Puget Sound Blood Center
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Blood Administration Guidelines for King County Hospitals

This document has been prepared by the Puget Sound Blood Center Transfusion Safety and Patient Blood Management Department to provide the critical elements for the administration of blood components and is applicable to all licensed clinicians responsible for the administration of blood components.

The responsibilities for this critical activity are divided as follows:

Puget Sound Blood Center

- Perform pre-transfusion testing and secondary processing on blood components as ordered by provider
- Issue blood component to hospital laboratory
- Conduct Suspected Transfusion Reaction work-up/follow-up
- Provide 24 hr/day transfusion related consultation

Ordering Provider

- Evaluate patient for potential transfusion-related therapies.
- Order and evaluate laboratory testing
- Conduct informed consent for administration of blood components
- Order blood component and write administration/transfusion instructions
- Evaluate and manage patients experiencing a possible transfusion reaction

Hospital Laboratory

- Collect and/or verify compatibility sample for acceptability
- Process order for testing
- Store blood components
- Issue blood components

Transfusionist

- Assess patient prior to transfusion (per defined *Transfusion Assessment*)
- Provide patient education including the signs and symptoms of a transfusion reaction.
- Complete request for blood components
- Perform two person verification of blood component at time of administration
- Administer blood component
- Monitor and evaluate patient during and after transfusion
- Document transfusion in the patient's medical record

All personnel who administer blood components must be trained to identify transfusion recipients and components, and to closely observe patients during and for a period of time after blood administration for signs and symptoms of a transfusion reaction.

ASSEMBLE EQUIPMENT AND SUPPLIES: Certain preparations must be conducted prior to starting a blood transfusion. These preparation steps are described here.

- Equipment
  - ✓ IV pump, when approved by manufacturer for administration of blood components. Preferred method of administration. Required for central line transfusions.
  - ✓ Vital sign monitoring equipment & stethoscope
  - ✓ Blood/fluid warmer, rapid infuser, compression/pressure sleeve/bag, if indicated
- Supplies
  - ✓ Blood Administration Tubing Set with 170-260 micron filter (Y-set for multiple units, straight set (if available) for single use). Follow manufacturer's instructions to determine maximum number of units approved for Y-Set. A new set should always be used with each platelet transfusion. All blood component tubing expires 4 hours after the initiation of the first unit.
  - ✓ Syringe for Neonates. A syringe set may be used to infuse after drawing component in syringe through appropriate filter (e.g. Charter Medical Neonatal Syringe Set with 150 micron filter).
- Medications and solutions
  - ✓ IV Solution. 0.9% Normal saline is the only IV solution that may be transfused with blood components.
    NOTE: In certain circumstances, FDA approved specific versions of Normosol and Plasmalyte may be administered.

IMPORTANT NOTES REGARDING CONCURRENT ADMINISTRATION OF MEDICATIONS OR OTHER IV FLUIDS

When IV fluid must be kept running during a blood transfusion, use a second IV line. If a second IV site cannot be started, and another medication is needed, then the blood component must be stopped, the line adequately flushed to clear the tubing (e.g., 20 mL of 0.9% normal saline). The medication administration must be followed with another 0.9% normal saline flush sufficient to clear the tubing before the blood component is restarted.

Lactated Ringers or other electrolyte solutions containing calcium are NEVER added or used concurrently with blood.

Medications are NEVER added to blood components.

ASSESS PATIENT AND CONDUCT PRE-TRANSFUSION EDUCATION: Patients should be evaluated and informed about the blood transfusion process, the signs and symptoms of a transfusion reaction, have an opportunity to ask questions, and have their questions answered before the transfusion is started. All of the following items should be conducted and documented.

