Status Scheduled PolicyStat ID 11909865

Beaumont

Origination	7/5/2022
Last Approved	6/21/2022
Effective	7/5/2022
Last Revised	6/21/2022
Next Review	6/20/2024

Document Contact	Kelly Sartor
Area	Laboratory-Blood Bank
Applicability	Dearborn, Troy

Selection of Blood Components for Neonatal Transfusion

Document Type: Procedure

COPY

I. PURPOSE AND OBJECTIVE:

This document will provide the Blood Bank staff with policies and procedure for the selection of blood components for neonatal transfusion.

II. CLINICAL SIGNIFICANCE:

A. Patients less than four months old have immature immune systems and small blood volumes, which necessitates special approaches to component transfusion. For example, the risk of transfusion-associated graft-vs.-host disease is reduced by using irradiated red blood cells (RBCs) and platelets. The risk of cytomegalovirus (CMV) transmission is reduced by using leukocyte reduced components from CMV-negative donors, or pathogen reduced products. In addition, neonates are transfused with plasma components meeting strict freezing and thawing requirements to ensure that the components contain sufficient levels of coagulation factors. All components are generally prepared in small-volume aliquots to limit the number of donor exposures and to decrease donor-related risks.

B. The immature neonatal immune system also necessitates special approaches to compatibility testing. Valid reverse typings are generally not obtained on neonatal samples; therefore, group O blood is required for neonatal transfusion. In addition, compatibility testing is performed only one time per admission until the age of four months in an effort to reduce iatrogenic blood loss and because alloimmunization is rare during the neonatal period.

III. SCOPE:

The policies in this document will be applied whenever any blood component is requested for neonatal transfusion. This document includes special transfusion requirements and ABO/Rh compatibility

considerations for neonatal transfusion on patients less than four months old. The steps found in Transfusion Medicine policy, Newborn Compatibility Testing Guidelines are also applicable and should be performed before components are prepared for neonatal transfusion.

IV. DEFINITIONS/ACRONYMS:

A. **Neonates**: Patients < 4 months old.

B. **Pediatric patients**: Patients > 4 months old through 18 years old.

C. **CMV**: Cytomegalovirus

D. **ABO-identical**: Refers to a component that is of the identical ABO blood group as the recipient.

E. **ABO-compatible**: Refers to a RBC or granulocyte component that lacks ABO antigens corresponding to the recipient's ABO antibodies.

F. **ABO-plasma-compatible**: Refers to a platelet, plasma, or cryoprecipitate component that lacks ABO antibodies corresponding to the recipient's ABO antigens.

G. **Rh-identical**: Refers to a component that is of the identical Rh as the recipient.

H. **Rh-compatible**: Refers to a blood component of the following specificity:

1. For a Rh negative recipient, the component is Rh negative.
2. For a Rh positive recipient, the component is either Rh positive or Rh negative.
3. For a recipient with a Rh type that is undetermined for any reason, the component is Rh negative.

I. **Unexpected antibody**: Any antibody (other than naturally occurring Anti-A or Anti-B that is regularly found in normal serum or plasma) that is currently or was historically present in a patient's sample.

J. **Passively acquired antibodies**: Antibodies that are transferred from the donor(s) to a recipient through the transfusion or administration of plasma-containing components (i.e., RhIG administration).

K. **Pathogen reduced**: treatment with psoralen and ultraviolet (UVA) light which is effective in mitigating cytomegalovirus (CMV) and is a proactive approach to reducing the risk of CMV transmission. The treatment inactivates T cells in platelets, potentially lowering the risk of transfusion-associated graft-versus-host disease (TA-GVHD).

L. **Standard neonatal RBC Unit**: A RBC unit intended for neonatal transfusion meeting the following minimal requirements:

1. Group O
2. Rh Compatible with the neonate
3. Leukocyte Reduced
4. CMV-negative
5. Hemoglobin S (Sickle Cell) negative
6. Irradiated
7. Fresh (less than 10 days old ; less than 5 days for infant exchange)

COPY

M. **CDM**: Computer Documentation Manual;computer documentation workflow

N. **FFP** (Fresh Frozen Plasma): Plasma that has been frozen within 8 hours of phlebotomy. After thawing, it has an expiration date of 24 hours.

O. **FP24**: Plasma that may be frozen up to 24 hours after phlebotomy. After thawing, it has an expiration date of 24 hours.

P. **Thawed plasma**: Thawed FFP or FP24 (more than 24 hours after thawing) that has an expiration date of 5 days from the time of thawing. Thawed plasma may have a reduced concentration of Factors V and VIII.

V. POLICIES:

A. If the Blood Bank does not have a blood component that meets the neonate's special transfusion requirements, then every effort will be made to obtain the component from the blood supplier. The patient's nurse or physician will be notified of any potential delays, and this communication should be documented in the blood bank computer and/or on internal variance.

B. Prior to preparing any blood component for neonatal transfusion, all required compatibility testing must be performed in accordance with Transfusion Medicine policy, Newborn Compatibility Testing Guidelines.

