

Blood Transfusion

It is critical for nurses to know and understand the principles of blood transfusion to prevent life-threatening transfusion reactions from occurring. This pocket card reviews the different types of blood products as well as nursing tips for transfusions.

Blood Products (Lippincott Advisor, 2023)

| Blood Products | | |
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| Product and details | Indications | Administration |
| Whole blood <ul style="list-style-type: none"> Consists of all blood components 450 – 500 mL/unit Each unit raises the hemoglobin (Hgb) by 1 g/dL (about 3%) | Rare cases of blood loss from hemorrhage to rapidly restore blood volume | <ul style="list-style-type: none"> Y-type IV set with 10-micron filter (unless 20- to 40-micron filter ordered) Transfuse slowly but within 4 hours of initiation. |
| Red Blood Cells (RBCs) <ul style="list-style-type: none"> Whole blood with 80% of plasma removed 250 mL/unit | <ul style="list-style-type: none"> Symptomatic anemia Acute anemia caused by trauma, acute or surgical blood loss, or chemotherapy Chronic anemia associated with cardiovascular decompensation | <ul style="list-style-type: none"> Y-type IV set with 10-micron filter (unless a 20- to 40-micron filter is ordered) Transfuse slowly but within 4 hours of initiation. |
| Leukocyte-reduced RBCs <ul style="list-style-type: none"> RBCs with 95% of leukocytes removed 200 mL/unit | Patients at risk for reactions caused by leukocyte antibodies with any of the following: <ul style="list-style-type: none"> Symptomatic anemia Immunocompromised Acute anemia caused by trauma, surgical blood loss, or chemotherapy Chronic anemia related to cardiovascular decompensation | <ul style="list-style-type: none"> Straight-line or Y-type IV set Infuse over 1 ½ to 4 hours. Use 40-micron filter for hard-spun leukocyte-poor RBCs. |
| White blood cells (WBC) or Leukocytes <ul style="list-style-type: none"> Whole blood with all RBCs and 80% of plasma removed 150 mL/unit | Sepsis unresponsive to antibiotics, if patient has blood cultures positive for sepsis or a persistent fever greater than 101° F combined with granulocytopenia (granulocyte count less than 500/μL) | <ul style="list-style-type: none"> Straight-line IV set with standard blood filter |

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| <p>Platelets</p> <ul style="list-style-type: none"> • Fragments of large bone marrow cells that help with clotting • 35 to 50 mL/unit | <ul style="list-style-type: none"> • Control or prevent bleeding due to decreased or malfunctioning platelets • Increase platelet count in patients who require an invasive procedure | <ul style="list-style-type: none"> • Component drip set to infuse 100 mL over 15 minutes. • Don't use a microaggregate filter. • Transfuse as quickly as tolerated, within 4 hours of initiation |
| <p>Fresh Frozen Plasma (FFP)</p> <ul style="list-style-type: none"> • Noncellular portion of blood that is separated and frozen after donation; contains coagulation factors and proteins • 200 to 250 mL | <ul style="list-style-type: none"> • Temporarily reverses warfarin • Plasma exchange thrombotic thrombocytopenia • Factor deficiency (if concentrate is unavailable) • Treat abnormal coagulation prior to invasive procedures • Liver disease with protein synthetic defect • Dilutional coagulopathy • Consumptive coagulopathy | <ul style="list-style-type: none"> • Straight-line IV set to rapidly administer FFP • Transfuse over 30 to 60 minutes |
| <p>Albumin</p> <ul style="list-style-type: none"> • Small plasma protein prepared by fractionating pooled plasma • 5% (buffered saline) 12.5 g/250 mL • 25% (salt-poor saline) 12.5 g/50 mL | <ul style="list-style-type: none"> • Replace volume lost due to shock from burns, trauma, surgery or infection • Prevent significant hemoconcentration • Treat hypoproteinemia (with or without edema) | <ul style="list-style-type: none"> • Straight-line IV set |
| <p>Factor VIII</p> <ul style="list-style-type: none"> • Insoluble portion of plasma recovered from FFP • 30 mL freeze-dried | <ul style="list-style-type: none"> • Treat hemophilia A (standard dose is 15 to 20 units/kg) • Control bleeding associated with factor VIII deficiency • Replace fibrinogen or deficient factor VIII | <ul style="list-style-type: none"> • IV set supplied by manufacturer • Administer with a filter |
| <p>Factors II, VII, IX and X complex</p> <ul style="list-style-type: none"> • Lyophilized, commercially prepared solution drawn from pooled plasma • Prothrombin complex | <ul style="list-style-type: none"> • Congenital factor V deficiency • Disorders associated with an acquired lack of factors II, VII, IX, and X | <ul style="list-style-type: none"> • Straight-line IV set |

