

TRANSFUSION SERVICE

FACULTY (Section of Transfusion, Hemostasis, and Apheresis Medicine)

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SOURCES OF BLOOD

Our hospital receives blood components from the American Red Cross, Mississippi Valley, Versiti, and University of Chicago Blood Donation Center.

REGULATION

We are bound by the policies of the hospital (PC083 and PC235, etc), and requirements/regulations of Joint Commission, AABB, CAP, and the FDA.

REQUESTS FOR BLOOD COMPONENTS

Laboratory Tests:

Pre-transfusion testing is required before routine issue of blood components. Pre-transfusion testing should be submitted to the Transfusion Service with tube(s) of EDTA anticoagulated blood in order to perform ABO type, RBC antibody screen and crossmatching.

An ABO verification test may need to be performed if a patient does not have prior ABO type on-file at UCM. The ABO verification sample must be obtained from a second needle stick after a second patient identification. In cases of ABO discrepancies, another entire set of tubes from a new blood draw and request slips must be submitted. There will be no exceptions to this rule.

The label on each tube of blood must have complete patient name and MRN. It is a requirement that each tube of blood be labeled in the presence of the patient, with the identification of the phlebotomist and the date and time of the blood draw written on the label. The patient identification must be identical on tubes of blood and request slips.

In cases of emergency, type O red cells will be issued until properly labeled tubes and request slips are available. It takes approximately 45-60 minutes to perform Type and screen. If RBC antibodies are identified or the patient has a history of clinically significant RBC antibodies, the testing and crossmatching will take longer.

Ordering:

- Emergency Transfusions: Emergency release (EREL) and Massive Transfusion Protocol (MTP).
Activation options:
 - Call blood bank
 - Retrieve products from department fridge (if available).An order via Epic EMR is required, but can be placed retrospectively. If pre-transfusion testing has not been performed for a patient with EREL or MTP activation, a sample must be obtained as soon as possible in order to preserve emergency blood inventory and provide optimal patient care.
- Transfuse RBC/FFP/Platelet/Cryoprecipitate: Available in Epic.
- Special Blood Preparation: Blood preparation is expected to be delayed in patients with RBC antibodies or other special blood needs. Consider this auto-released order for all patients with RBC antibodies.
- Preparation and Dispense: For patients going into scheduled surgeries (dispense to OR)

Available Blood Components:

- Packed Red Blood Cells: Prior to issuing units, the patient must have two ABO/RhD results on-file and an active RBC antibody screen. The results from sample and crossmatching expire after 72 hours for patients who are pregnant, recently transfused, and with clinically significant antibodies. Should be used within 3hrs of issue.
- Whole Blood: This product is only available for selected trauma patients.
- Plasma: It takes 30-40 minutes to thaw and prepare; Transfusion Services keeps a certain number thawed at all times. The thawed plasma should be used within 3 hours after issue.
- Cryoprecipitate: Pools of 5 single cryoprecipitate units are used for adults. Single cryoprecipitate (unpooled) are available for pediatric patients. Cryoprecipitate should be used within 3 hours of issue.
- Platelets: This component is collected via apheresis from one donor. HLA matched and crossmatch compatible platelets can be made available for patients who have HLA antibodies with high PRA, but

before ordering these special products, consult transfusion service for eligibility and coordination. HLA matched platelets are requested from blood supplier and availability is variable. A platelet count collected 10 minutes to 1 hour post platelet transfusion is necessary to document refractoriness.

- Granulocytes: This product is not readily available as it must be requested from a blood supplier. A consult to the transfusion service is required.

UNIVERSITY OF CHICAGO TRANSFUSION GUIDELINES

While transfusion care must be individualized to each patient, general guidelines are as follows:

Adult Patients:

- RBC Transfusion:
 1. Hgb < 7.0 g/dL (Hct < 21%) in otherwise stable adult; higher for pediatrics or adults with cardiac disease
 2. Symptomatic anemia
 3. Active bleeding
 4. Transfusion protocol (i.e. ECMO/exchange transfusion)
 5. Massive transfusion
 6. Other (specify)
- Platelet Transfusion:
 1. Prophylactic for thrombocytopenia < 10,000
 2. Central line placement: platelets < 20K
 3. Active bleeding, preoperative, LP, and thrombocytopenia < 50,000
 4. Neurologic procedure or CNS bleed < 100,000
 5. Massive transfusion
 6. Other (specify)
- Fresh Frozen Plasma:
 1. INR > 1.5 and bleeding
 2. Clinically significant hemorrhage requiring red cell transfusion
 3. Liver transplant
 4. Massive transfusion
 5. Single coagulation factor/protein deficiencies where no factor concentrate is available
 6. Other (specify)
- Cryoprecipitate Transfusion:
 1. Post-partum hemorrhage
 2. Hypofibrinogenemia < 150 mg/dL and bleeding

