All staff using the Fluid & Medication Management policies must first familiarise themselves with the contents of:

- Roles & Responsibilities Policy
- Basic Infection Prevention & Control Principles related to Fluid & Medication
- Patient Identification Policy (Volume 11)

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### Paediatric Massive Transfusion Protocol (Paed MTP)

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**Purpose**

To provide staff with a system of rapidly delivering blood components from the Blood Bank to the patient’s bedside when the Massive Transfusion Protocol (MTP) has been activated

MTP is initiated for - massive bleeding AND shock or coagulopathy

This differs in definition from the ‘Patient Specific Emergency Blood Box’ system used for a patient experiencing a large haemorrhage requiring the issue of multiple units of blood only
**Scope**

The Paed MTP can be initiated by any doctor. The Paed MTP is a complex set of concurrent processes which require effective leadership within a functioning multidisciplinary team.

The process may involve any of the following staff groups:

- Medical Staff
- Nursing Staff / Midwives
- Anaesthetic Technicians
- Operating Theatre Assistants
- Hospital Aides
- Orderlies
- New Zealand Blood Services Staff

**Associated documents**

- Paediatric Massive Transfusion Protocol Checklist (see point 3)
- Paediatric Massive Transfusion Protocol Flowchart (see point 4)
- Request for Blood Bank Tests & Blood Components or Products form (NZBS 111F018)
- QMR022A – Resuspended Red Cells Transfusion Sheet
- QMR022B – Blood Components / Blood Products form
- Royal Children’s Hospital Hyperkalaemia Guideline

**1 Procedure**

1. Use the MTP Checklist to correctly initiate and activate the Massive Transfusion Protocol alongside the PaedMTP Flowchart

2. **INITIATE the MTP.** ED, OT, ICUs or BS call 777 and state MTP and your location. See the MTP Checklist

   All other areas call 777 and state ‘clinical emergency’

   The call will:

   - Initiate an orderly being sent to your area to relieve your initial staff runner. The orderly will act as runner to take forms to and deliver MTP boxes from the Blood Bank

   - Page the Associate Charge Nurse Manager for the area or BS Coordinator
- During weekdays 8-5, the Duty Anaesthetist will be made aware of the MTP activation

- Blood Bank will be alerted that MTP activation is imminent and will prepare to receive your activation call

3. **ACTIVATE the PaedMTP.** Call Blood Bank 80310 and activate MTP Alpha, Bravo or Charlie

   Clarify with Blood Bank information as per Paed MTP Checklist including if Blood Bank have a valid group and screen sample - if not send one immediately. Emergency O negative blood followed by Group Specific blood can be issued until testing is complete

4. Complete the QMR022A with the number of units of emergency blood required to sustain treatment for 20 minutes. This is the time it will take for MTP Box 1 to be ready (FFP needs thawing)

   **AND**

   Complete QMR022A and QMR022B, and request Paed MTP Box 1 and indicate whether it is Alpha, Bravo or Charlie

   Send ALL THREE forms at once to Blood Bank

5. **Only Use Runner's to deliver the forms to Blood Bank:** Use the Orderly (if available) or another staff member as runner initially. Instruct them to wait for, and return with the emergency blood. Then send a runner back to Blood Bank to await MTP Box If you do not have a runner available, ask Blood Bank to organise one

6. Blood Bank will inform the Transfusion Medicine Specialist that the MTP has been activated together with patient details after Box 4 is issued or earlier if requested

7. Blood Bank staff will label each Paed MTP box with the:
   - Description of box i.e. MTP box 1, 2, 3 or 4
   - Patient’s name
   - NHI number
   - Time the Box was packed
   - Latest time by which the transfusion of all units must be completed
   - The named Box Guardian(s) and the location of the delivery

Blood Bank staff will complete checks 1 and 2 on the QMR022A emergency blood request and the MTP Box 1 requests on forms QMR022A/B. The forms will be placed in the Box
8. On receipt of the MTP Box, the Guardian initials the label on the outside of the Box. (See sample label)

9. Remove the QMR022A & QMR022B forms from the MTP Box and check that the patient ID on the outside of the Box matches that on the forms

10. Select one blood component unit at a time from the box leaving the remainder in the container. Two staff members confirm the patient’s ID bracelet (Check 4). Adhere to the procedure ‘Administration of Blood Components and Blood Products’

