Beaumont Laboratory
Royal Oak

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POLICIES FOR THE SELECTION OF BLOOD COMPONENTS FOR NEONATAL TRANSFUSION

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Purpose

The purpose of this document is to provide the Blood Bank staff with guidelines for the selection of blood components for neonatal transfusion

Scope

The policies in this document should be applied whenever any blood component is requested for neonatal transfusion. The scope of this document includes special transfusion requirements and ABO/Rh compatibility considerations for neonatal transfusion. This document applies only to neonatal patients less than four months old. The steps found in P507*, Neonatal Compatibility Testing Guidelines*, are also applicable and should be performed before components are prepared for neonatal transfusion.

This document does not apply to pediatric patients greater than four months old. For additional information refer to P226, *Special Transfusion Requirements for Patients Greater Than Four Months Old.*

Principle

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 syringe aliquots to limit the number of donor exposures and to decrease donor-related risks.

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. For further information, refer to P507, *Neonatal Compatibility Testing Guidelines*.

Forms

- F-008a, *Communication Form for Patients with Antibodies or Special Instructions*
- F-008c, *Communication and Daily Blood Bank Rounds Log*
- F-407Aa, *Disposition of a Platelet from which an Aliquot has been Removed*
- F-407Ab, *RBC Aliquot Log*

- F-507, *Log of Red Cell Units Crossmatched for Neonates*

Policies

If the Blood Bank does not have a blood component that meets the neonate's special transfusion requirements, then every effort should be made to obtain the component from the blood supplier. The floor should be notified of any potential delays, and this communication should be documented on F-008a, *Communication Form for Patients with Antibodies or Special Instructions* or on F-008c, *Communication and Daily Blood Bank Rounds Log*.

Prior to preparing any blood component for neonatal transfusion, the *Neonatal Compatibility Testing Guidelines* described in P507 must be performed.

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

All RBCs transfused to neonates must be type O. There is one exception to this policy; see *Policies for Non-Group O Neonates Receiving Non-Group O RBCs*, below.

Neonates Should be Transfused with Fresh RBCs

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. For exchange transfusions, RBC units should be less than 5 days old (if possible). See also the *Policy to Limit Neonatal Donor Exposures.*

Syringe Aliquots

Components dispensed to neonatal patients should generally be filtered into a syringe prior to dispense from the Blood Bank, as described in P203, *Syringe and Aliquot Preparation.*

Pathogen Reduced Platelets

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

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 as described in P407A, *Disposition of Components from which an Aliquot has been Removed*.

RBCs: Neonatal RBC syringe aliquots are documented in the Blood Bank computer as described in the Triage CDM *Syringe Preparation,* and are documented on F-407Ab, *RBC Aliquot Log*.

Platelets: Neonatal platelet syringe aliquots are documented in the Blood Bank computer as described in the Triage CDM *Syringe Preparation,* and are documented on F-407Aa, *Disposition of a Platelet from which an Aliquot has been Removed.*

Plasma Components: It is preferable not to share plasma components among neonates.

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.

Transfusion of Rh Positive Components to Rh Negative Neonates
If Rh negative platelets are unavailable for an 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. If the physician decides to transfuse Rh positive platelets in this case, then the technologist shall:

- Submit a variance.
- Suggest the use of Rh Immune Globulin or WinRho for the neonate.
- The technologist should document or place a copy of the variance on F-008c, *Communication and Daily Blood Bank Rounds Log* for review by the Medical Director.

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

- When plasma components are required for a neonate, plasma that has been thawed in the 24 hours preceding dispense should be used.
  - Dispense a plasma unit that was previously thawed, as long as the technologist has verified in the computer that it was thawed in the 24 hours preceding dispense, or
  - Thaw a new plasma unit.
- Note that it is not necessary to modify the thawed plasma to FFP or FP24 in order to comply with this policy; do not modify to FFP or FP24. The terms thawed plasma, FFP, and FP24 are defined in the *Definitions* section.
- This policy was adopted because plasma that has been thawed for greater than 24 hours may have a reduced concentration of Factors V and VIII.
- If an exchange transfusion is required, then plasma that has been thawed in the 24 hours preceding dispense *must* be used.
- If a neonate requires multiple plasma aliquots over multiple days then consult the Medical Director, who will decide whether 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.*

Policies Relating to the ABO of Platelets, Plasma, and Cryoprecipitate
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 Group of ABO- Plasma-Compatible Platelets, Plasma, and Cryoprecipitate
O	O, A, B, or AB
A	A or AB
B	B or AB
AB	AB

- If an ABO-identical or an ABO-plasma-compatible 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 a variance.
- If ABO-identical or ABO-plasma- compatible platelets cannot be provided for a neonatal transfusion, then ~~volume reduced~~ or washed platelets must be provided. Refer to ~~P227, *Volume Reduction of Platelets* and~~ P230, *Washing Platelet Components* for additional information.

Policies for Non-Group O Neonates Receiving Non-Group O RBCs

On rare occasions, a non-group O neonate may receive a non-group O RBC. This may occur if a directed donation or rare unit is requested for the neonate. The following requirements must be met:

- Approval from both the Neonatologist and the Medical Director is required. If possible, the approvals should be received before the donor makes an appointment to make the directed donation. However, the approvals must be received before the RBC unit is selected for crossmatching. Both approvals must be documented in a variance.
- The neonate's plasma must be screened for anti-A and anti-B at the antihuman globulin phase by the tube method; see P604, *Antibody Identification by Tube Method* / *Detection of Anti-A or Anti-B in Non-Group O Neonates Receiving Non-Group O RBCs*.
- If anti-A or anti-B is detected in the neonatal plasma, then the RBC intended for transfusion must lack the corresponding ABO antigen.
- A gel crossmatch and immediate spin crossmatch must be performed using the neonatal sample.