- Informed consent documented
- Blood Component order and administration order documented in patient's chart
- Indication for transfusion deemed clinically indicated and documented based on lab results and patient assessment
- Patient's transfusion history reviewed, if applicable, and any previous transfusion reactions have been noted
- Transfusion Assessment (defined in Appendix A) completed and documented.
- Venous access (peripheral IV or central line) is patent, and available (peripheral access of 20g or larger is preferred for optimal flow, but not required)
- ID band present and accurate.
- Patient pre-medicated per MD order (if applicable)
- Transfusionist (or appropriate designee) available to monitor patient continuously for the first 15 minutes of the transfusion and at least every 30 minutes throughout transfusion, including 1 hour post transfusion.
- Patient Education on transfusion including the signs and symptoms of transfusion reaction and the requirement to notify the transfusionist without delay if they if any sign/symptom occurs. PSBC recommends reviewing *When You Need a Transfusion* and Post-Transfusion Discharge Instructions (for outpatient transfusions) with patient prior to obtaining the blood.

OBTAIN BLOOD FROM THE HOSPITAL BLOOD BANK/LABORATORY: The activities outlined below are critical to ensuring the right blood product is requested and issued for the right patient.

- The request: Each request should include all of the following:
  - ✓ Patient name
  - ✓ MRN#
  - ✓ Kind of Component, including special attributes (if ordered)
  - ✓ Patient location(example OR room 5, CCU 444)
- Blood Component Unit Verification at the time of Hand-off (Chain of Custody): This applies to validated pneumatic tube or person to person process. Each time a blood component is transferred from the laboratory the following should be verified:
  - ✓ Patient name
  - ✓ MRN#
  - ✓ Kind of Component, including special attributes (if ordered)
  - ✓ Confirmation that unit has not expired
  - ✓ Confirmation of time removed from refrigeration (only applicable to red blood cells and plasma)

IMPORTANT NOTE: If any discrepancies are detected during verification process, STOP. Resolve the discrepancy before proceeding.

VERIFY INFORMATION IMMEDIATELY PRIOR TO ADMINISTRATION. The following steps should be performed exactly as written to ensure the right patient receives the right blood component. To do this, each individual must independently verify the following at the patient's bedside:

- ✓ Informed consent for administration of blood components
- ✓ Rate and/or duration of transfusion
- ✓ Date and time of transfusion ordered
- ✓ Information on transfusion report (attached to blood component) matches the Provider's Order
  - Correct patient (Name and MRN)
  - Correct component (e.g. red blood cells, platelets)
  - Correct special processes, as ordered (e.g. Leukocyte Reduced, Irradiated)
  - Meets requirement for specific antigen negative units, when ordered (not common)

- Patient identity matches the transfusion report exactly
  - ✓ If possible, when the patient is "awake" and oriented to self, he/she should be asked to speak his/her name and date of birth (DOB) and the spoken information should be compared to the patient's wristband.
  - ✓ The patient's name and MRN # on the wristband should be compared to the name and MRN# on the left side of the transfusion report (attached to blood component unit)

- Information on transfusion report (attached to blood component unit) matches the component label exactly
  - ✓ Correct component (e.g., red blood cells)
  - ✓ Unit #, typically 13 digits (example, W141612555500)
  - ✓ ABO/Rh
  - ✓ Component expiration date and time, verify that date/time has not passed
  - ✓ Special processes, if applicable (example, leukoreduced) * appropriate substitutions may be noted

    NOTE: If an aliquot or division designation appears after the Unit # on the Transfusion Report, it should be checked against the component label. The following are examples of aliquot designations.
    - ✓ RBC Divided Assigned Aliquot (Part A0, or B0...through H0)
    - ✓ Divided Apheresis Platelet (1st Container or 2nd Container)

- For components requiring compatibility testing (RBCs, and Granulocytes), these additional items should be checked

- ✓ Compatibility testing results
- ✓ Compatibility expiration date and time has not passed.

- Visual inspection of unit – unit is normal in appearance. For additional assistance contact hospital blood bank
- Documentation of individuals involved in verification (one must be transfusionist), date and time of verification – both must sign the transfusion report and place the Chart Record (large top section above perforation) in medical record. The unit record (bottom section) must remain attached to blood component during the entire transfusion.

