

Transfusion Services

TRANSFUSION: BLOOD ADMINISTRATION

The transfusion procedures described in this section are derived from the Clinical Nursing Standards for use at Children's Hospitals and Clinics (366.00). Patient care units may have specific patient care needs that require alterations in these policies and procedures. Alternative procedures must be approved by the Transfusion Committee of Children's Hospitals and Clinics and must be available to patient care personnel. Personnel who participate in the administration of blood components must be trained in transfusion procedures and in recognition and management of adverse reactions.

EQUIPMENT AND SUPPLIES

A blood component administration set containing inline filter must be used unless the blood product is issued and labeled as *prefiltered* by Children's Transfusion Service. Either "Y-type" administration set or a buret type "straight" set may be used. Because of the large numbers of filters available, the instructions for use on the package or on the product insert should be read to determine priming instructions and the maximum number of units that may be administered using the filter.

INTRAVENOUS SOLUTIONS

Of the various intravenous solutions, only isotonic saline (0.9%) is recommended for use with blood components. Other commonly used intravenous solutions will cause varying degrees of difficulty when mixed with red cells. For example, 5% dextrose in water will hemolyze red cells. Intravenous solutions containing calcium, such as Lactated Ringers's solution, can cause clots to form in blood. Prior to blood transfusion, completely flush incompatible intravenous solutions and drugs from the blood administration set with isotonic saline.

SPECIAL BLOOD TRANSFUSION

Specialized equipment for transfusion of blood is available from the Patient Equipment sections of Material Services. Instruments and equipment for transfusion must be used in accordance with the manufacturer's instructions for use and quality control of the instrument. Devices such as blood warmers and infusion pumps are tested periodically for appropriate function and safety. Do not use equipment that does not have current Biomedical Engineering tag.

- Cuffs for pressure infusion may be used if care is taken not to exceed the designated pressure.
- Devices that control the rate of administration, such as IVAC infusion devices, can be used for the administration of blood components. The manufacturer's instructions for the instrument should be consulted for safety with specific blood components.
- Blood warmers may be used as long as the device has a temperature alarm and visible temperature monitor. Blood warming devices are most appropriate for massive and rapid blood replacement, such as exchange transfusion of the newborn.
- Platelet Administration sets with shorter tubing are available from Materials Management.

PATIENT INSTRUCTION/PREPARATION

Transfusion Service personnel will notify patient unit personnel by telephone when ordered blood is ready for transfusion.

The risks of transfusion, including adverse symptoms and alternatives to homologous (allogeneic) transfusion, must be discussed with the patient well before transfusion. This discussion should be

documented by the physician/practitioner in the patient's electronic medical record and signed consent form. Patient education materials are available to assist in this process ([see Patient Information Materials](#)). The patient's blood pressure, pulse, respirations, and temperature must be taken and recorded within 60 minutes prior to the transfusion. The pretransfusion vital signs provide a baseline for comparison data obtained during and after transfusion. If a patient is febrile, consideration should be given to postponement of blood transfusion, since the fever may mask the development of a febrile reaction to the blood component itself.

RELEASE AND TRANSPORT OF BLOOD

Before requesting that a blood component be delivered to the patient care unit, *verify the provider's order to transfuse*, administer any pretransfusion medication, record the patient's vital signs and initiate or verify patency of an intravenous line. This will allow the blood transfusion to be initiated as soon as the component arrives on the patient unit. The Transfusion Service will transport blood components via pneumatic tube or the blood component may be picked up at the Transfusion Service/Blood Bank by patient care unit personnel (CSA, RN, LPN) in a cooler. Patient care personnel must present Transfusion Service personnel with a Release Form. The form must contain the recipient's full name, registration number, and blood component ordered. Only one unit of blood will be released at a time for a patient unless two intravenous lines are in place for that patient, allowing two units of blood to be transfused simultaneously. To avoid delay, notify the Transfusion Service personnel of this situation in advance. Multiple blood units will be released only to patient care units with monitored blood refrigerators (surgery) or if issued in Transfusion Service coolers.

RECEIPT OF BLOOD COMPONENTS

Only nursing personnel or physicians may accept blood or blood components when delivered to a patient unit.

