I. **Title**

*Transfusion of Blood Components*

II. **Policy**

A. An informed patient consent for blood component(s) transfusion must be obtained prior to a transfusion.
   1. For emergent situations, follow IHOP - 09.03.17 - Consent - Overview and Basic Requirements.
   2. Post-operative patients requiring blood components for a diagnosis not directly related to the surgical procedure should have a new consent signed with the new diagnosis documented.

B. A physician order for transfusion must be present in the medical record. EXCEPTION: if a physician is the transfusionist.

C. Compatibility samples must be drawn prior to transfusion. Compatibility testing is to be repeated every 3 days, as indicated. The type and screen sample expires at midnight on the 3rd day after it was drawn. EXCEPTION for infants: A type and screen is valid for an infant until discharge or until they reach 4 months of age. At 4 months of age, compatibility testing must be repeated every 3 days as indicated.

D. Only a Registered Nurse (RN) or a Licensed Independent Practitioner (LIP) may initiate the administration of blood components.

E. Patient transport while blood component is infusing should be avoided unless absolutely necessary. If transport is necessary, the patient must remain under the observation of an RN or LIP. It is critical to notify the Blood Bank of the patient’s new location if additional blood components are ordered.

F. For ECMO patients, the perfusionist or specially trained respiratory care practitioners may initiate and administer blood components.

G. A Licensed Vocational Nurse (LVN) who has received specific training on blood component therapy may monitor blood component transfusions.

H. Uncrossmatched units of Group O red blood cells may be given only in life-threatening emergency situations when ordered as medically necessary by a licensed physician. The ordering physician must sign an Emergency Release of Blood Products waiver. A waiver may be found on the Blood Bank Division Primary Request form. A pre-transfusion sample for compatibility testing should be obtained prior to the initiation of the uncrossmatched transfusion. Send this specimen to the Blood Bank as soon as possible.
I. If group O Rh positive blood has been transfused to a Rh negative patient, the Blood Bank physician will advise the patient’s physician about the treatment options, including possible administration of an appropriate dose of Rh immune globulin within 72 hours of transfusion.

III. **Procedure: Pre-Transfusion**

A. **Compatibility Testing**

1. Blood sample(s) for compatibility testing should be drawn in lavender top EDTA tubes and labeled at the bedside. Infants less than 4 months of age: submit two EDTA microtubes to provide a total sample of at least 1 mL.
   
   a) **Blood Bank specimen tube label must include:**
      
      (1) Patient’s full name (first and last)
      (2) Patient’s medical record number
   
   b) **The Blood Bank request form must include:**
      
      (1) Patient’s full name (first and last)
      (2) Patient’s medical record number
      (3) Date/ time of collection
      (4) Signature (initials) of the person collecting the specimen

2. For any patient that does not have a historical blood type on file in the Blood Bank, an ABORh confirmation sample will be required. The Blood Bank will provide a pink top EDTA tube for the second sample. The second sample must be drawn at a different time than the initial type and screen sample. The same specimen labeling requirements apply for confirmation samples.

B. **Dispensing Process**

1. Blood component(s) must not be picked up from Blood Bank until consent for administration has been verified and the RN or LIP is ready to start the transfusion (except when issued in a Blood Bank cooler). Pre-transfusion vital signs should be taken before picking up blood components (see assessment and monitoring below).

2. Each transporter may only pick up blood product for one patient at a time.

3. The dispense request form will be submitted to the Blood Bank with the following information:
   a) Patient’s full name (first and last)
   b) Patient’s medical record number
   c) RN or LIP signature
   d) Blood Component(s) to be dispensed
   e) Transporter’s name
   f) Transporter's employee ID number

4. Once dispensed, the blood component(s) must be immediately transported directly to the RN or LIP requesting the component for transfusion. If the blood is not in a cooler and the transfusion cannot be initiated immediately, return the component(s) to the Blood Bank.

C. **Verification process**

1. Prior to transfusion, confirm the presence of an order to transfuse and a consent for blood component(s) administration has been duly signed and witnessed.
2. A bedside or chairside verification process will be conducted by 2 individuals, one of whom is the qualified transfusionist who will be administering the blood component(s) to the patient. If the 2nd individual conducting the verification of the blood component(s) is not a qualified transfusionist, he or she must have received training on the verification process.