11. When the bleeding is controlled cease the MTP and inform Blood Bank immediately

12. Return the MTP Box as soon as practicable and any unused blood and or components

2 Procedural considerations

Guardian of the MTP Boxes

The person who is responsible for overseeing the safe management of the Paed MTP Boxes. Normally this will be an IV Certified Registered Nurse / Anaesthetic Technician, or Medical Officer

Exception: In the Operating Theatre, Boxes are to be delivered to the Theatre Coordinator. This person will then hand the boxes over to the staff member who will oversee the management of the blood components and massive transfusion. The Theatre Coordinator may not hold an IV Certificate

Calcium

Follow the dosage recommended in the appropriate Paed MTP stream (Alpha, Bravo, Charlie) outlined in the Paed MTP Boxes

If only calcium chloride (CaCl) is available give a third of the calcium gluconate (CaGluc) dose

DO NOT give calcium in same IV line at the same time as blood components

Tranexamic Acid

Loading dose: 15 mg/kg (max 1g)

Consider maintenance infusion: 5 mg/kg/hour
Hyperkalaemia Management

See the Royal Children’s Hospital Guideline:
http://www.rch.org.au/clinicalguide/guideline_index/Hyperkalaemia/

Forms

Blood and Blood Products cannot be issued without two completed QMR022A and one completed QMR022B respectively.

Deliver QMR022A/ QMR022B by runner only in emergencies.

- The first QMR022A Form: write number of units of EMERGENCY BLOOD required.
- The second QMR022A Form: write MTP BOX 1.
- On QMR022B: write MTP BOX 1.
- Ensure the ‘requested by’ box has been signed on all three forms.

The QMR022A for emergency blood will accompany the emergency blood back to the patient. The second QMR022A and QMR022B will accompany MTP Box 1.

For ongoing MTP write MTP BOX, 2, 3, 4 (as indicated on MTP Flow Chart) under each signature in the ‘Requested by’ columns.

Return of stock

Return unused blood components to Blood Bank within 30 minutes of issue if not required so it can be returned to general stock.

Time constraints

MTP Boxes do not contain ice or coolant. All issued blood and components must be transfused within 4 hours of issuing or returned to the Blood Bank.

Box labels

Each Box is individually identified depending on the number of boxes available for circulation.
Changing patient location

The MTP system is designed so that the Box can move with the patient if they change locations, e.g. Emergency Department to Radiology to Operating Theatre to ICU or Ward.

There must be a suitably qualified health professional identified as the Guardian of the Box. When this person changes, a handover is given, and the new person’s name is entered on the outside of the Box. The Box must always be handed to a person.

Blood Bank must be notified if the patient’s location changes and or the Guardian of the box is changed.

Communication with Blood Bank

Initiation of the Paed MTP requires frequent communication with Blood Bank because as one box is issued, the next box will automatically be prepared. Information on the patient’s condition and the rate that boxes are required will influence eventual wastage of components.

The Transfusion Medicine Specialist (TMS) on call will be notified by the Blood Bank when box 4 is issued, or earlier if requested. The Blood Bank will supply the contact details of the TMS if requested. When Box 2 is issued the clinician in charge of the Paed MTP will be contacted by Blood Bank for a progress report.

Example of Label on MTP Box

<table>
<thead>
<tr>
<th>Patient Surname</th>
<th>NHI Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue Date</td>
<td>Issue Time</td>
</tr>
<tr>
<td>Use by Date</td>
<td>Use by Time</td>
</tr>
<tr>
<td>Box Guardian</td>
<td>Location</td>
</tr>
</tbody>
</table>
3 Paediatric Massive Transfusion Protocol (Paed MTP) Checklist

**Paediatric Massive Transfusion Protocol (PaedMTP) Checklist**

**Medical decision to initiate MTP**

- ED, OT, ICU, BS CALL 777: State “MTP” & your LOCATION
- All other areas CALL 777: State “Clinical Emergency”
  - 1. Complete a QMR022A form, write EMERGENCY BLOOD GUIDE: 1-2 Units for Children
  - 2. Write MTP BOX 1 on a second QMR022A form AND on a QMR022B form
  - 3. Sign the ‘Requested by’ boxes on ALL 3 FORMS

