PURPOSE

To provide guidelines for the administration of blood products (red blood cells, platelets, plasma and cryoprecipitate) via syringe delivery

SITE APPLICABILITY

BC Children’s Hospital

EQUIPMENT

- Patient chart with physicians order and consent for blood transfusion
- Patient Identification band
- Personal Protective Equipment (PPE): gloves, goggles, +/-gown, mask
- Chlorhexidine/alcohol swabs
- Cap (for post transfusion CVC cap change)
- Sterile white cap (to cap off existing infusion)
- 10 mL pre-filled syringes with 0.9% Normal Saline for priming & flushing the line
- Microbore 60” tubing
- Infusion pump “brain”
- Syringe pump

From Transfusion Medicine Laboratory

- Pre filtered blood product in 60 mL syringe
- Transfusion tag attached to syringe
- Transfusion record

PRE-TRANSFUSION

<table>
<thead>
<tr>
<th>PROCEDURE</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>ENSURE</strong> order for blood product exists. <strong>Note:</strong> Preprinted order forms are available.</td>
<td>Blood products shall be prescribed by a health care provider with blood prescribing privileges.</td>
</tr>
<tr>
<td>2. <strong>ENSURE</strong> that informed consent for transfusion is complete and current. <strong>Informed consent need not be obtained:</strong></td>
<td>Informed Consent is required by law for the transfusion of all blood products.</td>
</tr>
<tr>
<td>- When urgent treatment is necessary to preserve a patient’s life and continuing health, and&lt;br&gt;- When it is not reasonably possible to obtain consent, and&lt;br&gt;- When there is no substitute decision maker</td>
<td></td>
</tr>
<tr>
<td>3. <strong>DETERMINE</strong> if a Group &amp; Screen / Cross match is required. Refer to blood product fact sheet. A cross match is required for red blood cell transfusion. <strong>Ensure</strong> that Transfusion Medicine Laboratory (TML) has a current Group &amp; Screen/Cross match sample, if required.</td>
<td>To avoid the transfusion of an incompatible blood component. To avoid unnecessary delay in transfusion.</td>
</tr>
<tr>
<td>4. <strong>ENSURE</strong> TML is aware of the planned transfusion. <strong>Complete/Send</strong> the Group &amp; Screen Crossmatch Request or Blood Component/ Derivative/Factor Concentrate Request form to TML.</td>
<td>To avoid unnecessary delay in transfusion.</td>
</tr>
<tr>
<td>5. <strong>ENSURE</strong> that the guardian is aware of the planned transfusion. <strong>Explain</strong> reason for transfusion and transfusion procedure to</td>
<td>Allows the guardian to prepare for the procedure. To ensure that the patient understands the reason for transfusion and the transfusion procedure.</td>
</tr>
</tbody>
</table>
patient/guardian. **Provide** patient/guardian with the information pamphlet “Blood Transfusion Answers to Some Common Questions” if necessary.

6. **CONFIRM** that a patient identification band is in place.
   **No identification band/card, No Transfusion**  
   A missing identification band is a significant factor in patient misidentification and wrong blood to patient incidents. Transfusion should not be administered to patients who lack positive identification.

7. **ENSURE** peripheral vascular access or central vascular access line of sufficient gauge is established for the transfusion of blood product(s) based on clinical status of patient and urgency of transfusion, see table 1 below.
   Gauge or lumen size should be large enough to allow the flow of the blood product within the specified administration time and to prevent cell damage.

### Table 1: Intravenous Access for Administration of Blood Products (Syringe)

#### Peripheral Intravenous Access

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Lumen Size</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric</td>
<td>22 &amp; 24 Gauge</td>
<td>Suitable for blood product transfusion</td>
</tr>
<tr>
<td>Neonatal</td>
<td>≥ 26 Gauge</td>
<td>Suitable for blood product transfusion</td>
</tr>
</tbody>
</table>

#### Central Venous Access Devices

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Lumen Size</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>All</td>
<td>Suitable for blood product transfusion</td>
</tr>
</tbody>
</table>

#### Cuffed & Uncuffed Peripherally Inserted Central Catheter (PICC)

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Lumen Size</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric</td>
<td>3 French or greater</td>
<td>Suitable for blood product transfusion</td>
</tr>
<tr>
<td>Neonatal</td>
<td>2 French or smaller</td>
<td><strong>DO NOT</strong> use for blood product transfusion</td>
</tr>
</tbody>
</table>

#### Uncuffed Double Lumen 4 French PICC

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Lumen Size</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric</td>
<td>20 Gauge (= 3 French)</td>
<td>Suitable for blood product transfusion</td>
</tr>
<tr>
<td>Neonatal</td>
<td>23 Gauge (= 2 French)</td>
<td><strong>DO NOT</strong> use for blood product transfusion</td>
</tr>
</tbody>
</table>

8. **ENSURE** a dedicated line for the administration of blood product. Blood products are compatible with 0.9% Normal Saline and Plasma-Lyte only.

