

**AURORA SYSTEM NURSING ALLIANCE – SYSTEM POLICY**

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**BLOOD AND BLOOD COMPONENTS, ADMINISTRATION of**

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**Other Resources with detailed instructions:**

Perry, A. & Potter, P. (2006). *Clinical Nursing Skills & Techniques* (6<sup>th</sup> ed.). St. Louis: Mosby; Chapter 28, Pages 965-982.

Bowden, V., & Smith, C. (2003). *Pediatric Nursing Procedures*. NY: Lippincott Williams and Wilkins; Chapter 20, pp. 122-130

**I. PURPOSE:**

To provide guidelines for safe and efficient administration of blood and blood components.

**II. POLICY STATEMENTS:**

1. A physician's order is necessary to transfuse blood or blood components.
2. Informed Consent must be obtained and documented by the physician prior to the administration of blood or blood components, except for albumin or plasma protein fraction.
3. In the event a patient refuses a blood or blood component, the physician will be notified. Informed Refusal will be documented.
4. Identification of the recipient and the blood or blood components, will be performed by 2 health care providers, one of whom is a Registered Nurse, using two patient identifiers. Identification is done in patient's presence.  
[http://ahcweb03.aurora.org/manualmetro/metro\\_policies/IdentificationofPatientsMETRO.pdf](http://ahcweb03.aurora.org/manualmetro/metro_policies/IdentificationofPatientsMETRO.pdf)
5. All blood/blood components must be started within 30 minutes after release from the Blood Bank. Any unused blood/blood components must be returned to the Blood Bank within 30 minutes of release.
6. Blood/blood components may only be stored in a refrigerator or cooler designated by the Blood Bank. Platelets and granulocytes are never put into a refrigerator or cooler.
7. The maximum time for infusing any blood component is 4 hours.
8. Normal saline is the only solution used for priming and administering the blood or blood component.
9. Medications **MUST NOT** be added to the blood/blood components administration set or the intravenous tubing during transfusions.
10. At a minimum, vital signs of temperature, pulse, respirations, and blood pressure should be taken (AABB, 2002):
  - Before initiation of blood or blood components
  - After the first 15 minutes
  - At the conclusion of the transfusion
  - Further vital signs will be done based on patient assessment and nursing judgment
11. At a minimum (AABB, 2002; AABB, 2005; AABB, 2006a):
  - The nurse will remain with or be in close observation of the patient for the first 15 minutes of the transfusion, or longer based nurse's judgment; and
  - The patient will be evaluated throughout the transfusion.
12. All blood components must be transfused through a blood administration set that has a filter designed to remove clots and aggregates. Change filter tubing after a maximum time of 4 hours OR after a maximum of 2 units (AABB, 2006b).
13. If there is a change in ABO blood type in two (2) consecutive transfusions, the blood administration set and filter shall be changed between units.

14. Platelets and RBCs should not be infused through the same tubing. Some platelets are not ABO specific and may cause coagulation in the tubing.
15. Blood may be warmed with an approved blood warmer at the discretion of the ICU, NICU, ED, PACU, or operating room RN. Other areas require a physician order.

**General Information:**

1. If type and crossmatch needs to be drawn from an IV catheter, the nurse will coordinate with the Lab tech to be present for the blood draw. The ACL policy will be followed for blood ID banding and blood sampling; the nurse should be familiar with these procedures.
  - At the time the blood is drawn by the nurse, the Lab tech will place the blood ID band on the patient.
  - If a Lab tech is not present during the blood draw from the line, the nurse will place the blood ID band on the patient.

**Please see the Blood Bank arm banding procedures file listed under this policy in the Aurora System Manual.**
2. Transport of patients should not occur during first 15 minutes of the transfusion; transport while blood is running should be avoided unless absolutely necessary. If transport is necessary, nursing assessment and judgment is used to determine whether an RN will accompany the patient, or other personnel may be used.
3. The Circular of Information for the Use of Human Blood and Blood Components is available for further information. **Please see the Circular of Information file listed under this policy in the Aurora System Manual.**

**III. PROCEDURE: ADMINISTRATION OF BLOOD/COMPONENTS**

IMPORTANT STEPS	KEY POINTS - INFORMATION - PRECAUTIONS
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**A. BEFORE ADMINISTRATION:**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Check physician’s order for date, amount, and type of component to be given.</li> </ol>   | <ol style="list-style-type: none"> <li>a. Order must state: “Give,” “Transfuse,” or “Administer.”</li> <li>b. Check order for any medications to be given before or after a transfusion, or between transfusions.</li> </ol>  |
| <ol style="list-style-type: none"> <li>2. Verify that patient’s cultural and religious beliefs have been considered.</li> </ol>   | <p>Address individual fears or concerns regarding transfusions. Inform Jehovah’s Witnesses that plasma protein fraction (i.e., Plasmanate™) is derived from human blood.</p>  |
| <ol style="list-style-type: none"> <li>3. Verify informed consent in chart</li> </ol> <p>Once consent has been documented, it is valid for the duration of the hospitalization or treatment course.</p> | <p>When a patient refuses blood or a blood component, an informed refusal will be documented (eg, progress note, consent, or Form #05403700 if available, etc.). If available, the chart may be labeled with a neon pink sticker: <u>“Patient Refuses Blood or Blood Products.”</u></p> |

NOTE: If blood is refused for religious/cultural reasons, this includes ALL blood components (Refer to Appendix 1).

