Blood Bank Labsite

Preface

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6 TRANSFUSION PROCEDURES

The transfusion procedures described in this section have been approved for use in the University of Michigan Hospitals and Health Centers.

Patient care units may have specific patient care needs that require alterations in these policies and procedures.

Alternative Procedures

Alternative procedures must be approved by the Transfusion Committee of the University of Michigan Hospitals and Health Centers and must be available to patient care personnel.

Training and Competency Assessment

Personnel who participate in the administration of blood components must be trained in transfusion procedures and in recognition and management of adverse reactions. The bedside identification is to be performed by qualified individuals such as a physician and registered nurse, two registered nurses, or by a registered nurse and a licensed practical nurse.

Non-physician transfusionists and anyone who assists in double checking the units (i.e. physician assistants, perfusion technicians, anesthesia allied health technicians, and emergency department technicians) must complete the "Blood Transfusion Policies" course and examination.

Equipment and Supplies

- **All blood components must be filtered** during administration.
- A blood component administration set containing an in-line blood filter is recommended. Either a "Y-Type" administration set or a single line set may be used.
- An add-on filter, such as a leukocyte reduction filter, may be used when the component was not leukocyte-reduced by the blood supplier.
- Because of the large number 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

- Only isotonic saline (0.9%) is recommended for use with blood components.
- Other isotonic electrolyte solutions that do not contain calcium may be used.
- 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 Ringer'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.

Component Infusion Sets

Component and Platelet Administration sets with shorter tubing are available from the Materiel Service Center (MSC) section of Materiel Services.

Leukocyte-Reduction Filters

- With the exception of autologous units, the components stocked by the Blood Bank are leukocyte-reduced by the blood supplier.
- In rare circumstances, a beside leukocyte-reduction filters may be required.
- Granulocyte, hematopoetic progenitor cells, and mononuclear cell transfusions must NOT be administered through these white cell removal filters.
- Follow the priming instructions on the product package.

Pressure Infusion Devices

Follow the filter, port or catheter manufacturer's instructions regarding the use of pressure infusion devices. The flow through some blood filters may be compromised and some catheters may cause catheter wall rupture if a pressure infusion device is used.

- Infusion pumps are available from the Patient Equipment section of Materiel Services.
- Equipment for transfusion must be used in accordance with the manufacturer's instructions for use and quality control of the instrument.
- Do not use equipment that does not have a current Biomedical Engineering tag indicating it has been tested for appropriate function and safety.
- Cuffs for pressure infusion may be used if care is taken not to exceed the designated pressure.

Blood Warmers

Blood warmers are available from the operating rooms.

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.

Patient Instructions and Preparation

Blood Bank personnel will notify patient unit personnel by telephone when ordered blood is ready for transfusion.

Informed Consent

- Informed consent for blood transfusion is a process in which the patient is informed of the medical indications for the transfusion, the possible risks, the possible benefits, the alternatives, and the possible consequences of not receiving the transfusion.
- The **risks of transfusion**, including adverse symptoms and alternatives to homologous (allogeneic) transfusion, must be discussed with the patient well before the transfusion. The **booklet,** "**Blood Transfusion, Your Options"** describing transfusion options are available from Moore. This booklet should be provided to patients as early as possible before transfusion.
- The patient is then given a choice to accept or decline transfusion. Consent should be obtained by the ordering physician sufficiently in advance of the transfusion that the patient can truly understand what is said and have sufficient time to make a choice.
- Consent should be documented in the medical chart using the form "Consent to Receive Blood Transfusion" (available on-line or from Moore).
- A single informed consent may cover many transfusions if they are part of a single course of treatment.
- It may be advisable, though, to **obtain a new consent when there is a significant change** in the patient's care status, such as a transfer for care to another service, an inpatient admission, or an outpatient transfusion.
- In **emergency situations** the physician ordering the transfusion must make a reasonable judgement that the patient would accept the transfusion. Transfusion should not be delayed in a life-threatening situation if it is likely that the patient would agree to transfusion. After the event, the circumstances of the transfusion decision should be documented in the medical chart.