3. During the 2 person bedside/chairside verification process, the following will be confirmed:
   a) Patient identification must be confirmed by matching the patient’s first and last name and MRN on the patient’s ID band with the patient information label on the blood component(s). The patient should participate in identification if possible.
   b) Match the following information on the component(s) label and patient information label:
      (1) patient’s name and medical record number (UH#)
      (2) type of blood component: PRBC, platelets, plasma, cryoprecipitate
      (3) donor unit ID#
   c) Expiration date and time of blood component(s)
   d) Blood component to be transfused is compatible with the patient’s blood type. Refer to Transfusion Service Compatibility Chart (See Appendix A)

4. Once all the above information is checked, the 2 persons involved in the verification process must sign, date, and time the Blood Transfusion Record Tag. This tag should then be placed in the patient’s medical record.

5. Prior to transfusion, verify the component(s) ordered and any special processing needs for the component(s). Example: irradiated, or leukocyte reduced. Infants under 4 months of age will receive leukocyte reduced (same as CMV safe) and irradiated cellular blood components.

*NOTE: If there is any doubt in verification process, do not administer the blood component(s) and notify the Blood Bank immediately.

IV. Procedure - Blood component(s) administration
   A. Initiate the transfusion
      1. Blood components should be transfused without delay upon arrival to unit (except when issued in a Blood Bank cooler)
      2. Acceptable administration routes:
         a) Adult and pediatric: Blood component(s) will be administered intravenously (unless otherwise specified by provider order) through a 14 to 24 gauge lumen.
         b) Neonatal: Peripheral IV with a 22 or 24 gauge lumen is an acceptable route of administration. Umbilical artery catheter (UAC) for PRBC only, umbilical venous catheter (UVC) – second port, may be used with faculty physician order. The second port of the UVC should be used for Cryo, FFP and Platelets as well as PRBC. Peripherally Inserted Central Catheter (PICC) lines are never to be used for blood component transfusion in neonates.
      3. All components will be transfused through a standard Y type blood administration set with a 150-260 micron filter. No additional filtration is needed for blood syringes supplied by the blood bank. Neonates only: Use Baxter extension tubing (34”) volume 3.9 mL (larger than microbore tubing) for administration.
4. The blood administration set can be used for 2-4 units or no more than 4 hours whichever happens first. Exception: With blood supplied in a syringe from the blood bank, a new tubing set is used with each syringe.
5. Only 0.9% NaCl or Plasmalyte should be used for priming and administering blood component(s).
6. Do not infuse blood components into lines also infusing medications or IV fluids.
7. No medications will be added to the blood component(s) or administered through the administration tubing set. If medication must be administered while blood components are infusing and a separate line is not available, stop the transfusion. Flush the line, administer the medication, flush the line again and then restart the transfusion.

B. Assessment and Monitoring
1. Vital signs will be taken and recorded prior to transfusion (within 30 minutes prior to initiation) and 15 minutes after beginning transfusion.
2. Patients receiving a transfusion will be continuously assessed for signs and symptoms of transfusion reactions and complications for the first 15 minutes and re-assessed with each set of vital signs.
3. Additional vital signs during the transfusion are per unit routine or more frequently as condition warrants. Neonates and pediatrics are as outlined below.
   a) Neonates: Vital signs will be taken at 15 minutes, then hourly until completion of the transfusion.
   b) Pediatrics: Vital signs will be taken every 15 minutes for the first hour, every 30 minutes for the second hour, then hourly until completion of the transfusion.
4. A final set of vital signs will be taken and recorded within 30 minutes of the conclusion of the transfusion.