IMPORTANT STEPS	KEY POINTS - INFORMATION - PRECAUTIONS
<p>4. Ensure IV access.</p>	<p>A large gauge needle is preferred; an 18 to 20 gauge needle is recommended (AABB, 2006b).                      Central lines are acceptable.                      Special populations:</p> <ul style="list-style-type: none"> <li>▪ Pediatrics, use 20 or 22 gauge catheter.</li> <li>▪ Older adults, or those with fragile veins and skin, use 22 gauge.</li> <li>▪ When smaller catheter used, infuse blood components slowly (2-3 hours) to reduce hemolysis of cells.</li> </ul>
<p>5. Prepare normal saline and blood filtered tubing to maintain patency of IV line.</p>	<p>a. Blood shall not be piggybacked into an administration set that has been used for any solution other than 0.9% sodium chloride.</p> <p>b. Blood filtered tubing must be used for all blood/blood components.</p> <p>c. Change filter tubing after a maximum time of 4 hours OR after a maximum of 2 units (AABB, 2006b).</p> <p>d. Notify the Blood Bank if a unit needs to be infused for more than 4 hours (due to risk of circulatory overload). The unit will be split into smaller infusion aliquots. Older patients and pediatric patients are at greater risk for circulatory overload.</p> <p>e. Platelets and RBCs should not be infused through the same tubing. Some platelets are not ABO specific and may cause coagulation in the tubing.</p> <p>f. All cellular blood components from the Blood Bank are leukocyte reduced. Special leukocyte reducing blood filters are not needed.</p>
<p>6. Obtain infusion pump if indicated.</p>	<p>An infusion pump is recommended to regulate flow on large volumes of blood/blood components.  <b>Caution: It is not recommended to run platelets on a pump, however, if a pump is needed, then only certain infusion pumps are approved for use with platelet products. Consult site Clinical Engineering staff or infusion pump manual.</b>                      Use an infusion pump for patients 80 years old or greater receiving volume greater than 100 mL and for appropriate pediatric patients.</p>
<p>7. Obtain TPR and BP.</p>	<p>This provides baseline data. MUST be taken before obtaining blood from Blood Bank.</p> <p>If temperature is 38.8°C or 100°F or greater, <u>consider</u> notifying the physician <u>before requesting</u> blood component from the Blood Bank. This is not a contraindication to the transfusion, but may make assessment and decisions regarding blood reactions difficult. (Simmons, 2003).</p>

IMPORTANT STEPS	KEY POINTS – INFORMATION - PRECAUTIONS
<p>8. Complete a request for release of blood card / sheet. Obtain blood band number from patient’s wristband only. Obtain unit of blood and/or components; may be picked up by any Aurora employee or delivered via tube system from Lab.</p>	<p>Albumin is ordered from Pharmacy.</p> <p>The IV must be running before requesting a unit of blood. Must have the patient’s name, medical record unit [MRU]/medical record number [MRN] and Blood Bank ID number in order to release blood.</p>
<p>9. Observe blood for abnormal color, clumping, gas bubbles, or extraneous material.</p>	<p>Report abnormal findings to the Blood Bank and return the unit to the Blood Bank.</p>
<p>10. All blood components must be started within 30 minutes after its release from the Blood Bank. Any unused blood/blood components must be returned to the Blood Bank within 30 minutes of release.</p>	<p>The Blood Bank may issue red cells or plasma in a portable cooler. The cooler may be used to store these products up to the time designated on the cooler. DO NOT remove red cells or plasma from cooler until ready to transfuse. Platelets or cryoprecipitate must NEVER be placed in a cooler.</p>
<p><b>B. IDENTIFICATION PROCESS:</b></p>	
<p>1. Complete patient identification using 2 required patient identifiers.</p>	<p>Policy statement #4: Identification of the recipient and the blood or blood components, will be performed by 2 health care providers, one of whom is a Registered Nurse, using two patient identifiers. Identification is done in patient’s presence.</p>
<p>2. Verify that patient identifiers are identical to:</p> <ul style="list-style-type: none"> <li>• Hospital armband</li> <li>• Blood Bank ID band and</li> <li>• Blood product unit tag.</li> </ul>	<p>The 1<sup>st</sup> health care provider must <u>verbally state</u> the patient’s name, MRU/MRN number (or date of birth, if MRU/MRN not available) and Blood Bank ID number from the Blood Bank armband.</p>
<p>3. <u>Verbally state</u> and compare blood bag and lab attached unit tag for the following:</p> <ul style="list-style-type: none"> <li>• Unit number.</li> <li>• Donor ABO and Rh type.</li> <li>• Type of blood component.</li> <li>• Blood Bank ID band number</li> <li>• Modified blood components/special product requirements</li> <li>• Expiration Date</li> <li>• Donor and recipient ABO and Rh type</li> </ul>	<p>The 2<sup>nd</sup> health care provider must <u>verbally read back</u> the patient’s name, MRU/MRN number and Blood Bank ID number from the blood product unit tag. The information MUST be identical in order to proceed with the transfusion.</p> <p><b>NOTIFY THE BLOOD BANK OF ANY DISCREPANCY.</b></p> <p>Do NOT administer the unit and immediately notify the Blood Bank of any discrepancy. Return the unit to the Blood Bank immediately. Note: with blood shortages, exact matches may not be possible. See Table 1: ABO Compatibilities for Packed Red Blood Cell Components (See next page).</p> <p>Modified blood components/special product requirements will have special labeling that may include irradiated, CMV negative, HLA-matched, or autologous units, etc.</p>
<p>4. Sign the Blood Bank requisition/unit tag.</p>	<p>Consult the Blood Bank if questions arise regarding ABO or RH suitability between the donor and recipient.</p> <p>Both individuals verifying the information must sign the Blood Bank requisition/unit tag.</p>

**Table 1. ABO Compatibilities for Packed Red Blood Cell Components (not whole blood); for information only – Blood Bank is ultimately responsible for crossmatch \***

<b>Recipient</b>	<b>Donor Unit, First Choice</b>	<b>Donor Unit, Second Choice</b>	<b>Donor Unit, Third Choice</b>
A positive	A positive	O positive, A negative	O negative
B positive	B positive	O positive, B negative	O negative
AB positive	AB positive	AB negative, A positive, B positive	O positive, A negative, B negative, O negative
O positive	O positive	O negative	----
A negative	A negative	O negative	----
B negative	B negative	O negative	----
AB negative	AB negative	A negative, B negative, O negative	----
O negative	O negative	----	----

**\* The universal RBC donor is O negative; the universal recipient is AB positive.**

\*Not applicable to whole blood, which must be administered ABO identical

**ABO Compatibility for Fresh Frozen Plasma**

<u>Recipient</u>	<b>Donor Unit</b>
A	A or AB
B	B or AB
AB	AB
O	O, A, B, or AB

*Adapted from Weinstein, S. (2007). Plumer's Principles & Practice of Intravenous Therapy (8<sup>th</sup> ed.). NY: Lippincott and AABB. (2006b). Primer of Blood Administration. Bethesda, MD: Author*

### C. PREPARATION OF BLOOD/BLOOD COMPONENTS:

- Resources:
- Perry, A. & Potter, P. (2006). Clinical Nursing Skills & Techniques (6th Ed.). St. Louis: Mosby; Chapter 28, Pages 965-982.
- Bowden, V., & Smith, C. (2003). Pediatric Nursing Procedures. NY: Lippincott Williams and Wilkins; Chapter 20, pp. 122-130.

