department (SGH)	Dr Shir-Jing Ho, Medical Head, Haematology Date: 30.04.2024

Executive Sponsor / s	Dr Heidi Boss, Director of Medical Services
Contributors to BR	Rochelle Cummins, Sara Smith & Kate Jarrett, CNC ED Rebecca Hughes, CNC Deteriorating Patient Programs Ian Press & Kei Luen Kelly, Deteriorating Patient Programs team Louise Everitt, CMC Obstetrics and Gynaecology Dr Ilana Delroy-Buelles, Department of Anaesthetics Dr Rob Scott, Department of Anaesthetics Dr Mary Langcake & Kelsey Langley, Trauma Dr Trevor Chan, Emergency Department SGH Peter Loizou, Kathleen McGrath & Roselle Estacio, Blood Bank Sarah O'Hare, A/CNC Blood & Blood Products Samantha Connelly, CNC Blood & Blood Products Blood Management Committee, SGH

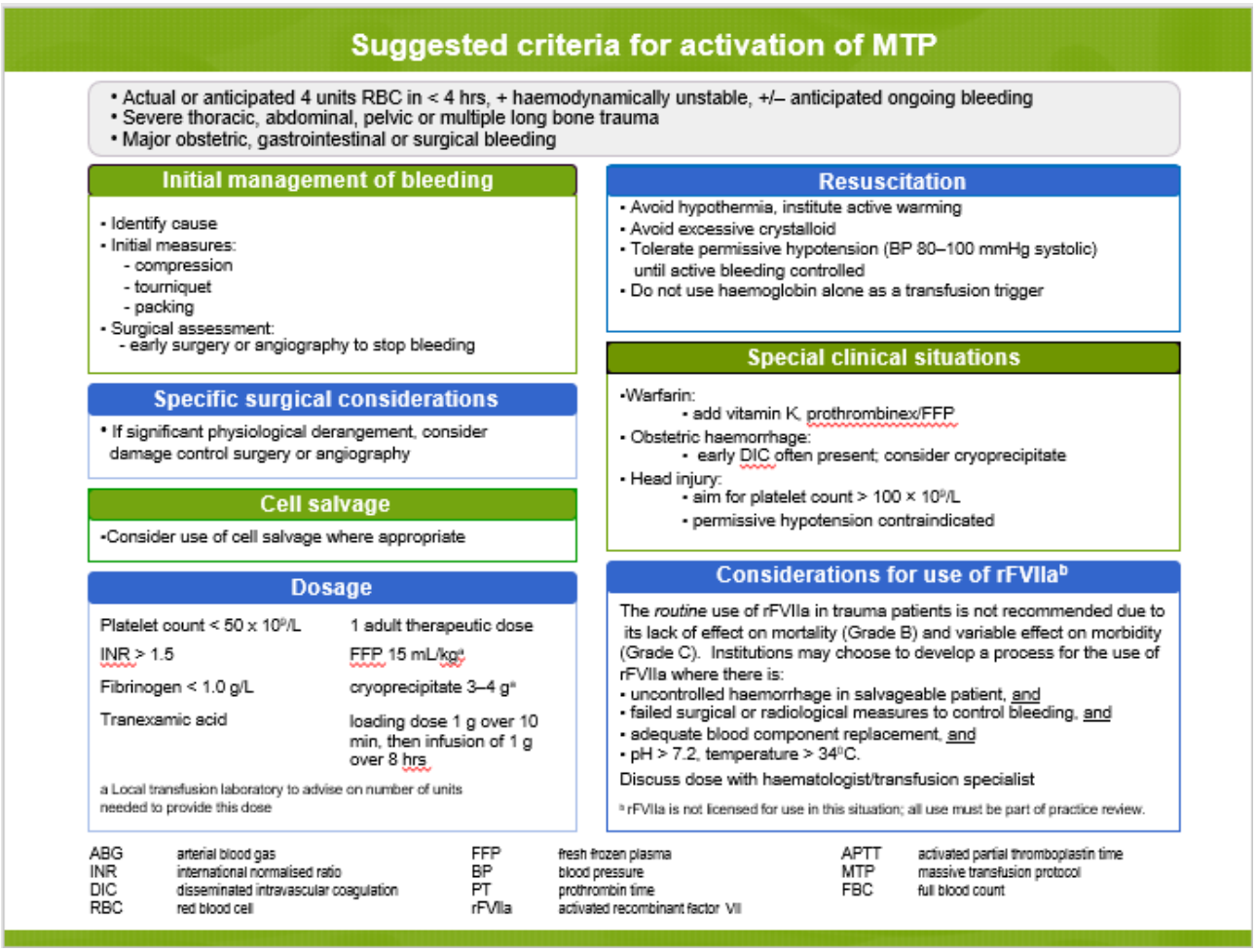
Revision and Approval History

Revision Date	Revision number	Reason	Coordinator/Author	Revision Due
May 2003	0	New	Staff Specialist ED Chair, Blood Transfusion Committee SGH	May 2006
Oct 2008	1	Review	Staff Specialist ED Chair, Blood Transfusion Committee SGH	Oct 2011
Mar 2013	2	Review	Chair, Blood Transfusion Committee SGH Director of Haematology	Mar 2016
Jun 2014	3	Review:	Chair, Blood Transfusion Committee SGH Director of Haematology	Jun 2017
July 2016	4	UPDATE: changes to Blood Bank Policy included. Approved by Dr Martin Mackertich, DCS, 21.07.16	Szu-Hee Lee, Staff Specialist, Department of Haematology	Jun 2017
Nov 2016	5	Update	Szu-Hee Lee, Staff Specialist, Department of Haematology	Jun 2017
Mar 2018	6	Review	Szu-Hee Lee, Staff Specialist, Department of Haematology	Mar 2021
Aug 2018	7	UPDATE: Inclusion of Blood Group Compatibility	Szu-Hee Lee, Staff Specialist, Department of Haematology	Mar 2021
Mar 2020	8	UPDATE: trauma specific information included, and Trauma MTP policy archived	Szu-Hee Lee, Staff Specialist, Department of Haematology	Mar 2021

Sep 2020	9	REVIEW: Updates of Team Leader and Coordinator roles, new MTP flowchart, guidelines for nursing staff and special considerations for trauma and obstetric cases.	Szu-Hee Lee, Staff Specialist, Department of Haematology Sarah O'Hare, A/Blood & Blood Products CNC	Sep 2023
