

# MASSIVE TRANSFUSION PROTOCOL (MTP) [PAEDIATRIC] - SCH

## PROCEDURE <sup>®</sup>

### DOCUMENT SUMMARY/KEY POINTS

- Massive transfusion is defined as the replacement (or the anticipation of replacement) of >1 blood volumes within the first 24 hours of resuscitation.
- This procedure may be activated by any medical or nurse clinician when massive blood loss in a child is occurring or anticipated.
- Clinicians must provide Blood bank with a minimum data set to process MTP.
- On-call Paediatric Haematologist should be contacted through switchboard for any child receiving MTP.
- Blood bank will dispense both red cell and plasma products in a 1:1 ratio.
- Frequent monitoring of FBC, Coagulation, venous blood gas, electrolytes and calcium as indicated.
- Administration of all blood products *must comply* with the [Blood and Blood Components Administration – SCH](#).

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

<b>Approved by:</b>	SCHN Policy, Procedure and Guideline Committee	
<b>Date Effective:</b>	1 <sup>st</sup> June 2015	<b>Review Period:</b> 3 years
<b>Team Leader:</b>	Paediatric Surgeon	<b>Area/Dept:</b> General Surgery SCH

## CHANGE SUMMARY

- Update of SCH document as a result of changed practice in the POWH Blood Bank which supplies blood products SCH
- Massive Transfusion Pack (page 4)
  - The products **pooled platelets** and **cryoprecipitate** change order in the *Immediate* and *Second Dispatch* after the MTP request.
  - Pathology forms will no longer be automatically sent but now have to be requested.

## READ ACKNOWLEDGEMENT

- All clinicians involved in administering massive transfusions from haematology, anaesthetics, ICU, ED, surgery are to read and acknowledge they understand the contents of this document.

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## Purpose

This document describes the activation and deactivation procedure to provide blood components to patients requiring massive blood transfusion in a timely manner<sup>1</sup>.

## Definition

Massive transfusion is defined as the replacement (or anticipation of replacement) of one or more blood volumes within the first 24 hours of resuscitation<sup>2</sup>.

## Criteria for activating Massive Transfusion Protocol (MTP)

To activate the MTP, the following criteria applies;

1. Any child requiring more than 20mL/kg of packed red blood cells (PRBC) in 2 hours and/or anticipated ongoing blood loss;

**OR**

2. Any child requiring more than 40mL/kg of PRBC in a 24 hour period with ongoing blood loss

**OR**

3. **Blood Bank** may activate protocol if:
  - i. > 2 units of PRBC issued within 1 hour for child < 5 years old, **OR**
  - ii. > 4 units PRBC issued within 1 hour for child ≥ 5 years old, **OR**
  - iii. The Blood Bank technician anticipates likelihood of additional component needs. In this situation, the Blood Bank technician contacts the Haematologist to activate the protocol

## Activation and Notification

The following persons may activate the massive transfusion protocol (MTP):

- Any medical or nurse clinician involved in the treatment of a child requiring a massive transfusion.
- Blood Bank technician/Haematologist if the above criteria are met.
- The MTP is activated by notifying Blood Bank Technician (Ext 29145).
- On-call Paediatric Haematologist, should be notified through switchboard (Dial 9) by Blood Bank Technician.

## Details required by Blood Bank

When providing (verbal) information to Blood Bank, the following details are required:

- **Name and contact (phone/pager) of contact person.** (It is best to identify one person who will co-ordinate with Blood Bank<sup>2</sup>. e.g. anaesthetist in Operating Suite, surgeon or emergency physician in the Emergency Department.)
- **Name and medical record number of patient.**
- **Weight of patient.**
- **Location of patient and phone number of location.** **Note:** Clinical team must notify Blood Bank if the patient location changes.
- Initial blood results e.g. full blood count (FBC), coagulation screen (coags), venous blood gas (VBG).
- Urgency of need for blood products e.g. immediate or over next 30 minutes<sup>2</sup>. This will help determine what products will be despatched. Refer to Time for Blood Product Availability table.

## Massive Transfusion Pack

### Immediate Dispatch

The following "pack" will be despatched immediately upon activation of the MTP<sup>3</sup> according to patient weight:

Weight of Child			
< 15kg	15 – 30kg	30 – 50kg	>50kg
1 unit PRBC+	2 unit PRBC	3 unit PRBC	4 unit PRBC
1 unit FFP*	2 unit FFP	3 unit FFP	4 unit FFP
2 units cryoprecipitate	3 units cryoprecipitate	5 units cryoprecipitate	6 units cryoprecipitate
<b>NB:</b> Specimen tubes for sample collection from patient after administration of products and pre-printed pathology forms may be requested to accompany delivery of products.			