<b>IMPORTANT STEPS</b>	<b>KEY POINTS – INFORMATION - PRECAUTIONS</b>
1. Open blood administration set. Set all three roller clamps to off position.	NOTE: IV should be patent or running. Moving roller clamps to “off” position prevents accidental spilling.
2. Prepare for blood administration.	
a. Spike 500 mL 0.9% normal saline IV bag.	Only 0.9% normal saline shall be used. Other IV fluids may cause hemolysis or coagulation of the component.
b. Open roller clamp on tubing attached to saline bag.	
c. Squeeze drip chamber allowing saline to cover the filter.	
d. Open roller clamp on common tubing.	
e. Close the lower clamp (the clamp on the common tubing) after the tubing is filled.	
3. Attach the saline primed tubing to the client’s IV catheter. Normal saline can be running now.	Clean port prior to attaching tubing. Saline tubing should be in port closest to patient.
4. Read <i>Nursing Care During Administration</i> (next section) before starting blood infusion.	
5. Spike and hang blood component bag. Invert blood components 2-3 times. Wear gloves.	This will redistribute cells that may have settled with storage.
a. Close the roller clamp leading from the saline bag to the drip chamber.	This will prevent blood from backing up into the system.
b. Open the roller clamp leading from the blood component bag to the drip chamber.	
c. Squeeze drip chamber, allowing blood to enter.	

**D. NURSING CARE DURING ADMINISTRATION:**

IMPORTANT STEPS	KEY POINTS – INFORMATION - PRECAUTIONS
1. Educate patient related to transfusion signs and symptoms.	Partner with your patient regarding educational needs when receiving a blood transfusion.
2. Educating the patient to tell caregivers of a <i>change</i> in how they feel is most important.	Provide patient with appropriate educational materials for reference.
3. <u>Pre-medicate</u> if ordered by physician <ul style="list-style-type: none"> <li>- Give pre-medications 30 minutes before blood is started or as ordered by physician.</li> </ul>	<ul style="list-style-type: none"> <li>- Febrile reaction may be prevented by giving acetaminophen.</li> <li>- Allergic reactions may be prevented by giving antihistamines or steroids. (AABB, 2006b)</li> </ul>
4. <u>Perform Initial Assessment</u> (AABB, 2002): At a minimum, vital signs of temperature, pulse, respirations, and blood pressure should be taken: <ul style="list-style-type: none"> <li>• Before initiation of blood or blood components</li> <li>• After the first 15 minutes</li> <li>• At the conclusion of the transfusion</li> </ul>	<ul style="list-style-type: none"> <li>- Needs to be done before getting blood from Blood Bank</li> <li>- If temperature is 38.8°C or 100°F or greater, consider notifying the physician <u>before requesting</u> blood component from the Blood Bank. This is not a contraindication to the transfusion, but may make assessment and decisions regarding blood reactions difficult. (Simmons, 2003).</li> </ul>

**Table 2: Hemolytic transfusion reaction signs and symptoms**

Objective signs	Subjective symptoms
Fever: Temperature increase of 1° C or 2° F	Restlessness
Chills, rigor	Anxiety, feeling of impending doom
Hypotension, shock	Vague, uneasy feeling
Tachycardia	Pain in abdomen, chest or back
Respiratory distress / Extreme dyspnea	Headache
Hemoglobinuria	Nausea, vomiting
Bleeding, generalized oozing	Pain at IV site

*Bryan (2002)*

IMPORTANT STEPS	KEY POINTS – INFORMATION - PRECAUTIONS
5. Further vital signs will be done based on patient assessment and nursing judgment.	
6. Assess patient for any current symptoms that later may be mistaken for a transfusion reaction: chills, rash, muscle ache, breathing difficulty.	
7. Perform unit and patient identification as stated under B: Identification Process on Page 5.	Identification of the recipient and the blood or blood components, will be performed by 2 health care providers, one of whom is a Registered Nurse, using two patient identifiers. Identification is done in patient’s presence.

<b>IMPORTANT STEPS</b>	<b>KEY POINTS – INFORMATION - PRECAUTIONS</b>
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- |   |  |
|---|--|
| <p>8. Use appropriate personal protective equipment (PPE) for blood borne pathogens</p> <p>9. Start blood infusion.</p> <p style="margin-left: 20px;">a. The nurse will remain with or be in close observation of the patient for the first 15 minutes of the transfusion, or longer based on nurse’s judgment (AABB, 2002; AABB, 2006a).</p> <p style="margin-left: 20px;">b. Infuse blood at 100 mL per hour <b>for the first 15 minutes.</b></p> <p style="margin-left: 20px;">– If no reactions occur, then the rate may be increased to infuse blood over 1-2 hours (AABB, 2002; AABB 2005). Generally red blood cells are infused over 2 hours.</p> <p style="margin-left: 20px;">– The infusion may need to be slower as dictated by the patient condition or physician order.</p> <p style="margin-left: 20px;">– Blood infusion cannot be longer than 4 hours.</p> <p style="margin-left: 20px;">– Plasma, platelets and cryoprecipitate can be transfused at a rate of 10ml per minute or over 20-30 minutes.</p> <p>c) Evaluate the patient throughout the transfusion for his/her condition and adverse reactions; frequency of evaluation is dictated by patient’s status.</p> <p>10. <u>Monitoring and intervening</u> for transfusion reactions.</p> <p>11. If blood/blood components are administered for longer than 2 hours, agitate the unit of blood gently several times during the transfusion.</p> <p>12. After blood has infused, clear IV tubing with 0.9% normal saline.</p> <p style="margin-left: 20px;">- Use appropriate personal protective equipment.</p> | <p style="margin-left: 20px;">– Staying with the patient or being in close observation is critical to detect a reaction and be able to respond immediately.</p> <p style="margin-left: 20px;">– Baseline VS and VS after 15 minutes provide data for assessment and identification of any significant change. Additional VS after 30 or 60 minutes would be warranted if patient is symptomatic.</p> <p style="margin-left: 20px;">Severe reactions generally occur within the first 15 minutes.</p> <p style="margin-left: 20px;">In emergent situations, blood can be infused as rapidly as the patient will tolerate and the type of access will allow.</p> <p style="margin-left: 20px;">Change blood tubing after a maximum of 4 hours OR after a maximum of 2 units.</p> <p style="margin-left: 20px;">Infusion rate should be based upon the patient’s ability to tolerate the additional volume.</p> <p style="margin-left: 20px;">▪ The patient’s report of subjective symptoms is often the first indication of a reaction.</p> <p style="margin-left: 20px;">▪ A change in vital signs and objective signs are other indicators.</p> <p style="margin-left: 20px;">▪ See Table 2 (above).</p> <p style="margin-left: 20px;">See section on Transfusion Reactions (next page).</p> <p style="margin-left: 20px;">Turn the bag over 2 or 3 times as gentle agitation to keep the cells in suspension. This is not necessary when blood is given over 1-2 hours.</p> |
|---|--|

13. Dispose of empty blood bags and filter tubing in red biohazard bag.

Wear gloves while disconnecting tubing.