Jun 2024	10	REVIEW: Definitions updated. Flowchart reviewed and updated. Section 4.3.10 - Haemorrhage control info added. Section 4.4 reformatted to move important information to the top. Section 4.6 – resuscitative end points updated to reflect latest PBM guidelines. Section 4.7 & 4.8.3 – Use of 0 positive information added. Section 4.8.4 – IMS reporting information added. References updated.	Nina Dhondy, Haematopathologist, Department of Haematology SGH Samantha Connelly, CNC Blood & Blood Products, SGH	Jun 2027
Dec 2024	11	UPDATE: updated to reflect lifeblood change in cryoprecipitate provision from 4 units Lage bag apheresis cryoprecipitate to 10 units split apheresis cryoprecipitate.	Shir-Jing Ho, Medical HoD, Haematology SGH Samantha Connelly, CNC Blood & Blood Products, SGH	Jun 2027

General Manager's Ratification
Angela Karooz (SGH) Date: 27.06.2024

APPENDIX 1: Suggested Criteria for Activation of MTP



NBA Patient Blood Management Guideline: Module 4 MTP template. Accessed February 2024.

NBA Patient Blood Management Guideline: Module 1 Critical Bleeding/Massive Transfusion. 2013[1]

APPENDIX 2 - Red cells compatibility

Table 1: ABO Blood group compatibility chart for red cell transfusions

Patient ABO type	**Best option (1st choice)**	**Ok to use (2nd option)**	**Never use**
Unknown	Female ≤ 50 years or Male ≤ 18 years = O RhD negative	-	A, B, AB
	Female > 50 years or Male > 18 years = O RhD positive or negative	-	A, B, AB
O	O	-	A, B, AB
A	A	O	B, AB
B	B	O	A, AB
AB	AB	O, A, B	-

Patient RhD type	**Best option**	**Ok to use**	**Never use**
RhD negative	RhD negative	-	RhD positive*
RhD positive	RhD positive	RhD negative	-

*RhD negative males and females without child-bearing potential may safely be given RhD positive blood but have a risk of developing Anti-D antibodies.

Pooled Platelets compatibility

Table 2: ABO Blood group compatibility chart for Pooled Platelets

RhD compatible is ideal. If RhD positive platelets are given to an RhD negative female of child-bearing capacity, then give Anti-D.

