



- These practice guidelines have been developed by a cross functional group of physicians, management, and staff to advance the safety and quality of care for the patients receiving blood transfusions.
- When applying these guidelines, practitioners must use their training, experience, judgment, and a patient's specific clinical information to make optimal decisions on the patient's behalf.
- These guidelines cannot substitute for clinical judgment or the need for flexibility in practice and should not be considered a mandate to transfuse or not to transfuse.

## Initiation of Transfusion

- Prior to the administration of blood or blood components, informed consent is **required** and should include a discussion regarding the risks, benefits, and alternatives to allogeneic blood transfusions.
- Transfusion therapy, in certain situations, can be inappropriate and may pose unnecessary risks, while offering little or no benefit to patients. Risks include but are not limited to:
  - Host immune response to transfusion
  - Transmission of infectious agents
  - Volume overload
  - Transfusion-related acute lung injury (TRALI)
- Providers **MUST** document reasons for transfusion very clearly in the patient's medical record.
  - Documentation is especially important when a transfusion is administered in exception to the recommended guidelines.
- When feasible, clinicians are encouraged to consult with the transfusion service if a situation falls outside of standard guidelines.
  - The OSU UH and East Blood Banks are staffed 24/7 and can be reached at the numbers below:
    - OSU UH Blood Bank
      - 614-293-8467
    - OSU East Blood Bank
      - 614-257-2064
  - The Transfusion Medicine attending on service can be paged to your location anytime by calling the OSU UH Blood Bank at 614-293-8467.

## Packed Red Blood Cells

### Clinical Indications for Adult Transfusion of Red Blood Cells (RBC):

- Only one packed RBC unit should be transfused at a time with re-evaluation of the patient's condition and hemoglobin level before further transfusion, unless dictated otherwise by patient's clinical condition.
- In many scenarios, restrictive strategies are at least as beneficial to patients, if not superior to more liberal approaches.

## Active Bleeding

- Hemorrhagic shock with life threatening bleeding, where explicit transfusion protocols are activated, such as the Massive Transfusion Protocol
  - No Hgb threshold
- Active, non-life threatening bleeding and Hgb < 8 g/dl

## Bleeding Risk

- Preoperative assessment of surgical bleeding risk:
  - Hgb < 10 g/dl if intraoperative bleeding is expected to be life-threatening
  - Hgb < 8 g/dl if intraoperative bleeding is not expected to be life-threatening

## Anemia

- Asymptomatic
  - Hgb < 7g/dl for asymptomatic, hemodynamically stable inpatients
  - Cardiovascular Disease: Hgb < 8g/dl for asymptomatic inpatients with evidence of preexisting cardiovascular disease or complication
- Symptomatic
  - No Hgb threshold in the setting of acute blood loss or symptomatic, otherwise unexplained anemia, manifested by one or more of below:
    - Tachycardia or hypotension (e.g., diastolic pressures < 60 mmHg, systolic pressures reduced by 30mmHg, especially if unresponsive to fluids).
    - Other evidence of inadequate oxygen delivery, increased oxygen extraction, reduced central venous or tissue oxygen saturations, elevated lactate, or elevated laboratory indicators of organ failure.
    - Otherwise-clinically manifested cardiovascular failure related to anemia.

## Special Conditions - Exempt from Thresholds

**Note:** The presence of certain clinical conditions warrants maintaining a hemoglobin level higher than normally acceptable for an otherwise healthy, asymptomatic anemic patient; therefore patients in the following scenarios may fall outside of the stated guidelines.

## Hematology/Oncology patients, including any of the following populations:

- Hematology/Bone Marrow Failure or Bone Marrow Transplant (BMT) patients
- Thalassemia or other congenital anemia patients
- Sickle cell disease patients
- Patients on protocols for various blood exchange procedures
- Oncology patients
- Acute leukemia patients
- Patients on Extracorporeal Life Support (ECLS)
  - [OSUWMC Extracorporeal Life Support \(ECLS\) Guideline](#)
  - [ELSO Patient Care Practice Guidelines](#)
- Patients on [chronic transfusion protocols](#)

## Platelets

### Clinical Indications for Adult Transfusion of Platelets:

- Indicated for patients suffering from or at significant risk of hemorrhage due to thrombocytopenia and/or platelet dysfunction.

### Active Bleeding

- Recent (within 24 hours of request) platelet count < 50,000 u/L involving a:
  - Documented hemorrhage
  - Rapidly falling platelet count
  - Planned invasive or surgical procedure
- Neurosurgical patient with a platelet count < 100,000 u/L

### Thrombocytopenia

- Recent (within 24 hours of request) platelet count < 10,000 u/L (for prophylaxis in stable, non-febrile patient)
- Recent (within 24 hours of request) platelet count < 20,000 u/L for prophylaxis with fever (in last 24 hours) or instability

### Platelet Dysfunction

- Documented by a prolonged bleeding time > 1.5 X the upper limit of normal, ROTEM, platelet function tests, documented anti-platelet drugs, or history with:
  - Petechiae
  - Purpura
  - Bleeding
  - Planned invasive or surgical procedure

### If Patient Not Responsive to Platelets

- Routinely check post-transfusion platelet count within 1 hour after completing a platelet transfusion.
- Repeated poor responses may indicate immune refractoriness.
- Consult the Transfusion Medicine Service (UH 3-8467) (East 7-2064) in anticipation of need for human leukocyte antigen (HLA) matched or cross-matched platelets.

