

## DEPARTMENT OF PATIENT CARE SERVICES

## BLOOD COMPONENT ADMINISTRATION and TRANSFUSION REACTIONS

**INTRODUCTION:**

Administration of blood components exposes patients to certain risks. It is imperative to follow prescribed procedures for safe administration of blood components to reduce the risk to the patient and to identify and treat unintended adverse reactions to blood components

**Purpose:**

Outline the proper procedures to maximize safe blood administration practices. Identify the process of early identification and treatment of adverse reactions to blood components.

**DEFINITION OF TERMS:**

Epic "Prepare Order" – Order placed by Provider to **prepare** the blood component and have it available in the VMC Lab, not an order to transfuse. If ordered, it will contain the Special Attributes (e.g., Leukocyte Reduced, Irradiated). An Epic PSBC Request for Blood form is generated from this order.

Epic "Transfuse Order" – Order placed by Provider to **infuse** the blood component. Do not transfuse the blood component unless there is a Transfuse Order. If Special Attributes are ordered in the Prepare Order, this order will not show the Special Attributes. It only shows the kind of component (e.g., Platelets) to infuse, not any Special Attributes.

Epic "Pick-Up Slip" – Form that auto prints when the transfusionist "releases" the blood component from the Transfuse Order. One form prints for each unit released. Take to VMC Lab when picking up component.

Transfusion Assessment – Includes temperature, pulse, respiration rate, blood pressure, auscultation of the lung sounds, pulse oximetry, skin assessment (itching, rash, hives or flushing). A Transfusion Assessment will be completed before transfusion (within 30 minutes prior to start), 15 minutes after start of transfusion, at completion and 1 hr post transfusion

Reaction Assessment – will include checking patient for signs of dyspnea, itching or any discomfort, may include VS, pulse oximetry, auscultation of the lung sounds. A reaction assessment will be completed every 30 minutes while the blood component is infusing.

Plasma – Thawed Plasma or Fresh Frozen Plasma.

RBC – Red Blood Cells.

Cryo – Cryoprecipitate.

Unit of blood component – A single standard measurement for packaging blood components.

Pooled unit – Multiple units contained in one bag.

TACO (Transfusion Associated Circulatory Overload) – Signs and symptoms are due to excessive fluid in the vascular system and include shortness of breath, hypoxia, rapid respiratory rate, jugular vein distention and hypertension. Auscultation will reveal crackles. Temperature - normal range.

TRALI (Transfusion Related Acute Lung Injury) – symptoms are thought to be due to an antigen-antibody reaction and changes in the pulmonary capillary beds allowing increased levels of fluid and proteins to accumulate in the alveoli interfering with perfusion, appears similar to ARDS. Signs and symptoms are shortness of breath, hypoxia, and pulmonary edema; possible hypotension and tachycardia. Auscultation will reveal diffuse crackles and decreased breath sounds. Temperature may be elevated.