  IMPORTANT NOTE: If any discrepancies are detected during these verification steps, STOP. Resolve the discrepancy before proceeding.

INITIATE AND MONITOR THE TRANSFUSION: The following steps should be performed in the order listed.

1. Prime tubing with either blood component or normal saline. Make sure to saturate filter and fill the drip chamber approximately ½ full. Refer to manufacturer insert for specific directions.
2. Clamp off saline. (if used)
3. Allow the blood component to run to the end of the tubing making sure the saline (if used to prime) has cleared the tubing.
4. Load IV set in manufacture-approved IV pump
5. Attach the blood component administration tubing directly to IV catheter. Do not "piggyback".
6. For a routine, non-emergent transfusion, initiate the transfusion slowly for the first 15 minutes (See Appendix F).
7. Directly observe patient for the first 15 minutes of the transfusion.
8. After 15 minutes, assess patient as per Transfusion Assessment (defined in Appendix A).
9. If no transfusion reaction suspected, increase rate per provider order (rate or duration).
10. Continue to monitor patient as per Transfusion Assessment and Reaction Assessment (defined in Appendix A).
11. Provide the patient with transfusion specific discharge instructions when applicable(i.e., outpatient transfusions)

IMPORTANT NOTE: If it becomes necessary for the patient to leave the patient care area, the patient should be monitored by the transfusionist or appropriate designee to ensure the transfusion is proceeding and to identify any signs/symptoms of a transfusion reaction.

COMPLETE THE TRANSFUSION: When the transfusion is completed, additional steps should be performed to assess and patient and document the outcome.

1. Clamp off blood component.
2. Flush remaining blood component in through tubing with normal saline.
3. Remove tubing, blood component unit, and normal saline and dispose of per hospital policy.
4. Record the completion date/time, how patient tolerated the transfusion (may be recorded as "no change from baseline") and the total volume transfused in the patient's chart.

DOCUMENT THE TRANSFUSION: Each step of the transfusion preparation and administration should be documented. Listed below are the documentation items that have been addressed earlier in this document.

- Patient education and confirmation of understanding
- Informed consent
- Blood component order and administration order
- Kind of blood component requested and transfused
- Unit # and (if applicable) aliquot or division designation (example, AO or 2nd container)
- Transfusion Report, signed, dated, and timed by transfusionist and 2nd verifier just prior to administration
- Date and time of transfusion initiation
- Date and time of each Transfusion Assessment (see Appendix A)
- Date and time of each Reaction Assessment (see Appendix A) – may be charted as "no change from baseline" when appropriate.
- Date and time of transfusion completion
- How transfusion was tolerated
- Total volume of blood component transfused

Suspected Transfusion Reaction Guidelines for King County Hospitals

This document has been prepared by the Puget Sound Blood Center Transfusion Safety and Patient Blood Management Department to provide the critical elements for the investigation of suspected transfusion reactions

IMPORTANT NOTES REGARDING SUSPECTED TRANSFUSION REACTIONS

All signs and symptoms of a suspected transfusion reaction are cause for immediate concern. It is essential that the blood component being investigated not continue to infuse during the investigation. The transfusion should be discontinued, patient assessed, monitored, treated and investigation initiated.

INITIATION AND INVESTIGATION OF SUSPECTED TRANSFUSION REACTIONS: The following steps should be performed:

1. Stop the transfusion. Do not discard unit or infusion set.
2. Assess patient and record vital signs (B/P, HR, P, T, SaO2) as well as a lung and skin assessment. Continue to monitor patient.
3. If appropriate call the Rapid Response Team or Code.
4. Notify the provider, contact PSBC Physician on-call if necessary @ 206-292-6525(#3).
5. Perform a clerical check (see Appendix E)– ensuring that the transfusion report matches the blood bag label and armband, and that the appropriate armband is on the appropriate patient.
6. Hang new IV set with new 0.9% Normal Saline bag to keep line open (TKO).
7. Treat symptoms per provider's orders.
8. Initiate a hospital specific laboratory order for suspected transfusion reaction.
9. Facilitate the collection of 1 or 2 (per facility policy) EDTA lab tubes (lavender or pink). (follow 2 person verification)
10. Obtain urine sample, send to lab if red/dark in color.
11. Complete the Puget Sound Blood Center's pink Report of Suspected Transfusion Reaction form.
12. Send completed PSBC form, place all specimens, blood component bag, tubing, and saline bag in a biohazard zip lock bag to hospital laboratory STAT.
13. Document findings and actions in medical record.

Testing

1. The Hospital Laboratory may (based on hospital specific protocol) perform the initial hemolysis check on one of the two EDTA lab samples collected as well as the urine (if applicable).
2. The remaining EDTA lab sample should be routed to PSBC STAT. PSBC will perform a hemolysis check, a DAT (Direct Antiglobulin Test) and an ABO-Rh of the sample.

Follow-Up Reports

1. The hospital laboratory should notify the appropriate individual indicated on the Report of Suspected Transfusion Reaction form with the initial hospital laboratory testing results.
2. The Puget Sound Blood Center Transfusion Service will call the contact number written on the completed PSBC Report of Suspected Transfusion Reaction form with the initial PSBC transfusion reaction results. This information should be documented in the medical record and communicated to the provider.
3. If patient experiences severe/life threatening symptoms (such as those indicated in the right columns of signs/symptoms on the PSBC Report of Suspected Transfusion Reaction form) and does not return to baseline, the PSBC Physician on-call will contact the bedside caregiver or the provider to assist with treatment. If the patient's condition changes significantly from initial report, the PSBC Physician on-call should be notified at 206-292-6525 (option 3).
4. For all non-life threatening reactions, a full report include the serologic findings as well as an impression of the transfusion reaction conclusion of the transfusion reaction investigation will be completed by the PSBC Transfusion Service Medical Director within 3-5 days. The full report will be sent to the hospital laboratory, but also made available on PSBC Hospital Links (see appendix A).

References

- Standards for Blood Banks and Transfusion Services. Bethesda, MD: AABB current edition.
- AABB Technical Manual 17th edition, *Administration of Blood Component (*Chapter 21 pp. 613-639) AABB, Bethesda, MD 20814
- Circular of Information, AABB, America's Blood Centers, American Red Cross, 2009
- Laboratory accreditation checklist. Northfield, IL: College of American Pathologists, current edition.

Additional information may be obtained:

- CTL Lead or Puget Sound Blood Center Transfusion Service Physician on call 24 hours per day/7 days per week. Phone: 206-292-6525 (option 3)
- Puget Sound Blood Center Transfusion Safety and Patient Blood Management Department; Monday – Friday from 8:00 a.m. to 5:00 p.m. Phone: 206-292-1840
- Hospital Laboratory
- www.psbc.org