Emergency Issue of Blood Components for Neonatal Transfusion

- 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 (P507) is completed against the risks of delaying transfusion.
- In some cases, a RBC syringe may be dispensed as described in P419, *Downtime Emergency Issue*.

Post-Issue Crossmatches for Neonates

Post-issue crossmatches are performed (or cancelled) as described below. Refer also to the Triage CDM *Recouping Data from a Downtime Emergency Issue to a Baby who was not yet Assigned a MRN.*

- 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.
- If the neonate's ABO/Rh must be interpreted as GND (group not determined) or RND (Rh not determined), then a serologic crossmatch is not required post-issue as long as group O, Rh(D) compatible (Rh negative for RND patients) RBCs were emergency issued. The crossmatch that reflexes in Soft may be canceled.
- If there are maternal or neonatal antibodies, then serologic crossmatches are performed as described in P507, *Newborn Compatibility Testing Guidelines* / *Additional Compatibility Testing with the Standard Neonatal RBC Unit.* The crossmatch should automatically reflex in Soft.

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 the neonate • Leukocyte Reduced • CMV-negative • Hemoglobin S (Sickle Cell) negative • Irradiated • Fresh (See *Policies, Neonates Should be Transfused with Fresh RBCs)* • RBCs are usually prepared in syringe 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:** ◦ present in the maternal sample or neonatal antibody screen, or ◦ indicated in the maternal antibody history, then the unit must also meet the requirements found in P507 / *Additional Compatibility Testing with the Standard Neonatal RBC Unit*. • Refer to Triage CDM *Syringe Preparation* and P203, *Syringe and Aliquot Preparation.* • Document F-407Ab, *RBC Aliquot Log.*
Platelets	Platelets for neonatal transfusion should be: • ABO-identical or ABO-plasma compatible • Rh compatible • Leukocyte reduced • CMV- negative or pathogen reduced/psoralen treated • Irradiated or pathogen reduced • Platelets are prepared in syringe 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 Triage CDM *Syringe Preparation* and P203, *Syringe and Aliquot Preparation.* • Document F-407Aa, *Disposition of a Platelet from which an Aliquot has been Removed.*
Plasma (thawed)	♦ Thawed plasma should be ABO-identical or ABO-plasma compatible. ♦ Transfuse plasma that has been thawed in the 24 hours preceding dispense. ♦ Once thawed, plasma is prepared in syringe aliquots.	• See *Policy to Transfuse Neonates with Plasma that has been Thawed in the 24 Hours Preceding Dispense* • Refer to Triage CDM *Syringe Preparation* and P203, *Syringe and Aliquot Preparation.*
Cryo-precipitate (thawed)	Cryoprecipitate (thawed) should be ABO-identical or ABO-plasma compatible. Cryoprecipitate (thawed) is prepared in syringe aliquots.	• Single, random donor bags of cryoprecipitate are usually transfused (as opposed to pre-pooled bags from the supplier) to minimize donor exposures. • Refer to Triage CDM *Syringe Preparation* and P203, *Syringe and Aliquot Preparation.*

Definitions

- **Neonates:** Patients < 4 months old.
- **Pediatric patients:** Patients ≥ 4 months old through 18 years old.
- **CMV:** Cytomegalovirus
- **ABO-identical:** Refers to a component that is of the identical ABO blood group as the recipient.
- **ABO-compatible:** Refers to a RBC or granulocyte component that lacks ABO antigens corresponding to the recipient's ABO antibodies.
- **ABO-plasma-compatible:** Refers to a platelet, plasma, or cryoprecipitate component that lacks ABO antibodies corresponding to the recipient's ABO antigens.
- **Rh-identical:** Refers to a component that is of the identical Rh as the recipient.
- **Rh-compatible:** Refers to a blood component of the following specificity:
  - For a Rh negative recipient, the component is Rh negative.
  - For a Rh positive recipient, the component is either Rh positive or Rh negative.
  - For a recipient with a Rh type that is undetermined for any reason, the component is Rh negative.
- **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.
- **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).
- **Pathogen reduced:** treatment with psoralen and 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).
- **Standard neonatal RBC Unit:** A RBC unit intended for neonatal transfusion meeting the following minimal requirements:
  - Group O
  - Rh Compatible with the neonate
  - Leukocyte Reduced
  - CMV-negative
  - Hemoglobin S (Sickle Cell) negative
  - Irradiated
  - Fresh (See the *Policies* section, *Neonates Should be Transfused with Fresh RBCs*)

- **CDM:** Computer Documentation Manual
- **FFP (Fresh Frozen Plasma):** Plasma that has been frozen within 8 hours of phlebotomy. After thawing, it has an expiration date of 24 hours.
- **FP24:** Plasma that may be frozen up to 24 hours after phlebotomy. After thawing, it has an expiration date of 24 hours.
- **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.

References

- AABB, *Technical Manual*, current edition.
- AABB, *Standards for Blood Banks and Transfusion Services*, current edition.

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Revised by: Christopher Ferguson	07/29/2020	r00.02.00	Apheresis or pooled platelets may be used for neonatal transfusion. GND and RND neonates don't require post-issue IS crossmatches. Added reference to P230, *Washing Platelet Components*. IS crossmatches required in addition to gel if non-O RBCs are to be transfused to non-O neonates. Updated template, authorized reviewers, titles, and references.	
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