**IMPORTANT STEPS**

**KEY POINTS – INFORMATION - PRECAUTIONS**

14. Two units for administration:

Change blood tubing after a maximum of 4 hours OR after a maximum of 2 units.  
Perform and document assessment for 2<sup>nd</sup> unit appropriately.

15. Patient education post-transfusion:

- a. Give patient For Your Well Being material on blood transfusion
- b. Review critical components of education, e.g., delayed transfusion reaction, signs/symptoms of infection at IV site, etc.

Specific written instructions concerning possible adverse events must be given to patients who will be discharged after the transfusion. (AABB, 2006, Standard 5.19.8)

See Aurora Patient Education Materials: [www.aurora.org/apem](http://www.aurora.org/apem) - search “Blood Transfusion” for post-transfusion instructions.

16. Documentation:

- a. For initiation of blood/component, document on MAR/IV Profile or appropriate department form: blood component, volume infused, unit number of component, start time, end time and initials.
- b. If the patient is on Intake and Output, record the volume of blood/component and normal saline infused on the Intake and Output Record.
- c. Document vital signs on the Blood Bank unit tag.

Vital signs may be documented on other appropriate department forms. If so, document on the Blood Bag unit tag where the vital signs can be found.

- d. Complete the information needed on the Blood Bank unit tag.
- e. Place Part I – chart copy – in the patient’s chart under Laboratory Report.
- f. Return Part II (yellow copy) of the unit tag to the Blood Bank.

**IV. TRANSFUSION REACTIONS (AABB, 2006b)**

**A. General Information:**

- 1. Transfusion reaction: any unfavorable event occurring in a patient during or after a transfusion of blood or blood components that can be related to that transfusion.

2. A transfusion reaction may be acute (occurs within minutes or hours of blood or blood component administration) or delayed (occurs within days or years of blood or blood component administration).
3. Essential interventions are universal:
  - Stop transfusion
  - Keep IV access open
  - Notify physician
  - Notify Blood Bank

**B. Suspected Transfusion Reaction:**

**In the event of a suspected transfusion reaction, the following actions should be taken:**

IMPORTANT STEPS	KEY POINTS – INFORMATION - PRECAUTIONS
1. Stop the transfusion immediately.	To limit the amount of blood infused.
2. Attach a new bag of IV solution of 0.9% normal saline and new administration set or start saline infusion.  Infuse normal saline at “keep open” rate.	To keep the IV line open. If physician does not specify a rate, use 10 mL per hour as keep open rate.
3. Notify the physician of the patient’s symptoms and vital signs.	The physician will determine the need for the transfusion reaction evaluation.
4. Disconnect the blood component and blood administration set – put a sterile cap on the tubing and save for possible restart of infusion.	To prevent the patient from receiving any more blood or blood component. Do NOT throw the blood bag and tubing away; keep in room for examination. Wear gloves.
5. Treat the patient’s symptoms as prescribed by the physician and monitor vital signs as ordered, or every 15 minutes until acute symptoms resolve. The physician may order the transfusion restarted after treating the patient’s symptoms.	Do not resume unit unless ordered by physician.
6. Notify the Blood Bank if the physician determines the need for the transfusion reaction evaluation.	
7. Initiate the Suspected Transfusion Reaction Report: <ol style="list-style-type: none"> <li>a. Perform bedside verification of all labels, forms and patient identification on the blood component and patient.</li> </ol>	Suspected Transfusion Reaction Reports can be obtained from the Blood Bank, or Appendix 3 of this policy. To determine if the transfused component was intended for that recipient.

- b. If ordered, draw blood samples and collect a urine sample; send to Lab as soon as possible.
  - Draw blood from the arm not used for transfusion.
  - Draw blood carefully to avoid mechanical hemolysis.
  - Collect the patient's first urine specimen after the reaction started to determine if hematuria is present.
  
- c. Send the completed Transfusion Reaction Report to the Blood Bank and return:
  - Unused portion of the blood component or empty bag,
  - The administration set, and
  - All related forms and labels

**IMPORTANT STEPS**

**KEY POINTS – INFORMATION - PRECAUTIONS**

- 8. Document the time of reaction, signs and symptoms, physician notification, and all interventions taken as well as patient response and current condition.

**Table 3. Reaction, Signs and Symptoms, and Precautions/Nursing actions: Acute and Delayed***Adapted from AABB (2006b).*