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| <p>Cryoprecipitate Antihemophilic Factor</p> <ul style="list-style-type: none"> • Portion of plasma rich in clotting factors • 15 – 20 mL/unit | <ul style="list-style-type: none"> • Prevent or control bleeding • Hemophilia (lack factor VIII) • Low levels of fibrinogen, von Willebrand factor, factor XIII, and fibronectin | <ul style="list-style-type: none"> • Use a pyrogen-free transfusion set with appropriate filter. • Infuse immediately after thawing over 15 to 30 minutes. |
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One of the most common blood products transfused are red blood cells. It is important that nurses have knowledge of transfusion thresholds for which transfusions are indicated. The most recent transfusion guidelines from the Association for the Advancement of Blood & Biotherapies recommend a restrictive transfusion strategy considering transfusion when hemoglobin concentration is less than 7 g/dL with a less restrictive threshold of 7.5 g/dL for patients undergoing cardiac surgery and 8 g/dL for those undergoing orthopedic surgery or those with pre-existing cardiovascular disease (Carson et al., (2023).

Transfusion Tips (Lippincott Advisor, 2023)

- Informed consent should be obtained unless the transfusion is an emergency.
- Verify that the patient’s religious beliefs don’t conflict with blood transfusion therapy.
- Ensure patient has adequate intravenous (IV) access with 20 gauge (G) to 24G catheter. For rapid transfusion, a larger catheter (18G or 20G) should be inserted.
- Obtain baseline vital signs. If the patient’s temperature is 99.5° or greater, notify the practitioner and ask if the transfusion should be postponed until the temperature is within normal limits.
- Perform physical assessment; note abnormal or adventitious lung sounds.
- Administer blood products within 30 minutes of its arrival from the blood bank. Don’t store blood in a non-blood bank refrigerator. If there is a delay longer than 30 minutes, send the blood back to the blood bank for storage.
- Check the expiration date and assess for abnormal color, consistency, bubbles, or other materials. Return any expired or suspicious products to the blood bank.

Consult your facility’s policy regarding blood transfusion. Most institutions require two nurses or practitioners to identify the patient using two criteria and to double-check blood product compatibility before transfusion to prevent errors and a possible fatal transfusion reaction.

- Check the following:
 - Compare name and medical record number on the patient’s identification band with the blood product container label.
 - Verify blood product label identification number, ABO blood group, and Rh compatibility.
 - Compare the patient’s blood bank identification number with the number on the blood bag.

- Documentation may include name and volume of blood product, blood product ID number, date, and time of transfusion.
- Prior to WBC administration, premedicate the patient with diphenhydramine, as ordered.
- Prior to administration of factors II, VII, IX, and X complex, draw blood for a coagulation assay, as ordered.
- Administration sets should be sterile and pyrogen-free.
- Remember to prime the line with normal saline before and flush with normal saline after the transfusion. **Only normal saline is compatible with blood products.**
 - Infusions containing calcium can cause clotting in the tubing.
 - Excess glucose causes hemolysis and shortens RBC life.
- Begin administration flow rate slowly, no more than 2 mL/minute for the first 15 minutes of the transfusion and observe closely for transfusion reaction (e.g., change in vital signs, facial color, and any patient complaints).
- If the patient develops a reaction to the blood product:
 - Immediately stop the transfusion.
 - Record the patient's vital signs.
 - Infuse normal saline through a new or different IV line at a keep-vein-open rate.
 - Notify the practitioner.
 - Save the blood product bag and return to the blood bank.
 - Send patient urine and blood samples to the laboratory.

See NursingCenter Pocket Card: Blood Type Compatibility and Transfusion Reactions

- If no sign of transfusion reaction within 15 minutes, increase flow rate as ordered (or per your facility's policy).
- Continue to monitor the patient every 30 minutes during the transfusion and check the IV insertion site for infiltration.
- Once the transfusion is complete, flush the administration set and IV with normal saline.
- Monitor the patient for signs of a delayed transfusion reaction for 4 to 6 hours after completion of the transfusion.
- Repeat lab tests as ordered:
 - Citric acid in FFP products bind to calcium. Large-volume FFP transfusion may cause hypocalcemia requiring calcium supplementation.
 - Factor VII has a half-life of 8 to 10 hours. Repeat transfusion may be needed at specific intervals to maintain levels.

Reference

Carson, J. L., Stanworth, S. J., Guyatt, G., Valentine, S., Dennis, J., Bakhtary, S., Cohn, C. S., Dubon, A., Grossman, B. J., Gupta, G. K., Hess, A. S., Jacobson, J. L., Kaplan, L. J., Lin, Y., Metcalf, R. A., Murphy, C. H., Pavenski, K., Prochaska, M. T., Raval, J. S., Salazar, E., ... Pagano, M. B. (2023). Red Blood Cell Transfusion: 2023 AABB International Guidelines. *JAMA*, 330(19), 1892–1902. <https://doi.org/10.1001/jama.2023.12914>

Lippincott Advisor (2023, July 10). Blood and blood product transfusion.

<https://advisor.lww.com/lna/document.do?bid=3&did=1281588&searchTerm=blood%20transfusion&hits=blood,transfusion,transfusions,transfused,transfuse,transfusing>