**Note:**
Co-administration of morphine or hydromorphone with red blood cells can be considered as a last resort for optimal pain management. If approved by a physician, co-infusion of morphine or hydromorphone in 0.9% Normal Saline Y-connected with a blood product is acceptable. The morphine or hydromorphone infusion line should be connected to the port most proximal to the patient and distal from the blood product. A Y-connector with back check valves must be used to prevent backflow.

9. **PERFORM** a pre transfusion patient assessment within 30 minutes of commencing the transfusion and **PRIOR** to removing cap on the syringe.

**To avoid inadvertent co-administration of incompatible fluids or medications:**

Electrolyte and colloid solutions containing calcium should not be administered with blood components as they may cause clotting in the infusion line.

**D5W or hypotonic sodium solutions may cause hemolysis.**

Identify any clinical manifestations that may:
- be cause for delaying the transfusion e.g. fever
- be confused with a transfusion reaction e.g.
<table>
<thead>
<tr>
<th>Measure baseline vital signs:</th>
<th>fever or pre-existing rash</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Heart rate</td>
<td>• predispose the patient to a transfusion reaction</td>
</tr>
<tr>
<td>• Blood pressure</td>
<td>e.g. Transfusion Associated Circulatory Overload</td>
</tr>
<tr>
<td>• Temperature</td>
<td></td>
</tr>
<tr>
<td>• Respiratory rate</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
Include O₂ Saturation level; chest auscultation, and a review of fluid balance for patients who are considered high risk e.g. patients with coexisting medical conditions such as renal failure or cardiovascular disease or patients who have experienced previous transfusion reactions.

10. **ADMINISTER** pre medications as ordered.

11. **DOCUMENT** findings of pre transfusion assessment including any pre-medication related to transfusion preparation, e.g. diuretics or antihistamines.

12. **TRANSPORT** blood product immediately prior to initiation of planned infusion.

13. **ASSEMBLE** required equipment.

14. **START** the transfusion within 20 minutes of issue.

15. **PERFORM** the pre transfusion check.

**Note:**

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1. **Measure** baseline vital signs:
   - Heart rate
   - Blood pressure
   - Temperature
   - Respiratory rate

2. **Note:**
   Include O₂ Saturation level; chest auscultation, and a review of fluid balance for patients who are considered high risk e.g. patients with coexisting medical conditions such as renal failure or cardiovascular disease or patients who have experienced previous transfusion reactions.

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**TR 06.02.01 Transfusion Manual 02-Mar-2018**
ADMINISTRATION OF BLOOD PRODUCTS (RED CELLS, PLATELETS, PLASMA, & CRYOPRECIPITATE)
SYRINGE METHOD

Initial check:
Visual Inspection:
The integrity of the blood product is checked for:
- Leaks at syringe cap
- Abnormal colour
- Excessive air or bubbles
- Any evidence of hemolysis

⚠️ Blood products that appear abnormal should not be transfused without further investigation.
Contact TML @ 7388 for an explanation of abnormal appearance.

CONFIRM that Informed Consent exists.

Compare the patient details:
- First and last name
- DOB
- MRUN
- Front sheet of the patient chart
- Blood product order
- Product Tag
- Transfusion Record

Check order for:
- Specific blood product required
- Number of units or volume in mL required
- Date of the transfusion
- Rate or duration of infusion
- Any modification &/or special requirements e.g. irradiation, washing, or Anti-CMV negative
- Pre/post transfusion medication orders

The information on the product tag & transfusion record must match.
COMPARE details on the product tag & transfusion record.

Patient information:
✓ First & last name
✓ DOB
✓ MRUN
✓ ABO & Rhesus factor

Product information:
✓ Product type e.g. red cells, platelets etc
✓ Unit number
✓ Expiry date & time
✓ ABO & Rhesus factor
✓ any modification &/or special requirements e.g. irradiation, washing, or Anti-CMV negative
✓ Sticker to indicate that the product has been filtered
⚠️ Check for any TML comments

Consent is required for transfusion of all blood products.
The intended recipient must be properly identified at the commencement of transfusion.

