

**Criteria for Transfusion  
University of North Carolina Hospitals  
Chapel Hill, NC  
(Pediatrics)**

The following criteria represent institution consensus indications for the transfusion of blood and blood components. Such guidelines:

- (1) cannot substitute for clinical judgement and the need for flexibility in practice
- (2) should not be considered a recommendation to transfuse or not to transfuse;
- (3) will serve as the basis for the focused review of transfusion practices.

**Prior to the administration of blood or blood components, the indications, risks, and benefits of a blood transfusion and possible alternatives must be discussed with the patient and documented in the medical record. The standard consent form (The Request and Authorization for Operation or Other Procedure – HD 107) includes the transfusion of blood. Should a patient receive a transfusion alone, the transfusion itself can be indicated as the procedure. Consent should be obtained with the Request and Authorization for Operation or Other Procedure (HD107) by the patient’s Licensed Independent Practitioner (LIP).**

**IT IS RECOMMENDED THAT TRANSFUSIONS BE DOCUMENTED IN THE PATIENT'S CHART AS TO INDICATIONS AND OUTCOME WITH SPECIFIC NOTATIONS. SPECIFIC NOTATIONS MUST BE MADE WHEN EXCEPTIONS TO THESE CRITERIA EXIST.**

**Red Blood Cells**

1. Newborn infants less than four months of age:

a. Shock (with blood loss > 10% of blood volume (8.5 mL/kg))

Examples:

- suspected or confirmed fetomaternal hemorrhage
- placental blood loss from specific umbilical cord or placental abnormalities resulting in loss of fetal blood, such as laceration of vasa previa.

b. Removal of blood for laboratory testing when the volume removed exceeds 10% of the baby's blood volume (i.e. > 8.5 mL/kg) within a one week period and the circulating hemoglobin level is less than 13.0 g/dl in babies with compromised ability to deliver oxygen to tissues or with acute illness. This would include babies with acute hemorrhage, persistent fetal circulation, respiratory failure or pulmonary disease, cardiac disease, or dysfunctional hemoglobinopathies.

c. Hemoglobin level of less than 10.0 g/dl in stable premature infant or stable term infants with at least one of the following in the absence of another etiology

- i. Oxygen requirement
- ii. Tachypnea (RR > 80 for > 24 hours), increased work of breathing, increased ventilatory support, or inability to decrease respiratory support
- iii. Apnea (with increased incidence or severity of bradycardia)
- iv. Tachycardia (HR > 180, sustained)
- v. Patent ductus arteriosus
- vi. Poor weight gain (< 10g/d for 4 days while receiving  $\geq 100$  kcal/kg/d), poor feeding
- vii. Diminished activity or other signs/symptoms suggestive of decreased oxygen transport, lethargy
- viii. Major surgery associated with impaired oxygen transport
- ix. Active hemolytic process

d. Hemoglobin level of less than 7.0 g/dl in an asymptomatic infant with a reticulocyte count < 5%

- e. Neonate with respiratory distress and Hct < 45%.
- f. Exchange transfusion for severe hemolytic disease of the newborn.

**Notes:**

1. The volume of transfusion should equal 15cc/kg unless the infant is volume sensitive.
  2. **DO NOT TRANSFUSE** for phlebotomy replacement or low hematocrit alone until above criteria are met.
  3. When possible, the patient's hemoglobin should be determined within 24 hours prior to transfusion and within 24 hours after transfusion if the patient remains hospitalized.
2. All other pediatric patients:
- a. Acute blood loss with symptoms and signs of hypovolemia not responsive to crystalloid or colloid infusion.
  - b. Intraoperative blood loss of more than 15% blood volume.
  - c. Significant preoperative anemia (< 10 g/dl) in emergency surgical cases or in non-emergency cases when an alternate, effective therapy for anemia (e.g. iron therapy in a child with iron deficiency anemia) is not clinically appropriate.
  - d. Hemoglobin level of less than 13.0 g/dl, in children with severe pulmonary disease (e.g. requiring supplemental oxygen and assisted ventilation or CPAP), or in children with structural heart disease and cyanosis, congestive heart failure, patients undergoing extracorporeal circulation, or with congenitally dysfunctional hemoglobinopathies.
  - e. Chronic congenital or acquired anemia without an expected satisfactory response to medical therapy (e.g. iron therapy in a child with iron deficiency anemia) and
    - i. a hemoglobin level less than 8.0 g/dl or
    - ii. symptoms and signs of anemia (tachycardia, mental status changes, ischemic signs and symptoms, or impairment of growth attributable to anemia).
    - iii. selected patients to prevent the consequences of severe anemia and ineffective erythropoiesis (such as patients with thalassemia or sickle cell syndrome).
  - f. Sickle cell anemia and
    - i. cerebrovascular accident
    - ii. acute chest syndrome
    - iii. splenic sequestration
    - iv. recurrent priapism
    - v. pre-operative preparation for surgery with general anesthesia
    - vi. multisystem organ failure
    - vii. hepatic sequestration
    - viii. intrahepatic cholestasis
  - g. Children receiving treatment for cancer or undergoing a bone marrow transplant
    - i. in a stable asymptomatic child recovering from therapy-induced anemia, red cell transfusion is usually required only for a hemoglobin < 8 g/dl.
    - ii. hemoglobin < 8 g/dl in a patient beginning a course of induction or maintenance chemotherapy or during a period of marrow failure.