APPENDIX A: GLOSSARY OF TERMS ASSOCIATED WITH BLOOD TRANSFUSION

Term	Description
Blood Component Unit Verification	Process to ensure the correct component is administered to the correct patient, in the correct amount, that the expiration times are not exceeded, and that the unit is normal in appearance.
Hospital Links	Web-based application developed by the Puget Sound Blood Center to provide authorized users at contracted hospitals and medical facilities immediate online access to patient blood orders and laboratory results. https://psbclinks.psbc.org/PSBCLinks/
Informed Consent	Process conducted by the ordering provider to ensure the patient is informed before receiving blood components. A description of the blood components, associated risks and benefits, alternatives to transfusion, including no transfusion, and the opportunity to ask questions and obtain satisfactory answers are key elements of this process.
Transfusion Reaction	Any adverse event which occurs during or following a blood component transfusion.
Transfusion Report	Form attached to blood component to identify recipient and provide blood component information. One portion (Chart Record) of the report is signed by transfusionist and 2nd verifier and maintained in the patient record. The other portion (Unit Record) remains attached to the blood component throughout the transfusion.
Verification of Delivery Process	Process that occurs when a blood component is delivered from one individual to another to ensure that the correct blood component, for the correct patient is being delivered / received.
Verification at the Time of Administration	Process of two-person verification (one of whom must be the transfusionist) immediately prior to administration at the bedside.
Transfusion Assessment	Patient assessment performed by transfusionist no more than 30 minutes prior to initiation of transfusion, 15 minutes after initiation, at completion, and 1 hour post transfusion to gather appropriate data in order to evaluate response and potential adverse events. The following tasks are performed at each assessment. • Vital sign assessment (heart rate, blood pressure, respiration count, temperature, and O2 saturation) • Skin assessment • Lung sounds

Term	Description
Reaction Assessment	Patient assessment performed by transfusionist at least every 30 minutes throughout transfusion to evaluate for possible transfusion reaction. Includes checking the patient for the following signs or symptoms of a reaction including: • Respiratory distress, dyspnea, cough • Itching, hives • Chills, rigors, diaphoresis • Pain, restlessness, anxiety • Discomfort, nausea, vomiting, abdominal cramps, headache • Dark or bloody urine (when available for assessment)

APPENDIX B: Transfusion Related Lab Tests/Results

Item	Description
Hemosafe® Eligible (applies on to those facilities with a Hemosafe®)	Patient has an ABO/Rh and a current, negative type and screen for red cell antibodies with no history of antibodies. An electronic crossmatch is performed and red cells are assigned from the Hemosafe® at the time of administration order. When red cell antibodies are identified, then the patient is not Hemosafe® eligible. A serologic crossmatch is performed and the unit assigned and issued from PSBC transfusion service. Note: Patients that require special components such as Washed, Hemoglobin S negative, Autologous, or Directed RBC units are not eligible for Hemosafe®; however these units (except washed) will be stored in the Hemosafe after issue from PSBC transfusion service.
Hold Sample	Pretransfusion specimen collected when future blood transfusions are a remote possibility. The specimen is delivered to the laboratory but no testing is performed. Having a specimen in the laboratory improves turnaround time should a Type and Screen or blood components be needed.
Type and Screen	Pretransfusion specimen collected for laboratory testing to determine the patient's ABO, Rh, and red cell antibody status, If the red cell antibody screen is positive, an antibody identification procedure is performed.
Type and Crossmatch	Pretransfusion specimen collected that includes a type and screen and a compatibility test. When a component containing a significant number of red blood cells (i.e., RBCs, and granulocytes) is ordered, this testing is automatically completed. Patients with red cell antibodies require a serological crossmatch and may require a selection of antigen-negative units. These additional procedures may increase processing time.
Compatibility Expiration	Applies only to RBCs and granulocytes where crossmatching is performed. Will expire 3 full days after the day of sample collection. Example, sample collected on a Monday, expires at 23:59 on Thursday.
Unit Expiration	Time at which the component is no longer deemed safe to transfuse. This time varies based on the kind of component. <u>30 minute expiration</u>: Refrigerated components (RBCs and Plasma) must be returned to hospital laboratory within 30 minutes in order to maintain proper temperature <u>4 hour expiration</u> : Refrigerated components (RBCs and Plasma) must be transfused within four hours of removal from refrigeration

Item	Description
Blood Component Storage	All blood components are stored in the hospital laboratory until requested for release. Blood components must never be stored in a patient care unit medication or food refrigerator. For emergency bleeding events, where multiple units are required, the units should be stored in an approved portable blood bank refrigerator/validated cooler. In order to maintain proper temperature, if not transfused just after issue, refrigerated components (RBCs and Plasma) must be returned to hospital laboratory within 30 minutes to avoid wastage.