<b>Acute Reactions</b>		
<b>Reaction</b>	<b>Signs/symptoms</b>	<b>Recommended precautions/nursing actions</b>
<p><u>Febrile non-hemolytic reaction</u> is defined as an increase in temperature of 1° C or 2° F or more without any other clinical reason. It may occur early in the transfusion or several hours after completion. It is caused by the reaction to antibodies directed against leukocytes or platelets, plasma protein antibodies, or inflammatory cytokine release.</p>	<ul style="list-style-type: none"> <li>• Fever</li> <li>• Chills</li> </ul>	<ul style="list-style-type: none"> <li>• If leukocyte antibodies are suspected, may give acetaminophen or antihistamines for prophylaxis as ordered by physician.</li> <li>• Use of leukocyte-reduced red blood cells reduces the incidence of febrile non-hemolytic reactions.</li> <li>• Stop infusion immediately, report to physician for evaluation.</li> <li>• Notify Blood Bank</li> <li>• Do NOT restart blood transfusion with this unit.</li> </ul>
<p><u>Allergic reactions</u> are caused by a sensitivity reaction to foreign plasma protein in the transfused component. It is the second most common type of reaction. Allergic reactions may be mild or severe. In mild reactions, the transfusion may be continued after antihistamines are administered and symptoms have subsided. Pretreatment with an antihistamine may be ordered if the patient has a history of allergic reactions during blood administration.</p> <p>A severe reaction, or anaphylaxis, is also thought to be associated with sensitization to a foreign protein. This may occur after only a few milliliters of blood or plasma are infused and can result in cardiopulmonary arrest.</p>	<p><u>A. Mild allergic reactions</u></p> <ul style="list-style-type: none"> <li>• Urticaria</li> <li>• Flushing</li> </ul> <p><u>B. Anaphylaxis</u></p> <ul style="list-style-type: none"> <li>• Urticaria</li> <li>• Flushing</li> <li>• Asthmatic wheezing</li> <li>• Laryngeal edema</li> </ul>	<ul style="list-style-type: none"> <li>• Give antihistamines for prophylaxis to individuals with a tendency toward allergic reactions as ordered by physician.</li> <li>• Stop transfusion immediately.</li> <li>• Report to physician and Blood Bank.</li> <li>• <i><u>NOTE:</u> With this type of mild reaction, it may be possible to restart transfusion if no other cause or symptoms are found.</i> <ul style="list-style-type: none"> <li>- <i>Transfusion is often restarted after administration of antihistamine and relief of itching.</i></li> </ul> </li> <li>• Give antihistamines for prophylaxis to individuals with a tendency toward allergic reactions as ordered by physician.</li> <li>• Stop transfusion immediately.</li> <li>• Monitor blood pressure</li> <li>• Maintain patent IV with normal saline</li> <li>• Report to physician and Blood Bank.</li> <li>• Epinephrine may be used for wheezing or anaphylactic reaction. Code may be called.</li> <li>• Transfusion <u>should not</u> be restarted if there is a fever, any pulmonary or airway symptoms, or anaphylaxis.</li> </ul>

Reaction	Signs/symptoms	Precautions/nursing actions
<p><u>Hemolytic Reactions</u> are the result of the recipient's plasma being incompatible with the donor's red blood cells or the donor's plasma being incompatible with the recipient's red cells. Misidentification of the blood sample, blood unit or patient, <u>or</u> the improper labeling of the blood sample or blood, are the errors that lead to this reaction.</p>	<ul style="list-style-type: none"> <li>• Chills</li> <li>• Shaking</li> <li>• Fever</li> <li>• Pain at needle site and along venous tract</li> <li>• Nausea/vomiting</li> <li>• Sensation of tightness in chest</li> <li>• Red or black urine</li> <li>• Headache</li> <li>• Flank Pain</li> <li>• If progressive, signs of shock and/or renal failure</li> </ul>	<ul style="list-style-type: none"> <li>• Positively identify donor and recipient blood types and groups before transfusion is begun.                             <ul style="list-style-type: none"> <li>- Verify with one other nurse, physician or other health-care professional as permitted by State, local or hospital regulations.</li> </ul> </li> <li>• Transfuse blood slowly for first 15-20 minutes.                             <ul style="list-style-type: none"> <li>- Remain with patient during this time.</li> </ul> </li> <li>• In event of signs and symptoms                             <ul style="list-style-type: none"> <li>- Stop transfusion immediately</li> <li>- Notify physician and Blood Bank</li> </ul> </li> <li>• Save donor blood to re-crossmatch with patient's blood.</li> <li>• Monitor blood pressure for shock.</li> <li>• Maintain patent IV with normal saline</li> <li>• Monitor urine output                             <ul style="list-style-type: none"> <li>- Insert urinary catheter and monitor hourly outputs as ordered by physician</li> </ul> </li> <li>• Send sample of patient's blood and urine to laboratory for presence of hemoglobin.                             <ul style="list-style-type: none"> <li>- (indicates intravascular hemolysis)</li> </ul> </li> <li>• Observe for signs of hemorrhage resulting from disseminated intravascular coagulation (DIC).</li> <li>• Support medical therapies to reverse shock.</li> </ul>
<p><u>Transfusion-Associated Circulatory Overload (TACO)</u> is caused by a rapid infusion of blood or blood components in patients with limited cardiac reserve, renal failure or impaired tolerance to fluids.</p>	<ul style="list-style-type: none"> <li>• Precordial pain</li> <li>• Dyspnea</li> <li>• Rales</li> <li>• Cyanosis</li> <li>• Dry cough</li> <li>• Distended neck veins</li> </ul>	<ul style="list-style-type: none"> <li>• For patients with cardiac dysfunction or age 80 years or older, the risk of circulatory overload is increased.</li> <li>• Lung auscultation at initiation of transfusion is recommended for patients at increased risk with further assessment as indicated.</li> <li>• Transfuse blood slowly, but no longer than 4 hours.</li> <li>• Prevent overload by using packed red blood cells or administering divided amounts of blood.</li> <li>• Use infusion pump to regulate and maintain flow rate (Perry &amp; Potter, 2006).</li> <li>• Diuretics may be ordered pre-transfusion or between units to reduce circulatory overload.</li> <li>• Place patient in semi-Fowler or upright or sitting position, to increase venous resistance.</li> <li>• If signs of overload, stop transfusion immediately.                             <ul style="list-style-type: none"> <li>- Notify physician and Blood Bank.</li> </ul> </li> </ul>