Refusal of Blood Transfusion

- The form "Patient's Release Form for Refusal of Blood or Treatment" should be used to document the patient's refusal of transfusion. The form is available on the Blood Bank web site.

Post Transfusion Instructions to the Patient

- Outpatients or patients who will be leaving the hospital within one week of transfusion should be given

written instructions regarding delayed transfusion reactions.
- The patient handout "Post-Transfusion Instructions for the Patient" may be used for this purpose.
- Copies of this form are available from Moore order number 2201460.

Release and Transport of Blood Components

To reduce the potential for waste of the component, do the following before requesting that a blood component be issued from the Blood Bank:

1	verify the physician's order for the product, volume and transfusion rate Note: Orders for blood components shall follow the policies for patient care orders and verbal orders for inpatient and out patients (UMHHC Policy 62-10-003 Patient Care Orders, UMHHC Policy 62-10-006 Inpatient Verbal Orders and UMHHC Policy 62-10-007 Verbal Orders - Ambulatory Care). (Added 1/10/05)
2.	administer any pretransfusion medication
3.	record the patient's vital signs
4.	initiate or verify patency of an intravenous line

Transport of Blood Components

Blood may be obtained by one of the following methods:

- pneumatic tube
- unit personnel picking up at the Blood Bank window Room 2F225 University Hospital
- transport of blood components using phlebotomy service when the blood order is large or the pneumatic tube system cannot be used.

When calling the Blood Bank for pneumatic tube delivery of a unit of blood provide the following:

1	intended blood recipient's full name and CPI number
2.	blood component ordered
3.	number of units required
4.	verification that the order was correct when the request is read back

- Transport personnel must present to Blood Bank personnel written notification indicating following:

1	intended blood recipient's full name and CPI number

2	blood component ordered
3	number of units required

- Blood components will be released to physicians and registered nurses on the basis of an oral request stating this information.
- Patient care units **Without a Blood Refrigerator**: Only one unit of blood will be released at a time for a patient unless the patient has two intravenous lines in place that allow for the simultaneous administration of two components.
- Patient Care Units **With a Blood Refrigerator**: Multiple blood units will be released only to patient care units with monitored blood refrigerators.

Receipt of Blood Components

The person receiving the blood being transported or opening the tube at the receiving location must immediately upon receipt

<table>
<tr><td>Step</td><td colspan="2">Action</td></tr>
<tr><td>1</td><td colspan="2">Verify

• Product is designated for a patient at the receiving location
• Name and CPI number recorded on the Transfusion Record Form attached to the unit correspond with that of the intended recipient
• Unit has a normal appearance.</td></tr>
<tr><td>2</td><td colspan="2">The person receiving the blood component should:

• Record the date and time that the blood was received/removed from the pneumatic tube on the Blood Delivery form
• Sign the Blood Delivery form</td></tr>
<tr><td>3</td><td colspan="2">Return the signed and dated Blood Delivery Form to the Blood Bank using hospital mail</td></tr>
<tr><td rowspan="4">4</td><td colspan="2">Verify that red blood cells and plasma components were received within 30 minutes of the dispensed time stamp on the form.

If Then</td></tr>
<tr><td rowspan="3">If more than 30 minutes have elapsed since the time stamp on the Blood Delivery Form</td><td>the Red Blood Cells or plasma may be used for immediate transfusion that will be completed within 4 hours of the time stamp, transfuse the component.</td></tr>
<tr><td>Do not store Red Blood Cells and plasma that has been out of refrigeration for more than 30 minutes in patient care unit Blood Refrigerators.</td></tr>
<tr><td>If the blood component is not needed for immediate transfusion, return the Red Blood Cells or plasma to the blood bank for proper disposal.</td></tr>
</table>

- Red Blood Cell and plasma components must be stored between 1 and 6 C and the temperature during transport cannot exceed 10 C. Refrigerated blood components will warm to above 10 C in approximately 30 minutes after removal from refrigeration.
- Platelets and Cryoprecipitate are stored at room temperature. These components may be used until the outdate time on the label.
- Consult with the Blood Bank if there is any question about the suitability or identification of a blood component.