APPENDIX C: Blood Component Descriptions and Indications

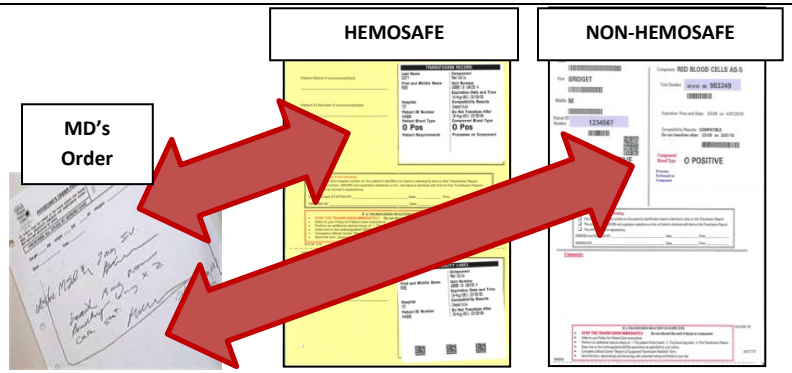
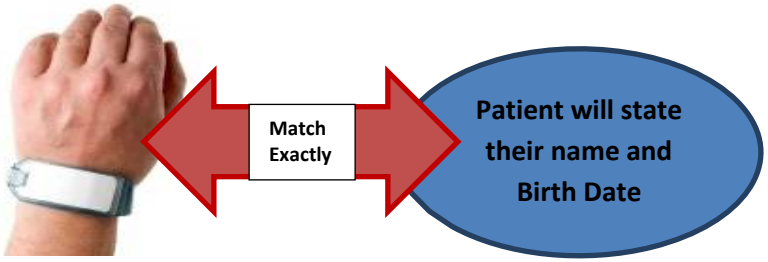
NOTE: Additional information about blood components is available on the Puget Sound Blood Center website ***www.psbc.org***