Immediately upon receipt, the component should be inspected for abnormal appearance and for patient identification at the patient bedside, using the patient's attached Medical Record Number wrist or ankle band. If the name and identification number recorded on the Unit Tag attached to the unit do not correspond with that of the intended recipient, the component must be returned to the Transfusion Service. Consult with the Transfusion Service if there is any question.

If a blood component cannot be transfused shortly after being received from the Transfusion Service, immediately return it to the Transfusion Service by messenger or pneumatic tube. To avoid waste, notify the Transfusion Service that blood is being returned.

An untransfused unit must be returned to the Transfusion Service within 20 minutes from the time it is received on the patient care unit. Blood components out of controlled storage temperatures more than 30 minutes cannot be safely reissued to another patient. Refrigerated blood components cannot be stored in medication refrigerators.

Platelets, Cryoprecipitate, and Granulocytes must not be stored at refrigerator temperatures.

These components have special storage requirements and cannot be stored properly on the patient unit or in the operating room.

IF COMPONENTS ARE NO LONGER NEEDED

To avoid unnecessary waste of blood resources, notify the Transfusion Service staff immediately if components are no longer needed for a patient, as the component may be suitable for transfusion to another patient.

STEPS THAT MUST BE TAKEN PRIOR TO BLOOD TRANSFUSION

- Verify provider's orders for transfusion and premedication.
 - Verify patient/component identification at the bedside. Before transfusion, the identification of the patient, using the unit tag on the bag, must be checked by two people at the patient's bedside against the identification of the intended blood recipient using the patient wristband. ***This step must never be bypassed.*** This is to be performed by qualified individuals (provider and registered nurse, two registered nurses, or by a registered nurse and a licensed practical nurse), one being the transfusionists.
 - If possible, ask the patient to state his or her name, and correlate this information with available identification.
 - Verify the blood to the provider's order for component, volume and special preparation.
 - Verify the blood type, donor number, component name, compatibility, and outdate match between the unit tag and the blood unit label.
 - Both persons must sign the unit tag. The person who hangs the blood must record the date and time of transfusion was started. The date, time, component, and unit number must be recorded on the appropriate sheet in the patient's medical record. Refer to Children's Clinical Nursing Standards (366.00).
 - Immediately before transfusion, mix the unit of blood thoroughly by gentle inversion.
 - Follow the manufacturer's instruction for the use of filters and ancillary devices. Additional administration instructions for selected components are printed at the end of this document.
- If a unit of blood or a blood component has been entered for any reason by personnel not working in the Transfusion Service and the unit has not been transfused, the unit must be discarded and the unit tag must be completed. Note the volume transfused (indicate "NONE", if none administered). The completed unit tag must be returned to the Transfusion Service.

FLOW RATES

Start the infusion slowly to allow for recognition of an acute adverse reaction. Complete the transfusion within 2-hours unless the patient can tolerate only gradual expansion of the intravascular volume. The infusion time should not exceed 4 hours.

Standard Infusion Rates:	
Red Blood Cells	2 – 5 mL/kg/hour
Platelets	10 minutes/unit OR 5 mL/minute
Plasma	1 – 2 mL/minute
Cryoprecipitate	1 – 2 mL/minute
Granulocytes	Slowly

DURING THE TRANSFUSION

At 15 minutes after initiating transfusion of a unit of blood or blood component, document the patient's vital signs including temperature, blood pressure, respirations, and pulse, and examine the skin for urticaria. Such monitoring is essential for the prompt recognition of any adverse reaction to transfusion. The rate of flow of the blood should also be noted during these periodic inspections. During the infusion, vital signs should be documented after the first 15 minutes, and after completion of the transfusion. If vital signs are not within normal range or if symptoms of a reaction are noted, vitals should be taken more frequently.

Any transfusion that stops or slows appreciably during administration should be investigated immediately. This is especially critical when a blood-warming device is being used. Measures

that may enhance blood flow include elevating the IV pole, changing the filter and tubing, repositioning the patient's arm or changing to a larger gauge needle.

MEDICATIONS

Do not add medications directly to a unit of blood during transfusion. Medications that can be administered "IV PUSH" may be administered by stopping the transfusion, clearing the line at the medication injection site with 5 - 10 mL of normal saline, administering the medication, refushing the line with saline, and restarting the transfusion.