Special Labels

- When blood is released for transfusion under unusual circumstances a special notation will be indicated on the Transfusion Record Form.
- This information will often suggest to physicians and nurses that particular caution must be exercised during transfusion, and that the blood transfusion should be terminated at the first sign of an untoward reaction.
- Personnel initiating the transfusion who have questions concerning the significance of this information should contact the Blood Bank.

IMMEDIATELY PRIOR TO BLOOD TRANSFUSION

Pretransfusion Vital Sign Documentation

- To provide a baseline, record the patient's blood pressure, pulse, respirations and temperature in the chart or on the transfusion record form

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.

- Verify physician's orders for transfusion and any that any pretransfusion medications have been administered
- Perform bedside verification of patient and component Using the
- labels on the bag,
- the Transfusion Record Form and
- the patients attached positive patient identifier.

Two qualified individuals must

These steps must never be bypassed.

1	Ask the patient to state his or her name. Verify patient and component identification information.
2	Verify the blood type, donor number, component name

3	Verify compatibility: a compatibility chart is on the back inside cover of this booklet.
4.	Verify the product is not outdated
5.	Sign the Transfusion Record Form before blood transfusion is initiated.
6.	The person who hangs the blood must record the date and time the transfusion was started
7.	Record the date, time, component and unit number on the appropriate sheet on the patient's chart. Refer to unit policy and procedures.

DO NOT START the transfusion if there is any discrepancy.
Contact the Blood Bank.

Initiating the Transfusion

- Immediately before transfusion, mix the unit of blood thoroughly by gentle inversion.
- Follow the manufacturer's instruction for the use of special filters and ancillary devices. Additional administration instructions for selected components are printed at the end of this chapter and are available upon request from the Blood Bank.
- If any part of the unit is transfused, the unit is considered transfused.

Flow Rates

Initial Flow Rate	Slowly at no more 1 mL/minute to allow for recognition of an acute adverse reaction. Proportionately smaller volume for pediatric patients.
Standard Flow Rate - Adults	If no reaction occurs in the first 15 minutes, the rate may be increased to 4 mL/minute
Pediatrics	10-20 mL/kg over 30-60 minutes
Usual Infusion time	Red Blood Cells: two hours unless the patient can tolerate only gradual expansion of the intravascular volume Platelets, plasma and cryoprecipitate: 10 mL per minute. The transfusion may be administered as rapidly as the patient can tolerate, usually 30 minutes.
Maximum Infusion Time	Infusion time should not exceed 4 hours for any component.

If rate slows appreciably	investigate immediately Consider measures that may enhance blood flow • repositioning the patient's arm, • changing to a larger gauge needle, • changing the filter and tubing, • and elevating the IV pole, if gravity rather than a pump is being used.

During the Transfusion Document

What	• temperature, blood pressure, respirations and pulse, and examine the skin for urticaria. • Assess flow rate
When	• before initiating the transfusion • after the first 15 minutes • after 30 minutes • hourly until one hour after completion of the transfusion
Outpatient Post Transfusion Vital Signs	For outpatient transfusions, the vital signs may be taken at 30 minutes post transfusion.

See Chapter 7 for details concerning the signs and symptoms of a transfusion reaction.

If the patient has a preexisting fever

The need for transfusion must be balanced with the risk of transfusion. Contact the patient’s physician to determine if pretransfusion medications should be administered.

If a patient is being transported with blood hanging

Patients should not be transported with blood components infusing unless accompanied by a clinician who can monitor and respond to a potential reaction. Additionally, the receiving clinic/area must have a clinician who can manage a patient while they are receiving blood components.

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, reflushing the line with saline and restarting the transfusion.