## Fresh Frozen Plasma (FFP), Thawed Plasma

### Clinical Indications for Adult Transfusion of Plasma:

- This component contains adequate levels of all soluble coagulation factors except those provided by platelets.
- FFP is indicated for the correction of multiple or specific coagulation factor deficiencies or for the empiric treatment of TTP/HUS.

### Active Bleeding

- Massive transfusion to replace diluted and consumed coagulation factors
- Hemorrhage in the setting of:
  - Severe liver disease
  - Disseminated intravascular coagulation (DIC)
  - Vitamin K depletion
- PTT > 60 seconds, exclude:
  - Lupus anticoagulant
  - Heparin
- INR > 1.5
  - **There is no evidence an INR < 1.5 reduces risk of hemorrhage.**
- ROTEM indicated deficiency

### Other

- INR > 1.5 with planned invasive procedure
  - **There is no evidence an INR < 1.5 reduces risk of hemorrhage.**
- Fibrinogen < 100 mg/dL

**Note:** Plasma products should not be used for nutritional supplementation or volume replacement.

## Cryoprecipitate

### Clinical Indications for Adult Transfusion of Cryo:

- Cryo is a cold insoluble fraction of FFP.
  - Each bag contains approximately 80–100 units of factor VIII and 150–250 mg of fibrinogen.
  - Cryo also contains factor XIII and von Willebrand's factor.
  - It is usually indicated when correction of fibrinogen-related coagulopathy is needed but the volume of FFP cannot be tolerated.
- When possible, the patient's coagulation parameters (such as PT/PTT, fibrinogen, specific coagulation factor assay, etc.) should be determined within 24 hours prior to transfusion and again within 24 hours after transfusion if the patient remains hospitalized.

### Fibrinogen Deficiency

- Fibrinogen < 100 mg/dL and bleeding, invasive procedure, or volume overload
- Fibrinogen < 150 mg/dL with suspected DIC or congenital deficiency
- ROTEM indicated deficiency

### Clotting Factor Deficiencies

- Factor XIII deficiency
- von Willebrand disease

## Other

- Bleeding associated with renal failure or certain platelet dysfunctional disorders may also benefit from cryo

## Massive Transfusion Protocol

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- These guidelines are not applicable to situations requiring the massive transfusion of blood products.
- The initiation of an MTP requires the involvement of an attending in the clinical situation and their approval.
  - Call the blood bank (UH 3-8467 or East 7-2064) for information.
  - See “Massive Transfusion Protocol [MTP]” on page 8 of the [Blood and Blood Products in the Perioperative Department](#) policy.

## Cytomegalovirus (CMV) Negative Blood Products

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**Note:** All allogeneic cellular products available at OSU are leukocyte reduced. Leukocyte reduced products are considered CMV safe for most patients.

- Blood products that are collected from known CMV negative donors and have been determined to be CMV negative after testing are provided for:
  - CMV sero-negative allogeneic (related or unrelated donor) HPC recipients.
  - CMV sero-negative acute leukemia bone marrow transplant candidates.
  - CMV sero-negative heart and lung transplant recipients and candidates.
  - CMV sero-negative (or unknown) pregnant women.
  - All low-birth-weight neonates.

**Note:** All liver, kidney, and pancreas transplant candidates receive leukocyte-reduced blood components (CMV safe).

## Irradiated Blood Products

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**Note:** Irradiated blood products are indicated for the prevention of transfusion associated graft versus host disease in certain circumstances. A minimum irradiation dose of 2500 cGy is directed to all irradiated cellular blood products -- red blood cells, white blood cells or platelets.

- **Donor categories:**
  - Product donated by family member
  - Product from HLA-selected donor
  - Products from directed donors whose relationship to recipient’s family has not been established
- **Pediatric practice**
  - Intrauterine transfusions (IUT)
  - Exchange or simple transfusion in neonates if prior IUT
  - Congenital immune deficiency states

- **Other considerations:**

- Acute leukemia or Hodgkin disease
- Allogeneic or autologous hemopoietic progenitor cell (HPC) transplant recipient
- Allogeneic HPC donor 7 days prior to, or during, HPC harvest
- History of treatment with purine analogues and related drugs
  - Fludarabine
  - 2CDA (Cladribine®)
  - Deoxycoformycin (Pentostatin®)
  - Clofarabine (Clolar®)
  - Bendamustine (Treanda®)
  - Nelarabine (Arranon®)
- History of treatment with alemtuzumab (Campath®, MabCampath® and Campath-1H®) (anti-CD52)
- Patients on anti-thymocyte globulin (ATG)
- Patient with congenital immunodeficiencies affecting cellular immunity
- Granulocyte transfusions

## OSUWMC Resources

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- [OSUWMC Cardiac Surgery Intraoperative Hemostasis and Transfusion guideline](#)
- [OSUWMC Liver Transplant Transfusion algorithm](#)

## References

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**Disclaimer:** Clinical practice guidelines and algorithms at The Ohio State University Wexner Medical Center (OSUWMC) are standards that are intended to provide general guidance to clinicians. Patient choice and clinician judgment must remain central to the selection of diagnostic tests and therapy. OSUWMC's guidelines and algorithms are reviewed periodically for consistency with new evidence; however, new developments may not be represented.

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## Quality Measures

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- Proportion of units prepared and not transfused:
  - PRBC
  - FFP
  - Platelets
- Inappropriate blood utilization:
  - PRBC
  - FFP
  - Platelets
- Frequency with which Hgb/HCT rechecked prior to transfusion of second unit of PRBC in the setting of non-emergent transfusion

## Guideline Authors

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## Guideline Approved

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