**Send forms via runner**

- Send ALL 3 FORMS via RUNNER to Blood Bank
  - Instruct runner to wait for emergency blood
  - Send runner back to Blood Bank to await Box 1

Runners can be: Nurses, Midwives, Orderlies, Hospital Aides, Operating Theatre Assistants, Medical Staff, Anaesthetic Technicians

**Activate MTP**

- Call Blood Bank on 80310, State “I am activating the MTP”
  - Confirm your location and contact number
  - Identify yourself, AND the name and designation of the Clinical Team Leader initiator
  - Identify patient: Full name and NHI
  - Name of the guardian of the box (Notify Blood Bank of any change)
  - Provide brief patient diagnosis, relevant information e.g. anticoagulant
  - CLARIFY the mode of delivery, who is the runner?

**Clarify with Blood Bank**

- Is there a valid group and screen?
- If not, send a new sample
- Blood Bank can supply emergency blood or group specific blood while the sample is being tested

**MTP Ceased? Notify Blood Bank on 80310**

- Received too many blood components?
  - Send the most recently received blood components back to Blood Bank
  - Return to controlled storage within 30 minutes of issue to minimise wastage
4 Paediatric Massive Transfusion Protocol (Paed MTP) Flow Chart

Clinical Team Leader Responsibilities
- Refer to CDHB Paed MTP Checklist
- Initiate and prepare QMR022A/B forms
- Send forms via runner
- Activate MTP
- Decision made to cease MTP: Call Blood Bank Ext 80310

Blood Bank Responsibilities
- Ensure X-match sample is processed ASAP after O neg release
- Call NZBS TMS after issuing MTP Box Four
- Thaw next box in advance and await request
- Ensure supply of platelets. If no neonatal platelets for Alpha, contact TMS
- BRAVO Box 3: label platelets ‘Give 150 mL only’
- Provide the freshest red cells possible (less than 14 days)

Contacts
- Blood Bank - Ext 80310
- Coagulation Lab - Ext 80374
- Transfusion Medicine Specialist details available from Blood Bank Ext 80310

Calcium
- If only Calcium Chloride (CaCl₂) is available give a third of the calcium gluconate (CaGlu) dose
- DO NOT give calcium in same IV line at the same time as blood components

Additional Treatment Thresholds
- Ongoing haemorrhage after Box 3 - if PR > 1.5 or APTT > 40 consider additional 20mL/kg FFP
- If fibrinogen < 1g/L consider additional 5mL/kg Cryoprecipitate
- If platelets < 75 x10⁹/L consider additional 10mL/kg platelets
- If ionized Ca²⁺ < 1mmol/L give 0.3mL/kg CaGlu
- See Royal Children’s Hospital Hyperkalaemia Guideline www.rch.org.au/clinicalguide/guideline_index/Hyperkalaemia/

Request, deliver and transfuse as below:

MTP BOX ONE
- 1 adult RBC
- 1 adult FFP
- 1 Cryoprecipitate
- 1 CMV neg Platelet
  - Give 10mL/kg of each in the following order:
    - RBC, FFP
    - RBC, Cryo
    - 0.45mL/kg CaGlu
    - Platelets
  - Beware of K⁺
  - and repeat alternate boxes 2 & 3

MTP BOX TWO
- 1 adult RBC
- 1 adult FFP
- 1 Cryoprecipitate
- 0.3mL/kg CaGlu
  - Give 10mL/kg of each in the following order:
    - RBC, FFP
    - RBC, Cryo
    - 0.45mL/kg CaGlu
    - Platelets
  - Beware of K⁺
  - and repeat alternate boxes 2 & 3

MTP BOX THREE
- 1 adult RBC
- 1 adult FFP
- 0.3mL/kg CaGlu
  - Give 10mL/kg of each in the following order:
    - RBC, FFP
    - Platelets
  - Beware of K⁺
  - and repeat alternate boxes 2 & 3

Tranexamic Acid (TXA)
- Loading dose: 15mg/kg (max 1g)
- Consider maintenance infusion: 5mg/kg/hour

Typical component volumes
- Red cells adult: 300
- FFP adult: 245
- Platelets adult: 270
- Cryoprecipitate: 100mL

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