To ensure that you are aware of the infusion rate, special requirements, any modifications, pre or post medications etc. that have been ordered for the transfusion.

To ensure that patient information and product details on the transfusion record and product tag are identical.

To ensure donor/patient compatibility.

To ensure that the product has not expired.

To ensure that required special requirements and/or modifications have been met.
Final check in the presence of the patient
1. Ask guardian, where possible, to state their infant’s full name and date of birth and compare to patient details on patient identification band/card.
2. Compare the patient details:
   - First and last name
   - DOB
   - MRUN
3. With patient details on:
   - Patient identification band/card
   - Product Tag
   - Transfusion Record

If you find any discrepancies DO NOT proceed. Contact TML @ 7388 immediately.

The product tag must remain attached to the product for the duration of the transfusion.

The majority of transfusion-associated mortality is due to patients receiving the wrong blood product, or blood intended for another person. The bedside check is a vital step in preventing serious transfusion error. Vigilance in checking to ensure that the right blood is given to the right patient is mandatory.

If this product is not the intended product for your patient another patient may be at risk i.e. another patient may be about to receive the wrong product.

Right click here to watch a short video on the Pre-Transfusion Checking Process

16. DOCUMENT the checking procedure by signing the transfusion record.
   Record:
   - Signature of both staff members who carried out the pre transfusion check
   - Date of transfusion
   - Start time

To confirm that the pre transfusion checking procedure has been completed.

TRANSMISSION

PROCEDURE

17. Immediately after the verification checks have been completed INITIATE the transfusion:
   - Wash hands; apply personal protective equipment and prepare field and equipment.
   - Prime microbore tubing with blood product.
   - Load syringe into syringe pump and prime using prime option on pump. Label pump channel.
   - Program pump to run at the appropriate/prescribed infusion rate, see infusion rate table below. Confirm the programmed rate and volume to be infused.
   - Clamp IV. Delay existing infusion for the durations of the transfusion.
   - Disconnect existing infusion. Connect sterile white cap to disconnected line to maintain sterility.
   - Clean connection cap. Flush with 0.9% Normal Saline and clamp.
   - Connect blood product line to patient’s IV access and start transfusion, see table below.

To prevent contamination of the product.

Prevent errors in the rate of infusion.

Right click here to watch a short video on the initiation of the transfusion process
ADMINISTRATION OF BLOOD PRODUCTS
(REDC CELLS, PLATELETS, PLASMA, & CRYOPRECIPITATE)
SYRINGE METHOD

Table 2: Infusion Rate Table for Non-Emergency situations

<table>
<thead>
<tr>
<th>Product</th>
<th>Neonatal / Pediatric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Blood Cells</td>
<td>2-5 mL/kg/h, up to a maximum of 150 mL/h</td>
</tr>
<tr>
<td>Platelets</td>
<td>20 mL/kg/h</td>
</tr>
<tr>
<td>Plasma</td>
<td>20 mL/kg/h</td>
</tr>
<tr>
<td>Cryoprecipitate</td>
<td>20 mL/kg/h</td>
</tr>
</tbody>
</table>

Note:
- The infusion rate should be adjusted to individual requirements, based on initial assessment and monitoring of the patient’s status.
- These rates may be exceeded in emergency situations.
- If a major ABO incompatibility exists or a severe allergic reaction such as anaphylaxis occurs, symptoms usually appear early in the transfusion.

18. MONITORING see table 3 below.
- Instruct the guardian to inform a HCP immediately if they observe:
  - Hives or itching
  - Difficulty in breathing

Patients will be aware of the:
- S&S of a transfusion reaction
- Actions to take should they experience a transfusion reaction

Table 3: Patient Monitoring During Blood Product Transfusion

Remain with, or be in a position to closely observe, the patient for the first 15 minutes following the start of each unit (when product reaches the patient) and observe for signs and symptoms of a transfusion reaction.

<table>
<thead>
<tr>
<th>Neonatal (less than 4 months old)</th>
<th>Pediatric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure Vital signs:</td>
<td>Measure Vital signs:</td>
</tr>
<tr>
<td>15 minutes after the start of the transfusion</td>
<td>15 minutes after the start of the transfusion</td>
</tr>
<tr>
<td>30 minutes after the start of the transfusion</td>
<td>60 minutes after the start of the transfusion</td>
</tr>
<tr>
<td>60 minutes after the start of the transfusion</td>
<td>Hourly for remainder of the transfusion</td>
</tr>
<tr>
<td>Hourly for remainder of the transfusion</td>
<td>Within 60 minutes of completion of the transfusion</td>
</tr>
<tr>
<td>Within 60 minutes of completion of the transfusion</td>
<td>Vital signs include:</td>
</tr>
<tr>
<td>Heart rate</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>Respiration Rate</td>
<td>O2 Saturation level</td>
</tr>
</tbody>
</table>

Note:
- Increase observation for high risk patient’s e.g. unaccompanied infants / children, clinically unstable or unconscious patients.
- Monitor O2 saturation level & fluid balance in patients who are at risk of fluid overload.