## **POLICY/PROCEDURE:**

1. Obtain order specifying the indications for the blood component.
2. Validate that the consent is obtained and signed.
3. Obtain blood sample for type and crossmatch (see VMC Policy).
4. VMC Lab notifies the nursing unit when the blood component is available by phone.
5. If more than one blood component is ordered, confirm order of administration with the LIP.
  - a. Perform a pre-Transfusion Assessment of the patient including vital signs and review of transfusion history if available.
  - b. Retrieve the blood component from the VMC Lab. Perform a double check with a lab employee and sign out the component from the VMC lab.
    - Epic – Take the blood component Epic Pick-Up Slip (auto prints when the component is “released” from the Transfuse Order) to the lab to pick up component. Leave Pick-Up Slip in lab. Note: To reprint slip, go to Chart Review, select Blood Tab, and reprint from the Transfuse Order.
    - Emergency Situation - If an Epic Pick-Up Slip is unavailable, take a patient ID chart label to the Lab to pick up component. Send the Epic pick-up slip to Lab once it is available.
  - c. When the blood component is received on the nursing unit, the following procedure will be performed by the RN with another RN or LIP and one of the two individuals will be the qualified transfusionist who will administer the blood component to the patient:
    - i. Before taking the component into the patient’s room, each person will perform an independent check to verify the following:
      1. Informed consent has been obtained and signed.
      2. Inspect the component for abnormal appearance (leaks, abnormal color, clots).
      3. To ensure the right component was received, verify the component Transfusion Report (Tag) against the LIP order, including any ordered Special Attributes:
        - Verify against both the Epic Prepare Order (which includes Special Attributes) and Epic Transfuse Order (which does not include Special Attributes, but must also be verified to ensure there is an order to give the unit)
          - a. Leukoreduced (equivalent to CMV Negative)
          - b. Irradiated
          - c. CMV Negative (Leukoreduced may be substituted for CMV Negative, this is acceptable)
          - d. Volume reduced
          - e. Washed
          - f. Other special attributes
    - ii. In the patient’s room, each licensed person will perform an independent 2 person identifier check using the two identifier process:
      1. Involve the patient as able. If able, ask patient to state name, compare reply to armband to ensure patient is wearing correct band.
      2. Compare the following on the component Tag to the armband:
        - Patient Name
        - Medical Record Number
      3. Compare the following on the component Tag to the component label
        - Unit Number
        - Component Blood Type (ABO/Rh)
        - Expiration Date/Time
        - Special Attributes (see above)

4. For RBCs only, check that the Expiration Date/Time of Compatibility Testing on the component Tag has not passed.
5. On the component Tag, compare the ABO/Rh of the component against the ABO/Rh of the patient to ensure they are compatible.
6. Blood component is not infused unless all checks are correct.
7. Both licensed persons sign the component Tag and it is placed on the paper chart.
  - Epic - Both persons must also complete the Dual Sign-Off in Epic.
8. Keep Unit Record (small Tag below perforation) attached to unit during transfusion.

iii. A Transfusion Assessment is performed prior to the infusion (within 30 minutes)

d. Initiate the component infusion

- i. Remain with the patient and observe for the first 15 minutes of the infusion.
- ii. Perform a Transfusion Assessment at 15 minutes after the infusion is initiated.
- iii. Assess for signs of a reaction and **document Reaction Assessment** results every 30 minutes while blood components are infusing.
- iv. Perform a Transfusion Assessment at the completion of each unit transfused and again at 1 hour post-transfusion.
- v. Any component not used must be returned to the VMC Lab within 30 minutes of leaving the blood refrigerator.

6. Component Administration

- a. Blood components including platelets should be administered using an IV pump. Use of an IV pump allows for a controlled infusion rate and alarm notification if infusion problems arise. Prime blood administration Y-Set with 0.9% Normal Saline (NS) only, saturate filter, fill drip chamber 1/3 full. Do not use other IV solutions and never add medications to blood component or piggyback into blood administration line.
- b. Rate of infusion is determined by the urgency of need and the patient condition as it relates to cardiovascular and renal status in particular.
  - In emergent situations, the component is infused as rapidly as tolerated.
- c. In non-emergent situations, the first 25 mL is infused in 15 minutes (rate of 100mL/hr). To ensure a slow 15-minute infusion of the blood component, and not NS, prime blood component to the end of the blood administration tubing set before starting transfusion.
- d. If the patient tolerates transfusion, after 15 minutes, infuse the remainder as prescribed. When blood component bag is empty, flush tubing with NS (approximately 60 ml) to ensure full transfusion of component.
- e. All blood components must be administered within 4 hours of being removed from a Blood Bank refrigerator or before the expiration date/time on the bag whichever comes first.
- f. All blood tubing must be changed every 4 hours or every 4 units whichever comes first.

**EXCEPTION: NEW TUBING MUST BE USED FOR EACH UNIT OF PLATELETS**

7. Document the Transfusion:

- Complete all required documentation in the Epic Blood Administration Flowsheet, including all Transfusion Assessments and Reaction Assessments.

Note: After clicking on the syringe in the “Rate (ml/hr)” row of the Epic flowsheet, in the unit number field, scan both the unit number bar code (top left) and the product code (bottom left) from the blood bag label. Information from both bar codes will automatically populate the field, with a dash separating the two codes (e.g., W141613000222-E0420V00). Scanning both the unit number and product code enters a truly unique blood product, which will prevent duplicate unit number warnings from displaying.