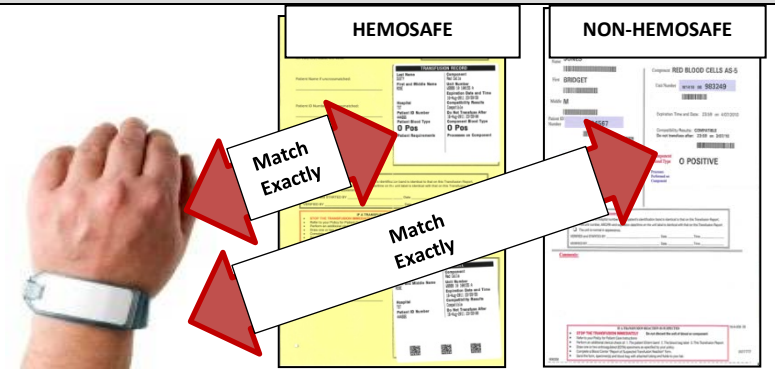
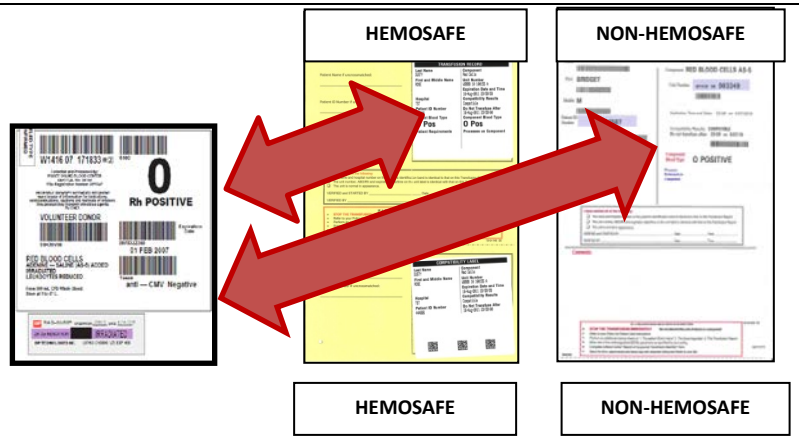
Component	Function	Indication	Additional Information
Red Blood Cells (RBC)	Carries oxygen from the lungs to the tissues, and carbon dioxide from the tissues to the lungs	Symptomatic anemia not treatable within a reasonable amount of time considering the patient's symptoms, with specific therapy such as iron, vitamin B12, folic acid or erythropoietin	Requires type and crossmatch (non-urgent situations) Monitoring requires evaluation of hemoglobin/hematocrit and physical assessment of patient
Plasma (Thawed Plasma or Fresh Frozen Plasma/FFP)	Fluid portion of that contains coagulation factors required for proper clot formation	Bleeding or imminent invasive procedures with clinically significant coagulopathy, treatment or prevention of coagulopathy in massive transfusion, factor deficiency when concentrate unavailable, or plasma exchange (especially for TTP)	Requires historical ABO (non-urgent situations) Monitoring requires evaluation of PT/INR, a PTT (if indicated) and physical assessment of patient
Platelets	Small megakaryocyte fragments required for proper clot formation	Treatment of thrombocytopenia, platelet function abnormalities, or bleeding due to thrombocytopenia	Requires historical ABO/Rh type (non-urgent situations Monitoring requires evaluation of platelet count and physical assessment of patient.
Cryoprecipitate	Prepared from plasma, contains fibrinogen, factor VIII, von Willebrand factor and small amounts of factor XIII and fibronectin	Treatment or prevention of bleeding due to hypofibrinogenemia and in disseminated intravascular coagulopathy (DIC)	Monitoring requires evaluation of Fibrinogen level and physical assessment of patient
Granulocytes	White blood cells (neutrophils) obtained by apheresis from designated ABO-Rh compatible donor	Indicated for severe neutropenia with a documented life threatening bacterial or fungal infection not responsive to appropriate antimicrobial therapy	Begin transfusion ASAP, must be transfused within 24 hours of collection Monitoring requires evaluation of granulocyte count and physical assessment of patient

APPENDIX D: Modifications to Blood Components

Description	Indication
Leukoreduction: Removal of white cells either through filtration or special collection techniques *NOTE: Leukoreduction is not indicated in components that contain no viable white cells (Plasma and Cryoprecipitate)*	• Prevention of febrile transfusion reactions • Reduce HLA alloimmunization with resultant platelet refractoriness or organ transplant rejection • Prevention of transmission of Cytomegalovirus (CMV)
CMV Seronegative: RBCs and Platelets from a Cytomegalovirus (CMV) seronegative donor. Blood products are considered "CMV safe" if either CMV sero-negative or leukocyte reduced	• Premature infants, low birth weight neonates, intrauterine transfusions, neonatal exchange transfusions • CMV seronegative or unknown with severe immune compromise or HIV/AIDS • Congenital immune deficiency • Recipients/candidates for hematopoietic or solid organ transplant • Pregnancy
Irradiation: Inactivation of lymphocytes to prevent Transfusion-related Graft Versus Host Disease (TA-GVHD), a very rare, but fatal (90-100%) complication of blood transfusion. *NOTE: Irradiation is not indicated in components that contain no viable white cells (Plasma and Cryoprecipitate)*	• Neonates, intrauterine transfusions, neonatal exchange transfusions • Congenital immunodeficiency • Severe other immunodeficiency • Hematological malignancy • Hematopoietic stem cell transplant • Patients receiving immunosuppressive drugs • All Granulocytes • Transfusions from family members (directed donations) or HLA-selected donors
Washed Red Blood Cells and Platelets: Washing with saline to remove donor plasma. This requires PSBC physician approval. *CAUTIONARY NOTE: For red cells, approximately 20% of the cells are lost. For platelets, both platelet recovery and function are severely impaired.*	• Severe, life threatening plasma allergies uncontrolled by medications or volume reduction as determined by PSBC.
Volume Reduced Platelets: Removal of donor plasma. *CAUTIONARY NOTE: Approximately 10% of platelets are lost, platelets are activated and function is lost.*	• Persistent allergic transfusion reactions • ABO incompatibility between platelet donor and patient • Exquisitely sensitive to volume