3. Hypofibrinogenemia <100 mg/dL without bleeding
4. Massive transfusion

LEUKOREDUCTION

Removal of WBC from cellular components

All cellular products are leukoreduced at UCM, with exception of granulocytes and possibly whole blood units (depending on supplier)

Leukoreduction

- Minimizes febrile transfusion reactions
- Minimizes or delays alloimmunization to WBC antigens
- Minimizes exposure to CMV
- Ameliorate the possible immunomodulatory effects of transfusion

SPECIAL TREATMENT OF BLOOD COMPONENTS

Irradiation	Gamma irradiation to prevent transfusion associated GVHD by inactivating lymphocytes. Indications: <ul style="list-style-type: none"> • Hematologic malignancy • Stem cell transplant recipients • Lymphoma/Hodgkin's Disease • Active treatment with chemoradiation in last year • Treatment with Fludarabine or ATG • Intrauterine transfusion • Neonatal transfusions or neonatal ECMO • Congenital cell-mediated immunodeficiencies • Directed donations • HLA-matched products
CMV seronegative	Donors that do not have antibody evidence of prior infection by CMV. Depending on the demographics, 40-90% of donors have CMV antibody. Leukoreduced cellular blood products are considered CMV safe and CMV seronegative blood products are only needed in selected patients.

Volume reduction	Reduces liquid supernatant level of cellular blood products. pRBC vol. red: Needed in selected patients with severe hyperkalemia. Platelet vol. red: Necessary in select pediatric patients with volume overload or for plasma incompatibility issues.
Washed	Washing of cellular blood products is a time intensive procedure that should be reserved for patients with prior severe allergic reaction to blood.
Split	Performed for pediatric patients or adults with volume overload or prior transfusion associated circulatory overload (TACO)

BLOOD COMPONENT ADMINISTRATION

All transfusions should be performed in keeping with UCM policies PC83 and PC235

- A signed and unexpired informed Consent to Blood Transfusion or Administration of Blood Products is required
- A pre-transfusion sample is required for all red cell products or for non-RBC blood products where patients do not have a verified ABO/Rh type on file with the UCM blood bank
- Blood product transfusion should be completed within three (3) hours of initiation
- The Report of Blood Transfusion form is used to document two-person blood verification and administration when Epic is not available. A unit tag or label with the name and identification number of the intended recipient, the component unit number, and the interpretation of compatibility tests (if performed) must be securely attached to the blood container. All identification attached to the container (with the exception of The Report of Blood Transfusion form) shall remain attached until the transfusion has been terminated. The blood product label shall not be written upon or defaced.
- Documentation should be completed in the appropriate Epic flowsheet or on the Report of Blood Transfusion form during Epic downtime. Documentation must include:
 - a. Identity of the transfusionist; the second verifier must also be documented
 - b. The type of blood component given
 - c. The donor identification number (DIN)
 - d. Date, start & stop time of administration
 - e. Volume transfused
- The transfusionist must directly observe the patient for the first 15 minutes of the transfusion to observe for any signs and symptoms of a transfusion reaction. At a minimum, the following vital signs should be taken and recorded
 - a. Pre-transfusion vitals
 - b. Vitals 15 min after starting transfusion, this includes
 - c. Vitals at conclusion of transfusion

TRANSFUSION REACTIONS

	Immediate	Delayed
Immune	Acute hemolytic reaction Febrile, non-hemolytic Urticaria (mild allergy) Anaphylaxis TRALI (transfusion-related acute lung injury)	Delayed hemolytic reaction Transfusion-associated Graft-vs-host disease Post-transfusion purpura Alloimmunization Immune suppression
Non-Immune	Bacterial contamination Volume overload Mechanical hemolysis Hyperkalemia Citrate toxicity Air embolus Hypothermia Bleeding diatheses	Viral infections Parasitic infections Iron overload

TRANSFUSION-TRANSMITTED INFECTION RISKS

Selected Agents	Estimates
HBV	1 in 200,000-500,000
HCV	1 in 2-4 Million
HIV	1 in 2-4 Million

REACTION TO TRANSFUSION

- Stop the transfusion immediately and keep line open with normal saline.
- Any unexpected reaction to blood or blood components can be life-threatening and must be reported to the Transfusion Service.
- Fill out a Transfusion Reaction evaluation request in Epic and send unit, attached tubing and samples to the blood bank.
- Transfusion reactions are evaluated with standard blood bank testing which may include visual inspection, clerical check, repeat blood type, direct Coombs test, unit blood type and repeat crossmatch.
- Additional testing maybe requested by Transfusion service. This may include chest x-ray, pro-BNP, tryptase, bilirubin, haptoglobin, LDH, urinalysis, bacterial culture, and Gram stain of the blood component.
- An evaluation of the results will be made by the Transfusion Service physicians