Reaction	Signs/symptoms	Precautions/nursing actions
<p><u>Hypothermia</u> is caused by the rapid administration of refrigerated blood or blood components.</p>	<ul style="list-style-type: none"> <li>• Chills</li> <li>• Low temperature</li> <li>• Irregular heart rate</li> <li>• Possible cardiac arrest</li> </ul>	<ul style="list-style-type: none"> <li>• Consider rewarming measures (e.g., warm blankets, hot water bottles, or warm oral fluids if alert)</li> <li>• Take temperature if patient complains of chills                             <ul style="list-style-type: none"> <li>- If subnormal, stop transfusion and notify physician and Blood Bank.</li> </ul> </li> <li>• Use a blood warmer to rapidly warm blood.</li> </ul>
<p><u>Bacterial contamination/ Bacterial Sepsis</u> is caused by the introduction of bacteria at the time of donation, or blood or blood component preparation or administration of blood/blood components. It occurs rarely and is usually caused by gram – negative organisms.</p>	<ul style="list-style-type: none"> <li>• Rigors</li> <li>• Chills</li> <li>• Fever</li> <li>• Shock</li> </ul> <p>Bacterial or toxin contamination – high fever, severe headache or substernal pain, hypotension, intense flushing, vomiting/diarrhea</p>	<ul style="list-style-type: none"> <li>• Report any signs to physician and Blood Bank</li> <li>• Stop transfusion</li> <li>• Monitor blood pressure</li> <li>• Maintain patent IV with normal saline</li> <li>• Send 2 samples from patient: 1 from peripheral and 1 from central line if used, for culture and sensitivity.</li> <li>• Blood Bank will order and submit blood component for culture.</li> <li>• Give antibiotics as ordered by physician</li> </ul>
<p><u>Citrate Toxicity</u> is caused by a large volume transfusion of blood or blood components to a patient with liver dysfunction. The patient’s liver is unable to metabolize the citrate in the blood. Citrate is used as a preservative in blood and can cause hypocalcemia.</p>	<ul style="list-style-type: none"> <li>• Tingling in fingers</li> <li>• Tetany</li> <li>• Muscular cramps</li> <li>• Carpopedal spasm</li> <li>• Hyperactive reflexes</li> <li>• Convulsions</li> <li>• Laryngeal spasm</li> <li>• Respiratory arrest</li> </ul>	<ul style="list-style-type: none"> <li>• Infuse blood slowly (citrate reaction less likely to occur), but no longer than 4 hours.</li> <li>• If signs of tetany occur                             <ul style="list-style-type: none"> <li>- Stop transfusion immediately</li> <li>- Maintain patent IV with normal saline</li> <li>- Notify physician and Blood Bank</li> </ul> </li> <li>• Calcium is used for treatment.</li> </ul>
<p><u>Hyperkalemia</u> may occur in patients receiving massive blood transfusions or in patients with renal dysfunction.</p>	<ul style="list-style-type: none"> <li>• Nausea, diarrhea</li> <li>• Muscular weakness</li> <li>• Flaccid paralysis</li> <li>• Paresthesias of extremities</li> <li>• Bradycardia</li> <li>• Apprehension</li> <li>• Cardiac arrest</li> </ul>	<ul style="list-style-type: none"> <li>• Use washed red blood cells or fresh blood if patient is at risk</li> <li>• Report to physician and Blood Bank</li> </ul>
<p><u>Air Embolus</u> may occur when blood is transfused under pressure</p>	<ul style="list-style-type: none"> <li>• Sudden difficulty in breathing</li> <li>• Sharp pain in chest</li> <li>• Apprehension</li> </ul>	<ul style="list-style-type: none"> <li>• If air is observed in tubing, clamp tubing immediately between air bubble and patient</li> <li>• Clear tubing of air by aspirating with syringe or disconnecting tubing and allowing blood to flow until air has escaped.</li> <li>• Notify physician and Blood Bank</li> </ul>

Reaction	Signs/symptoms	Precautions/nursing actions
<p><u>Transfusion – related acute lung injury (TRALI)</u> is caused by the activation of complement and release of biologic response modifiers resulting in increased pulmonary capillary permeability and noncardiogenic pulmonary edema. No known prevention exists.</p>	<ul style="list-style-type: none"> <li>• Dyspnea</li> <li>• Pulmonary edema</li> <li>• Normal pulmonary capillary wedge pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor blood pressure</li> <li>• Maintain patent IV with normal saline</li> <li>• Notify physician and Blood Bank</li> </ul>
<b>Delayed Reactions</b>		
<p><u>Alloimmunization</u> is caused by the stimulation of antibody development by foreign red cell antigens. It occurs after multiple transfusions. It may result in continued anemia or an unexpected drop in hemoglobin, mild jaundice, fever, or hemoglobinuria.</p>	<ul style="list-style-type: none"> <li>• Increased risk of hemolytic and febrile reactions</li> </ul>	<ul style="list-style-type: none"> <li>• Occurs in patients receiving multiple transfusions.</li> <li>• Transfusion should be reserved only when clearly indicated.</li> <li>• Observe carefully for signs of reactions.</li> <li>• Report to physician and Blood Bank.</li> </ul>
<p><u>Infectious diseases</u> may be transmitted during transfusion of blood or blood components. These diseases may include hepatitis B or C, CMV, Epstein – Barr virus, HIV and others.</p>	<ul style="list-style-type: none"> <li>• Signs of infection after transfusion, for example, jaundice from hepatitis would not be immediately apparent.</li> </ul>	<ul style="list-style-type: none"> <li>• Blood is tested for HIV 1 /2; Hepatitis B; Hepatitis C; syphilis; HTLV-I/II, and West Nile Virus. Additionally, platelets are tested for bacterial contamination.</li> <li>• Although rare, report any sign of immediate infection, and if occurring during transfusion                         <ul style="list-style-type: none"> <li>- Stop transfusion immediately</li> <li>- Send sample for culture and sensitivity tests</li> <li>- Notify physician, who will notify Blood Bank</li> </ul> </li> </ul>

**V. DONOR DIRECTED DONATIONS/AUTOLOGOUS**

**General Information:**

Due to concerns regarding transfusions, a patient may request that s/he receive blood only from family members or friends or from blood they have donated for themselves.

IMPORTANT STEPS	KEY POINTS - INFORMATION - PRECAUTIONS
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1. The physician, a nurse, or other staff member may phone the Blood Center of Wisconsin at (414) 937-6188 to request information on Donor Directed Blood.

A physician order is required for directed or autologous donations.

Blood Center of Wisconsin website:  
<http://www.bloodcenter.com> (click on “Blood Products & Medical Services” tab; then click on “Autologous & Directed Donations tab)

2. Determine ABO and Rh type if unknown (done by the hospital).  
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<b>IMPORTANT STEPS</b>	<b>KEY POINTS –INFORMATION- PRECAUTIONS</b>
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3. Supply Blood Center of Wisconsin with the following information:

- Patient’s Name
- Date of Birth
- ABO & RH type
- Hospital
- Diagnosis/surgery
- Date of anticipated transfusion
- Number of units needed and type of blood (ie., whole, PRBCs, etc.)

4. Notify donors (patient can do) to call (414) 937-6188 a minimum of 72 hours prior to blood being needed.

Donors must meet the standard criteria for blood donation and be compatible with the recipient.

5. Contact the Blood Bank to determine the number of donor-directed units available for the patient.

6. Donor directed (blood donors selected by the recipient) are identified by green tag attached to the unit. The patient’s name appears on the tag. Donor directed units should be transfused before random units.