C. Complete the transfusion
1. When the blood component(s) transfusion is complete, flush the tubing.
   (Neonates: Flush with 1 to 3 mL of 0.9% NaCl. Do not use ¼ or ½ strength saline).
2. Before disposal, ensure the patient information label from the component is removed or covered with an identity-concealing privacy label. Then discard the empty blood bag and tubing or blood syringe in a biohazard receptacle if no additional blood is to be infused and no transfusion reaction is suspected.
3. Documentation expectations for blood component administration
   a) Vital signs
   b) Type of blood component
   c) Use of a blood warmer (if applicable) and temperature
   d) Donor unit ID number
   e) Date/time initiated and completed
   f) Blood component volume given
   g) Volume of 0.9 % NaCl or Plasmalyte given
   h) Description of any suspected transfusion reaction symptoms, notification of physician, and interventions taken.

D. Patient/ Family Education
1. Patient / family education will be completed and documented on the appropriate patient records. Written instructions concerning adverse events are provided to the patient and/or responsible caregiver if the patient is being discharged on the same day as the transfusion was administered.

V. Procedure - Suspected Transfusion Reaction
A. **MANAGEMENT of Suspected Transfusion Reaction**

1. If a reaction occurs, it usually manifests within the first 15 minutes of the transfusion. However, transfusion-related adverse events can occur hours after the transfusion is complete.

2. Some common signs and symptoms associated with transfusion reaction are:
   a) Fever (Increase in temperature by 2°F or 1°C from baseline)
   b) Urticaria (hives)
   c) Hemoglobinuria (urine turns red or dark brown)
   d) Arthralgias
   e) Chills/ rigors
   f) Shortness of breath
   g) Flank pain
   h) Hypotension or hypertension

3. For a full list of transfusion reaction signs and symptoms and recommended actions, refer to the Transfusion Reaction Sign/ Symptoms and Action Chart (Appendix B)

4. If a suspected transfusion reaction occurs during the transfusion:
   a) Stop the transfusion and maintain adequate vascular access.
   b) Notify the patient’s physician and the Blood Bank.
   c) Perform an immediate bedside clerical check reviewing the blood component, patient identification information and medical record for correctness. If a discrepancy is discovered, notify the Blood Bank immediately.
   d) Change the IV set and start a new infusion of KVO with 0.9 % NaCl or Plasmalyte.
   e) Monitor and record post-transfusion vital signs.
   f) Take any measure(s) necessary to stabilize/support the patient throughout the event
   g) Obtain sample(s) for transfusion reaction investigation workup. Provide a lavender EDTA tube of at least 3 mL to the Blood Bank and provide a urine sample of at least 4 mL to the Chemistry division. For neonates and pediatric patients, two EDTA microtubes may be submitted for the blood sample (at least 1 mL total) and a urine sample of at least 0.5 mL will be acceptable.
   h) Monitor urinary output.
   i) Document reaction symptoms and actions taken.
   j) Return the following to the Blood Bank:
      (1) Blood component with the patient information label attached.
      (2) Attached blood administration set and any IV solutions connected.
      (3) Post-Transfusion sample(s)
      (4) Contact the Blood Bank physician if assistance is needed in the evaluation or treatment of the patient.

5. If symptoms of a potential transfusion reaction are recognized after the transfusion is completed, the event should still be reported to the Blood Bank for further investigation.

VI. **Related UTMB Policies and Procedures**

Nursing Policy 7-12-10 Perioperative Autologous Blood Collection and Administration

UTMB Nursing Practice Standards 7-16-20 Administration of Packed Red Blood Cells and Whole Blood to ECMO Patients

Nursing Policy 7-16-8 Storage of Blood for Emergencies with ECMO Patients

UTMB Nursing Practice Standards 7-16-21 Administration of Platelets to ECMO Patients
IHOP Policy 09.13.29

IHOP - 09.13.24 - Patient Identifiers

IHOP - 09.03.17 - Patient Consent - Overview and Basic Requirements

IHOP - 09.03.18 - Consent for Treatment of a Minor

Pathology Policy 1.02 Specimen Labeling

VII. Additional References
Mosby’s Skills: Blood Products Administration

Mosby’s Skills: Blood and Blood Component: Administration (Pediatric)

VIII. Dates Approved or Amended

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<td>01/11/2017</td>
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IX. Contact Information
Blood Bank Laboratory
(409) 772-8284
## TRANSFUSION SERVICE COMPATIBILITY CHART