C. The Blood Bank shall avoid the transfusion of any component that may passively transfer unexpected alloantibodies or ABO-incompatible antibodies to the neonate.

D. All RBCs transfused to neonates must be type O unless approved by both the Neonatologist and the Medical Director.

1. On rare occasions, a non-group O neonate may receive a non-group O RBC such as a directed donor unit or a rare unit with special requirements is required for the neonate.
2. The directed donor should obtain approval from both the Neonatologist and the Medical Director prior to being scheduled for collection.
3. Approval from both the Neonatologist and the Medical Director must be received by the Blood Bank technologist before any non-group O RBC unit is selected for crossmatching.
4. All approvals for transfusion with Non-Group O RBC must be documented in an internal variance.
5. The neonate's plasma must be screened for anti-A and anti-B at the antihuman globulin phase by the tube method as per Transfusion Medicine policy, Antibody Identification: Detection of Anti-A or Anti-B in Non-Group O Neonates Receiving Non-Group O RBCs.
6. If anti-A or anti-B is detected in the neonatal plasma, then the RBC intended for transfusion must lack the corresponding ABO antigen.
7. A gel crossmatch and immediate spin crossmatch must be performed using the neonatal sample.

E. **Neonates Should be Transfused with Fresh RBCs**

COPY

1. For routine neonatal RBC transfusions, RBC units should be less than 10 days old (if possible) the first time that an aliquot is removed from the unit.
2. For exchange transfusions, RBC units should be less than 5 days old (if possible). See also the *Policy to Limit Neonatal Donor Exposures.*

F. **Aliquots**
Component aliquots transfused to neonatal patients will be prepared as described in Transfusion Medicine policy, Aliquot Preparation.

G. **Policy to Limit Neonatal Donor Exposures**
In an effort to reduce the number of donors to which a neonate is exposed, neonates should generally not share blood components with other neonates. A neonate should be transfused from one specific unit, if possible. The remainder of the unit is reserved for potential subsequent transfusions for the neonate until it contains insufficient volume for transfusion; or until it is permissible to release the remaining aliquot to another patient. This permission should be documented on an internal variance.

H. **Pathogen Reduced Platelets**
Pathogen reduced platelets may be selected for patients requiring irradiation or CMV negative products. Platelets treated with psoralen are equivalent to a platelet needing to be irradiated or CMV negative.

I. **Transfusion of Rh-Compatible Components**
RBC and platelet components for neonatal transfusion should be Rh-compatible with the neonate. This policy is not applicable to plasma components or to cryoprecipitate.

J. **Transfusion of Rh-Positive Components to Rh Negative Neonates**

1. If Rh negative platelets are unavailable for a Rh-negative neonate and cannot be procured in a timely fashion, then the neonate's physician must decide whether to transfuse Rh positive platelets to the Rh-negative neonate.
2. If the physician decides to transfuse Rh positive platelets then the technologist will:
    a. Suggest the use of RhIg for the neonate to the physician
    b. Document all communication with the caregiver on an internal variance for for review by the Medical Director and/or designee.

K. **Policy to Transfuse Neonates with Plasma that has been Thawed in the 24 Hours Preceding Dispense**

1. When plasma components are required for a neonate, plasma that has been thawed in the 24 hours preceding dispense should be used because plasma thawed greater than 24 hours may have reduced concentrations of Factor V and Factor VIII.
2. If the plasma is required for the preparation of an exchange transfusion then plasma that has been thawed in the 24 hours preceding dispense **must** be used.
3. When plasma components are required for a neonate the technologist dispensing the unit should:
    a. Verify in the computer that the product was thawed in the 24 hours preceding dispense or
    b. Thaw a new plasma unit.

COPY

4. If a neonate requires multiple plasma aliquots over multiple days then Medical Director will be consulted to determine whether to honor the Policy to Limit Neonatal Donor Exposures or this Policy to Transfuse Neonates with Plasma that has been Thawed in the 24 Hours Preceding Dispense.

L. **Policies Relating to the ABO of Platelets, Plasma, and Cryoprecipitate**

1. Platelets, plasma, and cryoprecipitate transfused to neonates must be ABO-identical or ABO-plasma-compatible. The table below lists the blood group of ABO-plasma-compatible platelets, plasma, and cryoprecipitate based on the neonatal forward typing.

ABO-Plasma-Compatible Platelets, Plasma, and Cryoprecipitate	
Neonatal Forward Typing	**Blood Groups of ABO-Plasma Compatible Platelets, Plasma and Cryoprecipitate**
O	O, A, B, AB
A	A or AB
B	B or AB
AB	AB

2. If an ABO-identical or an ABO-plasma-compatible platelets, cryoprecipitate or plasma component is unavailable and cannot be procured in a timely manner, then the Medical Director's (MD) approval is required prior to transfusion and should be documented in an internal variance.