**NOTE:** If donor directed blood is compatible, it will be made available for the patient. If it is not, it will be released into general blood inventory. Exceptions may occur. Units of blood will not be sent by the Blood Center if:

- a) Testing results indicate donated blood is not safe for transfusion. Due to patient confidentiality the reason it is not safe will not be disclosed.
- b) The blood bag breaks during processing or transportation.

**VI. ALBUMIN:**

<b>IMPORTANT STEPS</b>	<b>KEY POINTS - INFORMATION - PRECAUTIONS</b>
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1. Ensure IV access and patency.

2. Obtain albumin from Pharmacy.

Specific albumin tubing comes with component from Pharmacy.

3. Record albumin volume on patient Intake & Output if appropriate for patient.

4. Document an IV therapy Profile: lot number, type, volume.

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**VII. COLLABORATION:**

ACL Transfusion Supervisor and Physician, Pharmacy, System Medical Director, Administrator for Blood Bank, Vince Lombardi Cancer Center representative

## Appendix 1. Summary of Blood Components Available at Aurora Hospitals: Use, Infusion Guide, and Special Considerations

**NOTE:** When blood is refused, this includes refusal of ALL blood components.

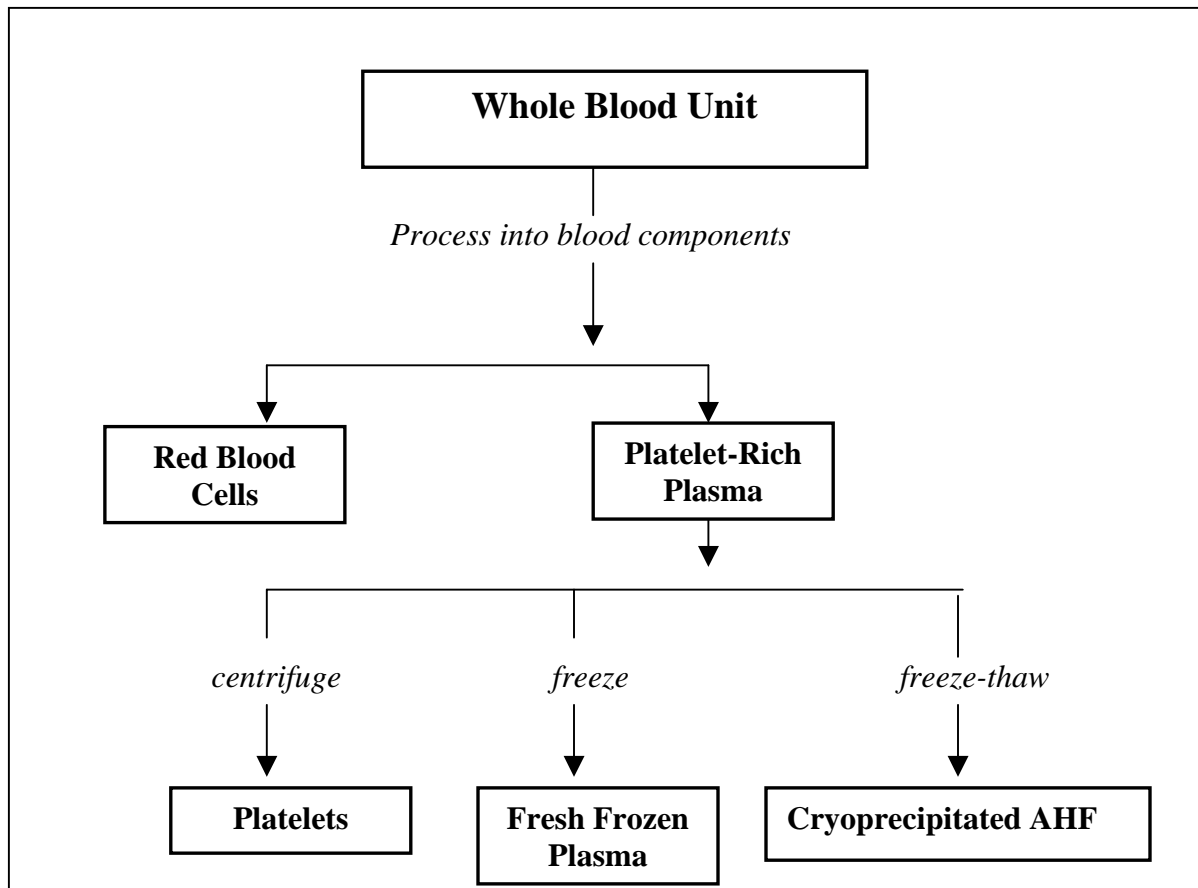
Blood Component	Volume	Action and Use	Infusion Guide	Special Considerations
RBCs, Leukoreduced	250 to 300 mL	Improved oxygen-carrying capacity in patient with symptomatic anemia, aplastic anemia, bone marrow failure caused by malignancy, or chemotherapy	0.9 % sodium chloride primer; transfuse in 4 hours, use standard 180 micron Y administration set	ABO and Rh compatible; 1 unit raises the hemoglobin approximately 1 gm/dl or hematocrit 3 to 4%, if there is no active blood loss.
Irradiated RBCs, Leukoreduced	250 to 300 mL	Prevent GVHD in immunocompromised patients	Same as for RBCs	Same as for RBCs. Has no radiation risk. Irradiation causes any lymphocytes in the unit to be nonviable.
Deglycerolized RBCs (frozen)	200 to 250 mL	Prolonged storage of blood for rare blood types and autologous donations; minimizes allergic reactions	Same as for RBCs; infuse within 4 hours	Must be used within 24 hours of being thawed and deglycerolized
Granulocytes  Prepared by apheresis	300 to 400 mL Note: Suspended in 200 to 250 mL of plasma	For neutropenia, fever, or significant infection unresponsive to antibiotics.	Usually administered for 4 to 5 consecutive days; administer slowly over 2 to 4 hours. DO NOT USE a leukocyte reduction filter. Avoid administering within 4 hours before or after amphotericin, anti-fungals, or anti-parasitic agents.	ABO-/Rh-compatible; reactions common Check vital signs every 15 minutes Note: Febrile reactions occur in about two thirds of patients; chills, fever, and allergic reactions common Requires pre-medication to control reactions
Platelets, apheresis, leukoreduced (AKA Single Donor Platelet)	Equivalent to 6-8 units from random donors	Control or prevent bleeding associated with platelet deficiencies.  Usual dose for an adult patient with bleeding and platelets <10,000 is 1 apheresis unit (one standard dose)	Administer as rapidly as patient can tolerate: 1 unit/10 min or less Use blood filter, syringe push, or standard Y administration set. May use infusion pump if indicated by manufacturer.	1 unit increases platelet count of 70-kg adult by 30,000-60,000/mL. ABO/Rh testing for compatibility may be required. Prophylactic medication with antihistamines and antipyretics to decrease the incidence of chills, fever, and allergic reactions.