Serious and life threatening reactions can occur unpredictably and progress rapidly therefore patients must be closely monitored throughout the transfusion.

19. If a second syringe of the blood product is required:
- NOTIFY TML one hour before it is required
- REPEAT steps 12 to 18

Note:
- Change the microbore tubing after administrating 2 syringes or every 4 hours, whichever comes first, and when changing to a different blood product.

To ensure TML staff have sufficient time to prepare the required blood product

Decrease the risk of bacterial contamination.

Red cell debris may trap the platelets.
Platelets must not be transfused through microbore tubing which has been used for red cells.

20. In the event of a suspected transfusion reaction:

- **STOP the transfusion immediately:**
  - **Administer** 0.9% Normal Saline
  - **Reassess** patient vital signs
  - **Seek** assistance and **notify** physician
  - **Reconfirm** unique identifiers on both patient and blood product
  - **Refer** to Transfusion Reaction Procedure & Quick Reference guide and **complete** Transfusion Reaction Report Form

To minimize patient harm.
To keep the vein open.
To seek direction for patient management.
To ensure correct procedure is followed.
To report the transfusion reaction.

21. **COMPLETION** of transfusion for red blood cells, platelets or plasma.

**Stop** the infusion when the prescribed volume is infused.

- **Clean** the connection between microbore tubing IV access.
- **Disconnect** the microbore tubing and syringe line.
- **Flush** the connection with 0.9% Normal Saline using pre filled syringe.
- **Reconnect** and **start** previously set aside existing infusion(s) or saline/heparin lock as per prescriber’s orders.

or:

**COMPLETION** of transfusion for Cryoprecipitate only.

**ENSURE** the entire unit including the cryoprecipitate in the microbore tubing is infused:

**Stop** the syringe pump.

- **Clamp** microbore tubing and **unload** syringe from the pump.
- **Clean** the connection between syringe and microbore tubing.
- **Detach** the blood product syringe from tubing and replace with a pre-filled 0.9% Normal Saline syringe.
- **Load** 0.9% Normal Saline syringe onto syringe pump (same pump used for blood product).
- **Press** “restore key” on the syringe pump to maintain the same rate used for the blood product transfusion.
- **Enter** volume in desired flush volume in the syringe pump.
- **Stop** normal saline flush once desired volume to be transfused has been delivered.
- **Clean** the connection between microbore tubing IV access.
- **Disconnect** the microbore tubing and syringe line.

Volume issued in the syringe allows for some discard in the microbore tubing.
To ensure all the product is cleared from the connection.

To ensure the entire volume of the syringe is infused.
### ADMINISTRATION OF BLOOD PRODUCTS
#### (RED CELLS, PLATELETS, PLASMA, & CRYOPRECIPITATE)

**SYRINGE METHOD**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.</td>
<td><strong>DISCARD</strong> syringe and microbore tubing in biohazard container</td>
</tr>
<tr>
<td>23.</td>
<td><strong>PERFORM</strong> post transfusion blood work if ordered.</td>
</tr>
</tbody>
</table>
| 24.  | **DOCUMENT**  
Complete the transfusion record:  
- Volume transfused  
- End time  
- Transfusion reaction noted: yes or no  
Complete the blood product tag:  
- Date/Time transfused  
- Transfused by  
- Transfusion reaction noted: yes or no  
Complete patient notification tag section:  
- Date of transfusion |
| 25.  | **FILE** transfusion record in patient’s chart. |
| 26.  | **GIVE** the guardian the patient notification tag section of the blood product tag. The notification tag may be filed in the patient’s chart and given to the guardian at discharge. |
| 27.  | **RETURN** the completed product tag to TML. |
| 28.  | **OBSERVE** in-patients for signs & symptoms of a transfusion reaction post transfusion. |
| 29.  | For outpatients, **REVIEW** post transfusion care and give the “Heading Home after a Transfusion” form to the guardian. **Discharge** when clinically stable. |

**REFERENCES**