- iii. acute blood loss estimated at > 10% of patient's blood volume; or ongoing blood loss of this magnitude or at hemoglobin concentration < 9 g/dl in a child unable to produce red cells.
- h. Hemoglobin < 13 g/dl in a patient with respiratory insufficiency requiring ventilatory support.
- i. Severe iron deficiency at presentation with hemoglobin < 5g/dl.
- j. For all others, hemoglobin < 7 g/dL.

Notes on Usage:

When possible, patient's hemoglobin should be determined within 24 hours prior to transfusion and within 24 hours after transfusion if the patient remains hospitalized.

**Platelets**

1. Premature infants (gestational age < 37 weeks):

- a. Blood platelet count less than  $50 \times 10^9/L$  (50,000/ $\mu$ l) in an unstable premature infant.
- b. Blood platelet count less than  $100 \times 10^9/L$  (100,000/ $\mu$ l) in a stable (non-bleeding, without cardiac/vascular or respiratory problems) premature infant.

2. All other cases:

- a. Blood platelet count less than  $10 \times 10^9/L$  (10,000/ $\mu$ l) in a stable, non-febrile (>24 hours) patient or less than  $20 \times 10^9/L$  (20,000/ $\mu$ l) in an unstable or febrile (<24 hours) patient or in an outpatient.
- b. Blood platelet count less than  $50 \times 10^9/L$  (50,000/ $\mu$ l) with active bleeding.
- c. Blood platelet count less than  $50 \times 10^9/L$  (50,000/ $\mu$ l) and invasive procedure, or less than  $100 \times 10^9/L$  (100,000/ $\mu$ l) when neurosurgery is anticipated.
- d. Active or anticipated bleeding with evidence/suspicion of platelet dysfunction (e.g. metabolic disorder, drug effect, or cardiopulmonary bypass).
- e. Life-threatening autoimmune thrombocytopenia (transfusion of platelets for autoimmune thrombocytopenia under routine conditions is generally ineffective).
- f. In massive blood loss with clinically abnormal bleeding.

**Granulocyte Concentrates**

- 1. Severe infection in a neonate less than two weeks of age and with an absolute neutrophil count less than  $3 \times 10^9/L$  (3,000/ $\mu$ l) and capable of marrow recovery.
- 2. Severe infection unresponsive to antimicrobial therapy in a child greater than two weeks of age and absolute neutrophil count less than  $0.5 \times 10^9/L$  (500/ $\mu$ l) and capable of marrow recovery.
- 3. Documented infection unresponsive to antimicrobial therapy in a child with a proven or highly suspected qualitative neutrophil defect regardless of the absolute neutrophil count and otherwise capable of recovery.

TRANSFUSION OF GRANULOCYTES MUST BE ARRANGED IN CONSULTATION WITH TRANSFUSION

## MEDICINE.

### **Fresh Frozen Plasma (FFP)**

1. Bleeding or invasive procedure with 1) documented significant deficiency of a plasma clotting protein, and/or 2) marked prolongation of the PT and/or PTT ( $> 1.5x$  the upper limits of normal).
2. Treatment of anti-thrombin, Protein C or S deficiencies.
3. Therapeutic plasma exchange for disorders in which FFP is documented to be appropriate replacement fluid, e.g. thrombotic thrombocytopenic purpura (TTP).
4. See adult criteria for expanded indications.

Note on Usage: Expect 10-15 mls/kg to raise a clotting factor approximately 15% posttransfusion.

\*Other plasma components, such as Plasma Frozen Within 24 Hours (FP24) or Thawed Plasma, may be issued when FFP is ordered.

### **Unacceptable criteria**

For nutritional supplementation

For volume replacement

### **Cryoprecipitate**

1. Bleeding or invasive procedure in patients with von Willebrand Disease for whom the use of DDAVP (Desmopressin) is insufficient (if a more satisfactory concentrate is not available).
2. Bleeding or invasive procedure in patients with primary or secondary hypofibrinogenemia, e.g. hypofibrinogenemia in association with DIC when fibrinogen  $< 150$  mg/dl. If an alternative fibrinogen threshold is utilized, contact Transfusion Medicine to communicate this.
3. Bleeding or invasive procedure in patients with Factor XIII deficiency.
4. Bleeding or invasive procedure in patients with uremia.

### **Special Considerations for Transfusion**

#### **1. Cytomegalovirus**

All allogeneic cellular products available at UNC are leukocyte reduced and are considered CMV safe.

#### **2. Irradiation**

A minimum irradiation dose of 2500 cGy to the center of all cellular blood products -- red blood cells, granulocytes, or platelets.

- a. Severely immunodeficient patients who are at risk for transfusion associated graft versus host disease (TA-GVHD).
- b. Patients with hematologic malignancies.

- c. Bone marrow transplant recipients.
- d. Congenital immunodeficiencies affecting cellular immunity.
- e. If blood donor and recipient are relatives.
- f. Granulocyte transfusions.
- g. All neonates <4 months old.

Once ordered, Transfusion Medicine will continue to provide irradiated blood products for a particular patient until requested to discontinue this service or until patient is >4 months old in case of neonates without another indication.

3. Transfusion of Leukocyte Reduced Red Blood Cells and/or Platelets

**All allogeneic cellular products available at UNC are leukocyte reduced.**

4. Transfusion of Washed Blood Products

All indications for red cells or platelets as previously indicated in addition to severe allergic/anaphylactic/anaphylactoid reactions to plasma-containing blood products (e.g., those with the need for IgA-deficient red cells and platelets).