If scanner is unavailable, in the unit number field, manually enter the unit number, insert a dash, then manually enter the product code (e.g., **W141613000222-E0420V00**).

8. **DURING TRANSPORTATION** of a patient receiving a blood component transfusion, a Registered Nurse must accompany the patient and provide thorough handoff. This ensures the patient is safely monitored in the event of a transfusion reaction.
9. Refer to the “Clinical Nursing Skills and Techniques” 7<sup>th</sup> edition by Perry and Potter for more detailed information about administration of blood components and transfusion reactions.
10. Transfusion reactions may occur immediately or be delayed as much as 6 hours or more after the completion of the transfusion. If you suspect that your patient may begin showing symptoms of a reaction:

Fever ( $\geq 1^{\circ}$ C or $\geq 1.8^{\circ}$ F)	Dyspnea (related to TRALI, TACO, Anaphylaxis, or other)	Cyanosis
Chills with or without rigors	Nausea/Vomiting	Diaphoresis
Hives/Itching	Pain – Back (Flank), Chest, IV	Generalized Bleeding
Hypotension	Tachycardia	Red, Pink, Dark urine
Hypertension	Anxiety (Impending sense of doom)	Oliguria/Anuria

- Stop transfusion immediately.** Take down blood component and attached blood tubing set. Do not discard.
- Assess the patient thoroughly (including vital signs and lung/skin assessments) to decide the severity of the reaction.
- Immediately notify LIP, or call Rapid Response Team as deemed appropriate.
- Maintain IV access, which may be needed to treat reaction, by using a new IV tubing set with 0.9% normal saline, infuse at TKO rate.
- Perform a patient and blood component ID check to ensure the right unit was given to the right patient.
- Treat the patient per LIP’s orders.
- Continue to closely monitor patient (including vital signs and lung/skin assessments).
- Contact the VMC Lab for the *PSBC Report of Suspected Transfusion Reaction* form supplied by Puget Sound Blood Center and the lab will send you this form. Follow the directions on the form, complete the form, and return to the VMC Lab immediately:
  - With the blood unit/attached blood tubing set/IV solution
  - Two lavender top tubes (one large, one small)

- As soon as available, send next fresh urine sample (do not delay submitting workup if urine not immediately available). If sent separately, send with copy of the PSBC Reaction form.

Note: After stopping the transfusion for a **Mild Urticarial reaction (hives/rash/itching only with no other symptoms)**, only the PSBC Reaction form (without samples or return of the blood unit) may be submitted to the VMC Lab. The LIP may choose to treat this type of reaction by ordering an antihistamine, and if reaction resolves/stabilizes, order restart of the transfusion at a slower rate. If restarted, monitor closely.

- Consultation regarding transfusion reactions is available 24/7 by contacting the Puget Sound Blood Center's Physician On-Call.
- Thoroughly document the reaction and treatment of the reaction in the Epic Blood Administration Flowsheet and complete an FYI in Epic (describe type of reaction in FYI). A Transfusion Reaction workup should also be ordered in Epic.

