

**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, risk, 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 physician.

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.

Transfusion of 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 (Hct 41%) 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 (Hct 31%) 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 ≥ 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 (Hct 21 %) 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.

3. When possible, the patient's Hgb should be determined prior to transfusion and within 24 to 36 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 (Hct 39%), 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

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 gm/dl.

ii. hemoglobin < 8 gms/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 gms/dl in a child unable to produce red cells.

h. Hemoglobin < 13 gms/dl in a patient with respiratory insufficiency requiring ventilatory support.

i. Severe iron deficiency at presentation with a hemoglobin of < 5g/dl.

Notes on Usage:

1. 10 mls/kg will normally raise the hemoglobin approximately 2 grams. With hemoglobins ≤ 5 g/dl transfuse slowly at 2 mls x hemoglobin (g)/kg if there is evidence of cardiovascular instability.
2. When possible, patient's hemoglobin should be determined prior to transfusion and within 24 to 36 hours after transfusion if the patient remains hospitalized,

Transfusion of Platelets

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

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

b. Blood platelet count less than $100 \times 10^9/L$ ($100,000/\mu l$) in an unstable premature infant.

2. All other cases:

a. Blood platelet count less than $10 \times 10^9/L$ ($20,000/\mu l$) in stable, nonfebrile (>24 hours) patient or less than $20 \times 10^9/L$ ($20,000/\mu l$) in unstable or febrile (<24 hours) patient .

b. Blood platelet count less than $50 \times 10^9/L$ ($50,000/\mu l$) with active bleeding or rapidly falling platelet count.

c. Blood platelet count less than $50 \times 10^9/L$ ($50,000/\mu l$) and invasive procedure, less than $100 \times 10^9/L$ ($100,000/\mu l$) when major surgery 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 (routine transfusion of platelets for autoimmune thrombocytopenia is generally ineffective).

f. In massive blood loss with clinically abnormal bleeding.

Note on Usage:

In specific cases, if clinical indications warrant, exceptions to these guidelines can be arranged in consultation with Transfusion Medicine.

Transfusion of Granulocyte Concentrates

1. Bacterial sepsis in a neonate less than two weeks of age and with an absolute neutrophil count less than $3 \times 10^9/L$ ($3,000/\mu l$).

2. Bacterial sepsis unresponsive to antimicrobial therapy in a child greater than two weeks of age and absolute neutrophil count less than $0.5 \times 10^9/L$ ($500/\mu l$).

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.

TRANSFUSION OF GRANULOCYTES SHOULD BE ARRANGED IN CONSULTATION WITH TRANSFUSION MEDICINE.

Transfusion of 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 (> the upper limits of normal).
2. Treatment of AT-III, 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% post transfusion.

Transfusion of Cryoprecipitate

1. Bleeding or invasive procedure in patients with von Willebrand's 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.
3. Bleeding or invasive procedure in patients with Factor XIII deficiency.
4. Bleeding or invasive procedure in patients with uremia and prolonged bleeding time.

Special Considerations for Transfusion

1. Cytomegalovirus

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

2. Irradiation

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

- a. Severely immunodeficient patients in whom transfusion associated GVHD (TA-GVHD) disease is a threat. This includes some children with congenital immunodeficiency and children significantly immunosuppressed such as children who are undergoing bone marrow transplant and all children on chemotherapy.
- b. Patients with hematologic malignancies undergoing chemotherapy.
- 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.

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 and severe allergic reactions to plasma-containing blood products including the need for IgA-deficient red cells and platelets.

Other Blood Derived Products

Other blood derived products available include:

Intravenous Immunoglobulin (IVIG)
Normal Serum Albumin (NSA)
Hepatitis B Immunoglobulin (HBIG)
Rh Immunoglobulin (RhIG)
Varicella Zoster Immunoglobulin (VZIG)
Clotting Factor Concentrates

Questions regarding these products can to:

Hospital Pharmacies
Hospital Pharmacies
Hospital Pharmacies
Transfusion Medicine Service
Hospital Pharmacies
Hospital Pharmacies