<table>
<thead>
<tr>
<th>Recipient's Blood Type</th>
<th>PRBC</th>
<th>FFP</th>
<th>Pooled Platelets</th>
<th>Single Donor Platelets</th>
<th>Cryoprecipitate</th>
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<tr>
<td>O</td>
<td>O</td>
<td>Any Type</td>
<td>Any Type</td>
<td>Any Type</td>
<td>Any Type</td>
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<tr>
<td>A</td>
<td>A or O</td>
<td>A or AB</td>
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<td>A or AB</td>
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<td>B</td>
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<td>B or AB</td>
<td>Any Type</td>
<td>B or AB</td>
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<td>AB</td>
<td>Any Type</td>
<td>AB</td>
<td>Any Type</td>
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<tr>
<td>Rh+</td>
<td>Pos. or Neg.</td>
<td>Pos. or Neg.</td>
<td>Pos. or Neg.</td>
<td>Pos. or Neg.</td>
<td>Pos. or Neg.</td>
</tr>
<tr>
<td>Rh-</td>
<td>Negative</td>
<td>Pos. or Neg.</td>
<td>Pos. or Neg.</td>
<td>Pos. or Neg.</td>
<td>Pos. or Neg.</td>
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**Note:**

First Choice for Plasma products is blood type specific, Rh+ or Rh-.

Cryo - 2nd choice depends on availability. AB recipients can receive Any Type due to smaller volume of plasma.

Pooled Platelets - Rh- recipient can received Rh+ Platelets, BB lab will consult with BB director for recipient to receive one vial of RhIg., due to Rh+ Plts transfused.

Single Donor Platelets - Rh- recipient can received Rh+ Platelets, BB lab will consult with the BB director for recipient to receive one vial of RhIg, due to Rh+ Apheresis Plts transfused.

**All neonate ≤ 4 mo of age will receive the products indicated below:**

<table>
<thead>
<tr>
<th>Baby's Blood Group</th>
<th>Leukoreduced Irradiated pRBCs</th>
<th>FFP*</th>
<th>Cryoprecipitate* (single units only)</th>
<th>Platelets (listed in order of preference)</th>
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</thead>
<tbody>
<tr>
<td>O Pos</td>
<td>O -</td>
<td>AB</td>
<td>AB</td>
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<td>O Neg</td>
<td>O -</td>
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<td>AB</td>
<td>Any Rh-, any</td>
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<tr>
<td>A Pos</td>
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<td>A Neg</td>
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<td>AB</td>
<td>AB</td>
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</tr>
</tbody>
</table>

*Rh is not taken into consideration when transfusing FFP or cryoprecipitate

Appendix B – Transfusion Reaction Sign/ Symptoms and Action Chart (on next 2 pages)
Acute Transfusion Reactions

Suspected Transfusion Reaction
- Signs & Symptoms
  - Fever > 38°C and ↑ of at least 1°C from baseline
  - Rash, pruritus, hives
  - Urticaria (Hives) or Rash
  - Dyspnea ↓ oxygen saturation

Immediate Actions
- STOP the transfusion
- PERFORM bedside clinical check to verify right component, right patient
- CHANGE IV set and start a new infusion of KVO 0.9% NaCl or Hespan
- RECORD vital signs and continuously monitor and take measures necessary to stabilize the patient
- NOTIFY Physician and Blood Bank
- MONITOR Urinary output, if indicated
- DOCUMENT reaction symptoms and actions taken

Additional Actions/Recommendations
- DO NOT RESTART TRANSFUSION
  - May give acetaminophen
  - Consider use of leuko - reduced for future transfusions
- DO NOT RESTART TRANSFUSION
  - May give acetaminophen
  - If bacterial contamination is suspected, order blood cultures and urinary analysis and give antibiotics as indicated