### ACUTE TRANSFUSION REACTIONS – Follow Steps 10.a. through 10.j. above

TYPE	CAUSE	SIGNS AND SYMPTOMS	TREATMENT (PER LIP)
<b>ACUTE HEMOLYTIC</b>	Usually an ABO incompatibility (majority caused by misidentification error at time of compatibility sample draw or pre-transfusion check)	<ul style="list-style-type: none"> <li>▪ Fever</li> <li>▪ Pain – <i>back/flank</i>, IV, chest</li> <li>▪ Dyspnea</li> <li>▪ Anxiety</li> <li>▪ Tachycardia</li> <li>▪ Nausea</li> <li>▪ Red/dark urine</li> <li>▪ Chills</li> <li>▪ Hypotension</li> <li>▪ Diaphoresis</li> <li>▪ Bleeding</li> <li>▪ Vomiting</li> <li>▪ Oliguria/Anuria</li> </ul>	<ul style="list-style-type: none"> <li>▪ Supportive</li> <li>▪ Maintain renal output with IV fluids / diuretics</li> <li>▪ Vasopressors</li> <li>▪ Treat for DIC as needed</li> </ul>
<b>ANAPHYLACTIC</b>	Patients with IgA deficiency and anti-IgA or severe sensitivity to plasma proteins in component	<ul style="list-style-type: none"> <li>▪ Acute respiratory distress</li> <li>▪ Bronchospasm</li> <li>▪ Chest tightness</li> <li>▪ Fever absent</li> <li>▪ Abdominal cramps</li> <li>▪ Wheezing</li> <li>▪ Stridor</li> <li>▪ Hypotension</li> <li>▪ Shock</li> </ul> <p style="text-align: center;"><i>(usually immediate onset)</i></p>	<ul style="list-style-type: none"> <li>▪ Epinephrine</li> <li>▪ Steroids</li> <li>▪ Antihistamines</li> <li>▪ Oxygen support</li> </ul>
<b>TRANSFUSION-RELATED ACUTE LUNG INJURY (TRALI)</b>	Passively transfused donor WBC antibodies react with patient's WBC resulting in agglutination and WBC aggregation in lungs with subsequent pulmonary damage	<ul style="list-style-type: none"> <li>▪ Dyspnea</li> <li>▪ Bilateral pulmonary edema</li> <li>▪ Hypotension</li> <li>▪ Normal pulmonary wedge pressure (non-cardiogenic)</li> <li>▪ Hypoxemia</li> <li>▪ Fever</li> </ul> <p style="text-align: center;"><i>(occurs during or up to 6 hours after transfusion)</i></p>	<ul style="list-style-type: none"> <li>▪ Oxygen</li> <li>▪ Intubation with mechanical ventilation prn</li> <li>▪ Vasopressors</li> </ul>
<b>TRANSFUSION-ASSOCIATED CIRCULATORY OVERLOAD (TACO)</b>	Cardiovascular inability to compensate for the increased fluid volume	<ul style="list-style-type: none"> <li>▪ Dyspnea</li> <li>▪ Hypertension</li> <li>▪ Non-productive cough</li> <li>▪ Jugular vein distention</li> <li>▪ Restlessness</li> <li>▪ Pulmonary edema</li> <li>▪ Headache</li> <li>▪ Tachycardia</li> <li>▪ Cyanosis</li> </ul>	<ul style="list-style-type: none"> <li>▪ Diuretics</li> <li>▪ Oxygen</li> <li>▪ Upright posture</li> </ul>
<b>ACUTE BACTEREMIA (SEPTIC)</b>	Bacterial contamination due introduction of bacteria during collection or processing	<ul style="list-style-type: none"> <li>▪ Chills or rigors</li> <li>▪ Nausea</li> <li>▪ Hypotension</li> <li>▪ Tachycardia</li> <li>▪ High fever</li> <li>▪ Vomiting</li> <li>▪ Shock</li> </ul>	<ul style="list-style-type: none"> <li>▪ Broad spectrum antibiotics</li> <li>▪ Supportive</li> <li>▪ Vasopressors</li> <li>▪ IV fluids</li> </ul>
<b>FEBRILE NON-HEMOLYTIC</b>	Antibodies to WBCs, or cytokines produced during storage	<ul style="list-style-type: none"> <li>▪ Fever (<math>\geq 1\text{ C}^\circ</math> or <math>\geq 1.8^\circ\text{ F}</math>)</li> <li>▪ Chills or rigors</li> </ul> <p style="text-align: center;"><i>(typically occurs toward end or shortly after transfusion ends)</i></p>	<ul style="list-style-type: none"> <li>▪ Antipyretics</li> <li>▪ Demerol for rigors</li> </ul>
<b>MILD ALLERGIC (URTICARIAL)</b>	Reaction to plasma proteins in component	<ul style="list-style-type: none"> <li>▪ Localized hives/rash</li> <li>▪ Itching</li> </ul>	<ul style="list-style-type: none"> <li>▪ Antihistamines</li> <li>▪ See 10.h. Note above</li> </ul>

## **RESPONSIBILITIES:**

RN must be one of the persons checking the blood components before the infusion. Another RN or LIP may be the second person for the verification.