Fresh Frozen Plasma (FFP) (or equivalent plasma product)	200 to 250 mL	Replacement of clotting factors in patients with a demonstrated deficiency or for single-factor deficiency when concentrate not available; TTP	Standard blood filter: may be infused rapidly: 20 mL over 3 minutes or as fast as tolerated; may be infused more slowly within 2 hours	Does not provide platelets. Each unit raises the level of clotting factor 2 to 3%; requires 30 minutes' thawing time by laboratory for each unit. Must be ABO compatible
Albumin (5% = 12.5 g/250 mL) (25% = 12.5 g/50 mL)	5% solution is in concentration of 250 mL or 500 mL; 25% solution is in 50 to 100mL concentration	Plasma volume expander; for hypovolemic shock Supports blood pressure during hypotensive episodes; induces diuresis in fluid overload	May be administered as rapidly as tolerated for reduced blood volume Normal rates: 2 to 4 mL/min for 5% solution; 1 mL/min for 25% solution Supplied in glass bottles with tubing for administration from pharmacy.	25% albumin is hypertonic and is five times more concentrated than 5% solutions Give with extreme caution can cause circulatory overload No type and cross-matching necessary; store at room temperature.
Plasma protein fraction (i.e., Plasmanate, Plasma-Plex, etc.)	Glass bottle with tubing 250 mL	Same as for albumin	Equivalent to 5% albumin	Has fewer purification steps than albumin; no type and cross-matching necessary; has high sodium content
Intravenous Immunoglobulin (IV-IG)	<i>See Medication Administration information</i>			
Cryoprecipitate antihemophilic factor (AHF), single or pooled	Each unit contains factor VIII, vWF, factor XIII, fibrinogen; 20-25 mL per unit. Usual order is for 6 to 10 units. Typically issued in pools of 5.	Mainly used to replace fibrinogen. Treatment of patients with hypofibrinogenemia, dilutional coagulopathy and DIC.	Standard blood filter; Administer as fast as tolerated (10mL/min) via syringe or standard Y administration.	Rh matching not required. Infuse within 4 hours of thawing; saline may be added to bag to facilitate recovery of component. Frequent repeat doses may be necessary. Order from Blood Bank.
Plasma Derivatives and Recombinant Plasma Proteins (eg Factor VIII concentrate - Recombinate; Humate-P; Antithrombin; Novo 7)		Replacement factor for specific factor deficiency	Infused by syringe/ not exceeding 10mL/min. Follow manufacturer's instructions.	Order from Pharmacy  Concentrate provided with sterile diluent and reconstituted by Pharmacy.

<p>Rhogam (RhOD)  Rho (D) Immune Globulin</p>		<p>Blocks maternal production of antibodies against Rh positive fetal cells in Rh negative maternal patients.</p>	<p>Standard dose is 300 micrograms IM injection.</p>	<p>Must be given within 72 hours of Rh negative maternal patient exposure to Rh positive fetal cells after delivery, miscarriage, abortion, ectopic pregnancy or prenatal manipulation. Type and Screen maternal patient for Rh factor. Obtain from Blood Bank. Contraindicated in patients with anaphylactic or severe systemic reaction to human globulin. Use with extreme caution when administering drug to patients with IgA deficiency due to risk of patient developing IgA antibodies and having an anaphylactic reaction.</p>
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Adapted from: Phillips, 2001 and AABB. (2006b). *Primer of Blood Administration*. Bethesda, MD: Author.

### Appendix 2 - Identification of Blood Components from Whole Blood



Adapted from AABB. (2004) *Primer of Blood Administration*, Chapter 1. Bethesda, MD: Author.

**Appendix 3 - Suspected Transfusion Reaction Report – next two pages**



ACL – Wisconsin  
Transfusion Services

Patient Identification:

**SUSPECTED TRANSFUSION REACTION REPORT**

**TO BE COMPLETED BY NURSE:**

Date & Time of Reaction: \_\_\_\_\_

Date & Time Laboratory Notified: \_\_\_\_\_

Physician Ordering the Reaction Work-up: \_\_\_\_\_

**Transfusion Information:**

**Pre-transfusion BBID#:** \_\_\_\_\_

Product:  Red Cells  
 Platelets

FFP  
 Cryo

Unit no.: \_\_\_\_\_

Amount Given: \_\_\_\_\_

Time Started: \_\_\_\_\_

Time Stopped: \_\_\_\_\_

**BEDSIDE CLERICAL ✓ BY NURSING:** Perform clerical check of crossmatch tag; bag label, BBID band and patient's hospital armband to determine that the correct patient received the intended component.

No clerical error  Clerical error Describe: \_\_\_\_\_

By: \_\_\_\_\_ RN Date: \_\_\_\_\_

**CLINICAL SIGNS OR SYMPTOMS:**

Increased Pulse \_\_\_\_\_ Chest Pain \_\_\_\_\_ Vomiting \_\_\_\_\_ Erythema \_\_\_\_\_  
Decreased B/P \_\_\_\_\_ Dyspnea \_\_\_\_\_ Back Pain \_\_\_\_\_ Itching \_\_\_\_\_  
Chills \_\_\_\_\_ Nausea \_\_\_\_\_ Hives \_\_\_\_\_ Fever \_\_\_\_\_  
Shock \_\_\_\_\_ Pain along vein of transfusion \_\_\_\_\_  
General Bleeding \_\_\_\_\_ Other \_\_\_\_\_

**PRE-TRANSFUSION:**  
Temp \_\_\_\_\_  
B/P \_\_\_\_\_  
Pulse \_\_\_\_\_  
RR \_\_\_\_\_

**POST-TRANSFUSION:**  
Temp \_\_\_\_\_  
B/P \_\_\_\_\_  
Pulse \_\_\_\_\_  
RR \_\_\_\_\_



**Send this completed form along with product bag and attached tubing directly to the Blood Bank. Do Not Send via pneumatic tube system.**

BLBK 174.1B