APPENDIX E: Blood Component Verification Job Aid

Who	Two Person Verification AT THE BEDSIDE just prior to the transfusion	Procedure
Transfusionist/RN & RN/MD Verifier		Verify that the component is normal in appearance; visually inspect the component for normal color, absence of cloudiness, clots, excess air or leaks.
Transfusionist/RN & RN/MD Verifier		Verify Informed Consent Verify rate and/or duration of transfusion Verify that the blood component dispensed by the lab matches the Provider's Order. Verify the following: ▪ Date/time of Provider's Transfusion Order ▪ Compare Transfusion Report Chart Record to Provider's Order : o Name and MRN o Component Type o If ordered, special processes (e.g., Leukocyte Reduced, Irradiated)
Transfusionist/RN & RN/MD Verifier & Patient		If the patient is able, ask them to speak their name and DOB Verify the armband matches EXACTLY.

Who	Two Person Verification AT THE BEDSIDE just prior to the transfusion	Procedure
Transfusionist/RN & RN/MD Verifier		**Verify that the following on the PSBC Transfusion Report Chart Record (Tag) match EXACTLY with the patient's armband:** • **Name** • **Medical Record Number**
Transfusionist/RN & RN/MD Verifier		**Verify that the following on the Component Label and Transfusion Report (Tag) match exactly :** • **Component Type** • **13 digit Unit Number (part number if applicable e.g. AO, BO)** • **ABO/Rh type** • **Expiration date and time has not passed or will not pass before component can be transfused** • **Expiration of compatibility testing has not passed (Red Cells and Granulocytes) – on Transfusion Report only** • **Special Processes on components (e.g., Leukocyte reduced) *Additional substitutions may be noted.** **If there are any discrepancies in the verification**
Transfusionist/RN & RN/MD Verifier	I have verified all of the following: ☐ The name and hospital number on the patient's identification band is identical to that on this Transfusion Report. ☐ The unit number, ABO/Rh and expiration date/time on the unit label is identical with that on this Transfusion Report. ☐ The unit is normal in appearance. VERIFIED and STARTED BY_____ Date_____ Time_____ VERIFIED BY_____ Date_____ Time_____	• **Check the three verification boxes** • **Both individuals - sign legibly on the signature lines on the Transfusion Report at the time of verification and write date and time.**

APPENDIX F: Typical Rates, Volumes, Durations for Routine (non-emergent) transfusions

Blood Component	Adult			Pediatric	
	Estimated Volume	Duration	Effect (Non-bleeding 70 kg adult)	Dose, rate	Max dose and/or max rate
All, first 15 minutes		100 mL/hr		2 mL/kg/hr	Do not exceed 100 mL/hr
Red Blood Cells	350mL	1 ½ -4 hrs	One unit will increase hematocrit by approximately 3% or hemoglobin by 1gm/dL.	2-5 ml/kg/hr	Do not exceed 300 mL/hr
Plasma	200-250mL	30-60 min. (max 4 hrs)	One unit increases clotting factors approximately 2-5%.	4-8 ml/kg/hr	
Platelets	250-350mL	1 hour	One apheresis or a pool of 4 units will increase platelet count by approximately 30,000 – 60,000.	4-8 ml/kg/hr	
Cryoprecipitate	90-120mL	15-30 min.	One pool (5-6 units) increases fibrinogen count approximately 50mg/dL.	4-8 ml/kg/hr	
Granulocytes	220-450mL	1-2 hrs.		Dose: 10-20mL/kg Rate: 5-10 mL/kg/hr	Max Dose: 20 mL/kg Max Rate: 10 mL/kg/hr