Patient ABO type	**Best option (1st choice)**	**Ok to use (2nd choice)**	**Avoid if possible (3rd choice)**
O	O	A*	B
A	A	B#, O#	AB
B	B	A*#, O#	AB
AB	AB (not routinely available)	A#, B#	O#
Unknown	A*# or O#	-	-

* Group A platelets that have an A2 subgroup do not express significant amounts of A antigen and are therefore more preferable for transfusion to group O and B recipients than other A platelets

Apheresis platelets that have low-titre anti-A/B or pooled platelets, pose a lower risk of haemolysis when transfusing ABO incompatible products

Plasma compatibility

Table 3: ABO Blood group compatibility chart for Plasma (FFP, ELP, Cryoprecipitate & Cryodepleted plasma)

Patient ABO type	Best option (1st choice)	2nd choice	3rd choice	4th choice
O	O	A	B	AB
A	A	AB	B^	-
B	B	AB	A^	-
AB	AB	A^	B^	-
Unknown	AB	A^	-	-

* ^ Plasma products that have low-titre anti-A/B pose a lower risk of haemolysis when transfusing ABO incompatible plasma.

Unknown blood group in an emergency

Table 4 shows the correct blood groups for the three products likely to be given. In emergency situations the patient's blood group should be determined as soon as possible and once known the patient should receive ABO-matched blood products whenever possible.

Table 4: ABO blood group compatibility chart for plasma product transfusions when the blood group is unknown

Patient ABO Group Unknown			
	Red Cells	Plasma Products	Platelets
First Choice	O	AB	A or O
Second Choice		A (low titre anti-B)*	

*Group A Plasma Products may be issued as the second choice due to stock restrictions. These should have a low titre anti-B identified on the label.

APPENDIX 3 – Task cards

MTP CO-ORDINATOR

TCM/ Senior Nurse/Medical

You are responsible for all communication with Blood Bank

(ext 33433 or 33434, AH page 464)

	Pre Arrival
☐	Ask medical team leader if O positive blood is an option? **O positive for Males > 18yrs or Females > 50yrs – located in RED ESKY** What blood products are priority?
☐	**"Activate Massive Transfusion Protocol"** State your name, pts details and gender.
☐ ☐	Liaise with staff member who will collect blood samples. **Discuss:** Pre-ordering/printing path forms. Order of collection. To give you the samples once collected **(send to pathology with orderly)**
	Arrival + 5 min
☐	Prioritise collection of blood samples in following order – 1. V/ABG 2. Group and Cross match 3. Coagulation screen (Fibrinogen, PT, INR,APTT, D-Dimer) 4. FBC, EUC, LFT 5. Ionised Calcium
☐	Label and send samples to pathology with orderly
☐	**Call blood bank:** Advise that samples are enroute with orderly.
☐	Check Blood products with circulation nurse, complete paperwork. Communicate given products to nursing TL
☐	Ensure patient is Kept warm
	Arrival + 10min/15min/20min - ASK T/L
☐	What are the next blood product priorities?
☐	Change to matched/typed products?
☐	What repeat bloods are needed? (consider MTP end points)
☐	Do we need to continue MTP? **Yes:** Inform blood bank EARLY if 2nd MTP pack required **No:** Inform blood bank to cease MTP
	Ongoing
☐	Return ED blood esky & yellow form to blood bank when used. **DO NOT place platelets, plasma, cryoprecipitate in esky**
☐	Return unused blood products, empty boxes and ice packs to blood bank within 2 hours of issue
☐	If patient is transferred to ICU/OT, inform blood bank and transfer blood products with patient.
☐	Handover to Anaesthetic/ICU - blood product ratios/ issues

MTP Contents

- 4 x PRBC
- 4 x ELP
- 4 x Cryoprecipitate
- 1 x pooled platelets

Massive transfusion task cards June 2024

Pre hospital blood products given			
RBC	CRYO	ELP	PLATELETS
Products given in the emergency department			
RBC	CRYO	ELP	PLATELETS

THERAPY INDICATIONS IN MASSIVE TRANSFUSION

- Check these parameters early and frequently (every 30-60 minutes while massive transfusion is going)

Parameters	Values to aim for
Temperature	> 35°C
pH	> 7.2
Base excess	≥ -6
Lactate	< 4 mmol/L
Ionised calcium (Ca)	> 1 mmol/L
Platelet (Plt)	> $50x10^9$/L
PT/APTT	< 1.5 x normal
Fibrinogen	> 2 g/L

Information in table taken from NBA patient blood management guideline for adults with critical bleeding 2023.

Massive transfusion task cards June 2024