## **EPIC DOWNTIME PROCESS MODIFICATIONS:**

1. When performing the pre-Transfusion two-person bedside verification to ensure right component was received, when comparing the transfusion Report (Tag) against the LIP order, compare Tag **against the Epic downtime LIP paper blood order.**
2. To pick-up component from Lab, take copy of **Epic downtime LIP paper blood order** to VMC Lab.
  - Emergency Situation - If a copy of the paper order is unavailable, take a patient ID chart label to the lab to pick up component. Send the copy of paper order to lab, once it is available.
3. Document the Transfusion: Complete all required documentation on the **paper downtime Blood Product Transfusion Record.**
4. If a reaction occurs, thoroughly document the reaction and treatment of reaction **on paper downtime Blood Product Transfusion Record and in a Progress Note in paper chart.**

## **Blood Component Administration Specific to Peri-Operative Services:**

1. OR Staff may pick up blood components from the VMC Lab by taking either the Epic Blood Pick-up Slip or a patient ID chart label.
2. In Peri-Operative Services the patient's identity and the correctness of the ID band on the patient's arm is verified using the two-identifier method, prior to bringing the patient into the Operating room. **The patient's identity** is again verified during the "Time Out" as part of the Universal Protocol. Due to limited access to the patient because of surgical positioning and draping, blood components may be verified using the face sheet in the patients chart only. In addition, due to limited patient access, the Transfusion Assessments will not include skin assessment or auscultation of the lungs.
3. In Peri-Operative Services, blood components are checked by the Circulating RN and Anesthesia Provider assigned to the patient. At times, depending on the patient's condition, blood components may be checked by two RN's or two Anesthesia Providers. One of the two individuals conducting the identification verification is the qualified transfusionist who will administer the blood component to the patient.
  - a. Epic - There is no Dual Sign-off in Epic in the Intra-op phase of care. Anesthesia scans both the unit number bar code (top left) and the product number bar code (bottom left) on the blood bag label into the unit number field (see step 7 of general policy above) and clicks the "Validate" button within Anesthesia's Intra-op record. If scanner is unavailable, in the unit number field, manually enter the unit number, insert a dash, then manually enter the product code (e.g., **W141613000222-E0420V00**).
4. The administration of blood to the patient is documented on Anesthesia's Intra-op record by the Anesthesiologist or CRNA.
5. In the Operating Room (OR) the patient is under continuous monitoring by Anesthesia, patient vital signs and condition changes are obtained and documented by the anesthesia provider on the Intra-op Anesthesia Record, and not on the Epic Blood Administration Flowsheet.

- In the PACU, the Epic Blood Administration Flowsheet will be used to complete any documentation for blood transfusions initiated in the OR, and to document any further components given.

**REFERENCES:**

- American Association of Blood Banks. (2011) Technical manual. 17<sup>th</sup> edition. Bethesda, MD: AABB Press.
- Dennison, Carol. (2008) Transfusion-related acute lung injury: A clinical challenge. Dimensions of Critical Care Nursing, 27(1), 1-7.
- Marik, Paul and Corwin, Howard. (2008) Acute lung injury following blood transfusion: Expanding the definition. Critical Care Medicine, 36(11), 3080-3084.
- Ruffolo, Daria. (2009) Seeing complications of blood transfusions. Nursing 2009 Critical Care, 4(3), 28-34.
- Triulzi, Darrell. (2009) Transfusion-related acute lung injury: Current concepts for the clinician. Anesthesia and Analgesia, 108(3), 770-776.
- Primer of Blood Administration. American Association of Blood Banks. September 2012.
- Blood Administration Policy Suggested Essential Elements of Inclusion. Puget Sound Blood Center. 2013.

**HISTORY:**

Approved by:	<b>PPC, Sr. VP PCS</b>
Title of responsible individual or committee:	Hospital Transfusion Safety Officer; Med. Surg. Clinical Educator
Original date issued:	February 9, 2010
Last review/revision effective date:	5/2014
Next review date:	5/2017
VMC cross-references:	PSBC Request for Blood
EMR Implications?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No