Possible Etiology / Cause
- Fever Non-Hemolytic Transfusion Reaction (FHNTR)
  - Antibodies to leukocyte antigens (mostly HLA), cytokines
- Bacterial Contamination
  - Most commonly caused by platelets which are stored at room temperature. Also contamination can occur during donation
- Acute Hemolytic Transfusion Reaction (AHTR)
  - Usually due to ABO incompatible blood
- Allergic - Mild
  - Antibodies to plasma proteins
- Allergic - Moderate to Severe
  - Antibodies to plasma proteins including IgA
- Transfusion-Associated Circulatory Overload (TACO)
  - Rapid infusion in patients with limited cardiac reserve, renal failure or impaired tolerance to fluids
  - Can be caused by excessive quantity
- Transfusion-Related Acute Lung Injury (TRALI)
  - Donor antibodies reacting to the recipient's white blood cells or recipient antibodies to donor white blood cells

Adapted from: Hemovigilance Module Surveillance Protocol v2.1.2, AABB Primer for Blood Administration (rev. September 2012), and AABB Circular of Information for the Use of Blood and Blood Components (rev. April 2014)
## Delayed Transfusion Reactions/Other Associated Reactions

<table>
<thead>
<tr>
<th>Suspected Transfusion Reaction Signs &amp; Symptoms</th>
<th>Additional Actions/Recommendations</th>
<th>Possible Etiology/Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms such as rash, diarrhea, fever, hemoglobinuria, liver dysfunction, and a decreased white blood cell count, 2-8 weeks post transfusion</td>
<td>Physician to notify blood bank for follow-up investigation when clinical syndrome is apparent.</td>
<td>Graft vs. Host Disease (GVHD)</td>
</tr>
<tr>
<td>Post-transfusion anemia and decreasing benefits from transfusions. Symptoms may also include mild jaundice, fever and hemoglobinuria (red/brown urine). Typically seen 5-10 day days after transfusion.</td>
<td>Physician should notify blood bank for follow-up investigation. Will require additional time to provide antigen-negative compatible RBC products for patient.</td>
<td>Transfused donor lymphocytes become engrafted in tissues and bone marrow of recipient, donor lymphocytes proliferate and destroy patient cells.</td>
</tr>
<tr>
<td>Signs and symptoms of infection typically occur weeks to months after transfusion. Disease/infection may include bacterial, viral, parasitic and well as others.</td>
<td>Physician will typically notify blood bank for follow-up investigation.</td>
<td>Delayed Hemolytic Transfusion Reaction (DHTR)</td>
</tr>
<tr>
<td>New clinically significant antibodies against red blood cells occurring between 24 hours and 28 days after a transfusion. Signs of hemolysis not present.</td>
<td>Usually detected in the blood bank when a new Type and Screen or additional units are requested.</td>
<td>Stimulated antibody development by foreign red cell antigens.</td>
</tr>
<tr>
<td>Thrombocytopenia. Typically a decrease in the platelet count between 20-80% from pre-transfusion counts occurring 5-12 days following the transfusion of platelets or red cells.</td>
<td>Alternative explanations for thrombocytopenia are likely but transfusion as a cause should be ruled out. Physician should notify blood bank for follow-up investigation.</td>
<td>Transfusion-Transmitted Infection (TTI)</td>
</tr>
<tr>
<td>Other</td>
<td>Infuse slowly if possible but no longer than 4 hours. Consider calcium supplement when multiple units are being transfused. Monitor calcium levels.</td>
<td>Hypocalcemia/Citrated Intoxication - Rare</td>
</tr>
<tr>
<td></td>
<td>Take steps to return potassium to normal levels. Monitor potassium levels. Washed or fresh blood, if patient at risk.</td>
<td>May occur in massive transfusion patients or those with liver dysfunction and the inability of the liver to metabolize citrate that may be present in banked blood.</td>
</tr>
<tr>
<td></td>
<td>Use fluid/blood warmer for patients requiring multiple blood products within a short period of time.</td>
<td>Hyperkalemia</td>
</tr>
<tr>
<td></td>
<td>Allergic reaction in the patient directed against HPA or other platelet specific antigen.</td>
<td>Electrolyte imbalance usually associated with massively transfused patients or those with renal failure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hypothermia</td>
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Adapted from: Hemovigilance Module Surveillance Protocol v2.1.1, AABB Primer for Blood Administration (rev. September 2012), and AABB Circular of Information for the Use of Blood and Blood Components (rev. April 2014)