Units entered and not transfused

If a unit of blood or a blood component has been entered for any reason by personnel not working in the Blood Bank, and the unit has not been transfused

- Record on the transfusion Record Form the volume transfused as "NONE"
- Indicate the disposition of the unit "Discarded on patient unit" and sign and date the notation.
- Return the Transfusion Record Form to the Blood Bank

If Components Are No Longer Needed

To avoid unnecessary waste of blood resources, notify the Blood Bank staff immediately if components are no longer needed for a patient, as the component may be suitable for transfusion to another patient. Return any unneeded units to the blood bank.

At the Termination of an Uncomplicated Transfusion

After the completion of each uncomplicated transfusion, the responsible physician or nurse should verify that the "Transfusers Must Complete" section of the Transfusion Record Form
is complete, including

- date and time transfusion was stopped
- volume of blood infused
- Check the box documenting the presence/absence of a transfusion reaction.

Discontinue the isotonic saline solution used to initiate the transfusion after the completion of the transfusion unless specifically ordered.

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

If a Transfusion Reaction is Suspected

- Stop the transfusion
- Maintain the IV.
- Save the bag and attached tubing and refer to Chapter 7 for additional instructions.

Disposal of Blood Bags If No Reaction is Suspected

Discard empty blood bags with attached blood infusion sets on the patient unit in a biohazard waste container such as a red bag.

Transfusion Record Form Distribution

Following completion of the form, the white copy of this form should be retained in the patient unit for attachment to the patient's chart; the pink copy of the form must be returned to the Blood Bank in hospital mail.

SPECIAL INSTRUCTIONS FOR HEMATOPOIETIC PROGENITOR CELL (HPC) INFUSION

Autologous stem cells are the patient's own stem cells that are harvested from the marrow or peripheral blood and then cryopreserved.

Allogeneic Bone Marrow is fresh stem cells taken from a donor's bone marrow. Allogeneic stem cells are taken from the peripheral blood by apheresis. After collection these cells may be cryopreserved.

Physician Orders	There must be a written order from a hematology/oncology staff physician for the infusion.
Transfusionist Qualifications	HPC must be administered by a physician or an experienced Bone Marrow Transplant RN or Physician Assistant under the direct supervision of a physician. A physician or Physician Assistant must be present on the unit during autologous HPC re-infusion with emergency equipment available at the bedside.
Maximum time from thaw to infusion	HPC products must be infused within 15 minutes of thawing. They cannot be stored since the cryoprotective agent DMSO is toxic to cells at 4 C.
Storage temperature of stems cells that are not frozen	Room temperature or if the infusion cannot be initiated immediately after processing is complete, the marrow may be stored in the Blood Bank at 4 C for no more than 24 hours
Compatible IV solution	Isotonic (0.9%) saline is the only solution compatible with stem cell products

Irradiation	Stem cell products are **not irradiated.**
Infusion equipment	Administer through a central venous catheter. Use a standard 170 to 210 micron filter. **Do not administer through a microaggregate filter.**
Documentation of Vital Signs	Vital signs must be documented after the first 15 minutes of the infusion, at half hour intervals during an allogeneic infusion, every 15 minutes during an autologous infusion and then every 30 minutes for one-hour post infusion.
Adverse Reactions	Adverse reactions associated with any blood component transfusion apply to HPC. . In addition, reactions due to the cryopreservative DMSO and the lack of an infusion filter may also occur. Monitor the patient closely for symptoms such as hypertension, dyspnea, pulmonary edema, chest pain, bronchospasm, abdominal cramping, hypoxia, headache, nausea, vomiting, fever, chills, hypertension, hemoglobinuria and urticaria.
If a reaction occurs	If symptoms develop, slow the infusion. Notify the patient's physician and the Blood Bank physician on-call.
ABO-incompatible stem cell products	Patients receiving a major ABO-incompatible HPC product will likely develop an acute hemolytic reaction depending on the volume of ABO incompatible cells infused. See chapter 7.
Red discoloration of the urine	A red discoloration of the urine commonly occurs up to 24 hours after the infusion of cryopreserved HPC as a result of the dye in the processing media. This occurrence does not need to be reported as a transfusion reaction.