M. **Emergency Issue of Blood Components for Neonatal Transfusion**

1. In an emergency, the Blood Bank will attempt to select blood components that meet the specific requirements listed in the *Policies for Specific Neonatal Blood Components* table below. However, in some emergencies it will become necessary to weigh the risks of transfusing with components that do not meet these requirements or before the required compatibility testing is completed against the risks of delaying transfusion.
2. In some cases, a RBC aliquot may be dispensed as described in Transfusion Medicine policy, Emergency Issue of Blood Products.

N. **Post-Issue Crossmatches for Neonates**

1. Post-issue crossmatches are performed (or cancelled) as described below.
    a. If there are no maternal / neonatal antibodies, then a serologic crossmatch is not required post-issue. The crossmatch that reflexes in Soft may be canceled.
2. If the neonate's ABO must be interpreted as GND (group not determined), then a serologic crossmatch is not required post-issue as long as group O RBCs were emergency issued. The crossmatch that reflexes in Soft may be canceled.
3. If there are maternal or neonatal antibodies, then serologic crossmatches are performed as described in Transfusion Medicine policy, Newborn Compatibility

COPY

Testing Guidelines: *Additional Compatibility Testing with the Standard Neonatal RBC Unit.* The crossmatch should automatically reflex in Soft.

O. **Policies for Specific Neonatal Blood Components**

Blood Component	Blood Component Requirements	Notes
RBCs	A standard neonatal RBC unit must be: • Group O • Rh compatible with neonate • Leukocyte reduced • CMV Negative • Hemoglobin S Negative • Irradiated • Fresh; typically less than 10 days old • RBCs are usually prepared in aliquots	• Medical Director approval is required for transfusion of any non-group O RBC. See *Policies for Non-Group O Neonates Receiving Non-Group O RBCs.* • In addition to the standard neonatal RBC unit requirements**, if unexpected antibodies are:** 1. present in the maternal or neonatal sample or 2. indicated in the maternal history, then the unit must also meet the requirements of Transfusion Medicine policy, Newborn Compatibility Testing. • Refer to Transfusion Medicine policy, Aliquot Preparation.
Platelets	Platelets for neonatal transfusion should be: • ABO identical or ABO-plasma compatible with neonate • Rh compatible • Leukocyte reduced • CMV Negative or pathogen reduced/ psoralen treated • Irradiated or Pathogen Reduced • usually prepared in aliquots	• If applicable see the policy, *Transfusion of Rh Positive Components to Rh Negative Recipients* • Platelets may be aliquoted from an apheresis or pooled platelet. The freshest platelet should be used to minimize donor exposures for the neonate. • Refer to Transfusion Medicine policy, Aliquot Preparation.
Thawed Plasma	• Thawed plasma should be ABO-identical or ABO-	• Refer to above *Policy to Transfuse Neonates with Plasma that has been Thawed in the 24 Hours Preceding Dispense*

COPY

	plasma compatible. • Transfuse plasma that has been thawed in the 24 hours preceding dispense. • Once thawed, plasma is prepared in aliquots.	• Transfusion Medicine policy, Aliquot Preparation.
Thawed Cryoprecipitate	• Cryoprecipitate (thawed) should be ABO-identical or ABO-plasma compatible. • may be prepared in aliquot	• Single, random donor bags of cryoprecipitate are usually transfused (as opposed to pre-pooled bags from the supplier) to minimize donor exposures. • Refer to Transfusion Medicine policy, Aliquot Preparation.

VI. SPECIMEN COLLECTION AND HANDLING:

COPY

Both a neonatal and maternal sample (if available) will be tested. All samples must meet the requirements found in the Transfusion Medicine Policies Triaging and Identifying Acceptable Samples for Testing and Forward Typing Determination of Neonatal ABO and Rh by the Tube Method.

A. **Neonatal Sample Requirements:**
    1. Samples may be a capillary sample or may be drawn into an EDTA tube, with affixed identifying label.
    2. Cord blood samples are unacceptable for transfusion purposes.

B. **Maternal Sample Requirements:**
    1. The specimen of choice is 6 ml EDTA sample with affixed identifying label.
    2. Samples drawn in serum separator tubes are generally not acceptable.

VII. REFERENCES:

1. AABB, *Technical Manual*, current edition.
2. AABB, *Standards for Transfusion and Blood Bank Medicine*, current edition.
3. College of American Pathologists, *Transfusion Medicine Checklist*, current edition.

Approval Signatures

Step Description	Approver	Date
	Jeremy Powers: Chief, Pathology	6/21/2022
	Vaishali Pansare: Chief, Pathology	6/21/2022
	Ryan Johnson: OUWB Clinical Faculty	6/20/2022
Policy and Forms Steering Committe (if needed)	Gail Juleff: Project Mgr Policy [IH]	6/17/2022
Policy and Forms Steering Committe (if needed)	Kelly Sartor: Supv, Laboratory	6/17/2022
	Teresa Lovins: Supv, Laboratory	6/16/2022
	Kelly Sartor: Supv, Laboratory	6/16/2022

COPY