AT THE TERMINATION OF UNCOMPLICATED TRANSFUSIONS

After the completion of each uncomplicated transfusion, the responsible provider or nurse should complete the unit tag, including acknowledgement of documentation of vital signs, and documentation of the response to transfusion. The top copy of this form should be retained in the patient unit for attachment to the patient's chart; the bottom copy of the form must be returned to the Transfusion Service as soon as possible to document the fact that the unit has been transfused. Following uneventful transfusion, discard empty blood bags with attached blood infusion sets on the patient unit. For a patient suspected of having a transfusion reaction, save the bag and attached tubing and refer to [Adverse Reaction to Transfusion](#) for additional instructions. Discontinue the isotonic saline solution used to initiate the transfusion after the completion of the transfusion unless specifically ordered.

Patients who have just received a blood transfusion should be observed for several hours by experienced personnel for signs and symptoms of a transfusion reaction.

Document the patient's response to the transfusion in the patient's medical record as needed.

FILTERS

- Follow manufacturer's instructions for priming.
- Do not twist the filter when attaching it to the IV tubing cannula.
- Do not use an infusion pump or suction (to fill a syringe) unless the manufacturer's instructions indicate that infusion pumps may be used. Inappropriate use of such pumps may result in filter material being infused.
- Filters must be changed every 4-6 hours or every 2-4 units.
- Administer all blood products not received in a syringe through a standard blood infusion set.

PLATELETS

- ***Do not refrigerate*** platelets as platelet activity is reduced if cooled below room temperature.
- Platelets should be transfused immediately after they are available since platelet activity diminished rapidly during storage.
- Platelets should be administered at a rapid rate for maximum effectiveness. A rate of 5 mL/minute is frequently used.

CRYOPRECIPITATED ANTIHEMOPHILIC FACTOR (CRYO)

- When multiple units of CRYO are ordered, the Transfusion Service will pool the product in a single bag.
- The component must be administered within 4 hours of pooling.
- ***Do not refrigerate*** CRYO as this causes reprecipitation and loss of Factor VIII activity.
- The component must be transfused immediately after it arrives on the patient care unit because Factor VIII activity diminishes at room temperature.

- For maximum effectiveness, transfuse the product rapidly. The usual flow rate is 1 to 2 mL/minute.
- CRYO does not contain red blood cells. CRYO from Rh-positive donors may be given to patients who are Rh negative.

FRESH FROZEN PLASMA (FFP), FROZEN PLASMA (FP), THAWED PLASMA

- The transfusion of plasma should be initiated as soon as it arrives on the patient unit. The usual flow rate is 1 - 2 mL/minute. ***Do not store at room temperature*** or in non-monitored refrigerators.
- Thawed Plasma must be transfused within 5 days.
- Previously frozen plasma does not contain red blood cells. Plasma from Rh-positive donors may be given to patients who are Rh negative.

GRANULOCYTE, PHERESIS OR WBC CONCENTRATES

- ***Do not refrigerate*** Granulocytes.
- Administer through a Standard blood filter. ***Do not use a microaggregate filter or filter designed to remove white blood cells.***
- Isotonic saline (90%) is the only intravenous solution recommended for use with this blood component.
- Infused ***slowly*** over 4 hours. The rate of infusion is ultimately dictated by the recipient's ability to tolerate the component volume and by adverse reactions.
- Premedication is recommended to avoid the need to discontinue transfusion due to a severe reaction.
- Document vital signs every 15 minutes during the entire procedure, every 30 minutes for 4 hours after the transfusion and then every 4 hours for 24 hours. Monitor the patient closely for moderate to severe symptoms such as urticaria, hives, wheezing, dyspnea, severe headache, cyanosis, hypotension, agitation and tachycardia. If such symptoms develop, stop the transfusion, keep the IV line open and notify the patient's physician and the Transfusion Service pathologist on-call for further instructions.
- In general, transfusion of Granulocytes should be terminated only for such complication as severe flank pain, chest pain, hemoglobinemia, hypotension, laryngospasm, or acute pulmonary injury.