### Second Dispatch

Upon request for further blood products, the following "pack" will be issued according to weight:

Weight of Child			
< 15kg	15 – 30kg	30 – 50kg	>50kg
1 unit PRBC+	2 unit PRBC	3 unit PRBC	4 unit PRBC
1 unit FFP*	2 unit FFP	3 unit FFP	4 unit FFP
1 unit pooled platelets	1 unit pooled platelets	1 unit pooled platelets	1 unit pooled platelets
<b>NB:</b> Specimen tubes for sample collection from patient after administration of products and pre-printed pathology forms may be requested to accompany delivery of products.			

+ Packed Red Blood Cells

\* Fresh Frozen Plasma

## Responsibilities

The following points outline the responsibilities throughout the activation of the massive transfusion protocol (MTP) for Blood Bank and the clinical service/team involved.

### Blood Bank Service

- Prioritise testing and product distribution to patient.
- Despatch massive transfusion package to the appropriate location.
- Maintain communication with clinical team and ensure continuous availability of products.
- Ideally products delivered as per MTP, but ultimate product requests, preparation and delivery at the discretion of treating Clinician and/or Haematologist
- Commence thawing of next batch of frozen products immediately upon despatch of previous pack.
- Communicates with and notifies on-call Haematologist.

### Clinical Service

- Activates MTP by calling Blood Bank Senior Scientist on Ext 29145
- Ensure availability of runner to transport products rapidly to patient location.
- Informs Blood Bank if patient location changes as soon as possible.
- Clinical Team Leader decides on order, amount and rate of product delivery
- Ensures blood products delivered through blood product warmer
- Clinical Team Leader consults with on-call Haematologist
- Deactivates MTP by notifying Blood Bank.

## Ongoing Clinical and Laboratory Assessment

The following points need to be actioned/considered:

- Strict compliance with identification, documentation and product administration is mandatory as per the [Blood and Blood Components Administration - SCH](#).
- Laboratory tests after administration of each "pack" (FBC, coags).
- Frequent monitoring of venous blood gas, electrolytes and calcium as indicated.
- Additional crossmatch samples may be required. Clinical team will be notified by Blood Bank technician.
- Consider use of cell saver (available in Operating Suite) to scavenge blood or to wash blood products and also rapid transfuser in children >30kg. Inform theatre floor manager as early as possible if you require cell saver as cardiac technicians need to be called in to set this up. Give about 30 minutes for this to happen.

- Tranexamic acid may be used at the discretion of the treating Clinician and Haematologist
- Consideration of Factor VIIa and Prothrombinex in the appropriate setting at the discretion of the treating Clinician and Haematologist.

## Deactivation of MTP

When deactivating the MTP the following will occur:

- The clinician in charge of the patient (or delegate) will notify Blood Bank of decreasing needs for products or termination of the massive transfusion protocol.
- Blood Bank technician will notify on-call Haematologist.

## Time for Blood Product Availability

Product	Time Until Despatch from Blood Bank
O negative PRBC	Immediate
ABO specific PRBC (uncrossmatched)	5 – 10 minutes
Crossmatched PRBC	40 minutes
Frozen products	20 – 30 minutes

## Laboratory Criteria – target values

As a general guideline in massive transfusion, the following target values are reasonable to aim for:

Test	Target Value
<b>Haemoglobin (Hb)</b>	> 70g/L
<b>Platelets</b>	> 50 x 10 <sup>9</sup> /L (or > 100 x 10 <sup>9</sup> /L if Neurological injury) <a href="#">2,3,5</a> .
<b>Activated Partial Thromboplastin Time (APTT)</b>	< 40 seconds <sup>3</sup>
<b>Prothrombin Time</b>	< 20 seconds
<b>Fibrinogen</b>	> 1 g/L <a href="#">2,5</a>
<b>Acidosis and hypothermia</b> should also be vigorously corrected, as these exacerbate coagulopathy <a href="#">2,3,11,14</a> (refer to <a href="#">Ongoing Clinical and Laboratory Assessment</a> ).	

## Abbreviations

MTP	Massive Transfusion Protocol
PRBC	Packed Red Blood Cells
FBC	Full Blood Count
Coags	Coagulation Screen
VBG	Venous Blood Gas
APTT	Activated Partial Thromboplastin Time
PT	Prothrombin Time
FFP	Fresh Frozen Plasma

## Tranexamic Acid

- Tranexamic acid reduces mortality in adult trauma.
- Due to the lack of published data on the use of tranexamic acid in paediatric patients who have undergone major trauma there is no evidence for a specific dose in this situation.
- Consider in paediatric Major Trauma patient with suspected/potential life threatening bleeding.
- Early administration is vital for efficacy – ideally within 1st hour, but consider up to 3 hours post injury.
- Dosage - 15mg/kg tranexamic acid loading dose (max 1g) over 10 minutes followed by 2mg/kg per hour.

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