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Syringe and Aliquot Preparation - Blood Bank Royal Oak

Document Type: Procedure

I. PURPOSE AND OBJECTIVE:

This document will provide policies and procedures to the Blood Bank staff for the preparation and labeling of syringes and aliquots (divided components).

II. SCOPE:

Syringes are prepared for neonatal transfusion as described in Transfusion Medicine policy, *Policies for the Selection of Blood Components for Neonatal Transfusion*. Aliquots may be indicated for pediatric patients or patients with conditions that may cause concerns of fluid or cardiac overload; i.e., severe chronic anemia, overt heart failure, or renal failure. Aliquots may also be provided for cases in which incompatible red blood cells (RBCs) that are not phenotypically matched must be transfused; refer to the *Determining whether to Aliquot Incompatible Donor Units* section of this document.

III. INTRODUCTION:

A. Syringes and aliquots are ideally made using a closed system in which the contents of the parent component and the syringe or aliquot are not exposed to the air or outside elements. The Sterile Connection Device (SCD) is used to maintain the closed system, as described in Transfusion Medicine policy, *Sterile Connecting Device Operation*. Tubing from the parent component is welded to tubing from a syringe set or satellite bag using a wafer that is heated to 500°F, preventing contamination. The expiration date of the parent component remains unchanged, allowing multiple syringes or aliquots to be drawn from the parent component over time and reducing the number of donor exposures.

B. In the event that the SCD is unavailable, syringes and aliquots may be prepared using an open system. However, this method should not be routinely performed because the contents of the

parent component, syringe, or aliquot may be exposed to the air and outside elements. The original expiration date of the parent component and aliquots will be shortened significantly. This may result in an increased number of donor exposures.

IV. DEFINITIONS:

A. **Open system**: A system, the contents of which are exposed to air and outside elements during preparation and separation of components.

B. **Closed system**: A system, the contents of which are not exposed to air or outside elements during preparation and separation of components.

C. **Parent component**: The component from which a syringe or aliquot is removed.

V. POLICIES:

A. Closed System is the Preferred Method

1. The use of a closed system is the preferred method for preparing syringes and aliquots. If the SCD is used, the integrity of the weld and maintenance of the closed system must be assessed and documented after each weld on the *Blood Product Division / Syringe Preparation Log*.
2. An open system should only be used if it is not possible to use a closed system.
3. If the integrity of the weld is unacceptable or if the SCD is unavailable, the system must be considered an open system and the expiration date must be modified accordingly; see the *Expiration Dates / Times of Syringes and Aliquots* section of this document. For additional information on weld integrity and inspection refer to Transfusion Medicine policy, *Sterile Connecting Device Operation*.
4. When preparing a syringe or aliquot, ensure that sufficient tubing remains on the products so that additional syringes or aliquots may be made or so that additional testing may be performed if necessary.

B. Irradiation of All Divided RBCs and Platelets

1. All divided RBCs and platelets must be irradiated or equivalent; they must be irradiated before they are divided. This statement is printed on the *Blood Product Division / Syringe Preparation Log.*
2. It is acceptable to irradiate a previously divided product as long as it is still in the original bag from the blood supplier. It is not acceptable to irradiate divided products in a transfer bag or syringe.

C. Policies Related to Component Labeling

1. Labeling of a syringe or aliquot includes the attachment of a *Neonate Transfusion Label* or component face label documented with the identifiers listed below, and a crossmatch tag.
2. When possible, a computer generated label should be used for any of the identifiers listed below. See the *Computer Modification* section of this document. If it is not possible to use a

computer generated label, then the identifier should be handwritten, or another approved sticker may be used. For example, during a computer downtime:

a. A donor sticker number from the back of the unit may be used and the suffix should be handwritten.

b. An *Expiration Date / Time sticker* may be used.

D. Labeling of Syringes / Identifiers

1. The *Neonate Transfusion Label* (sticker) shall be affixed to the syringe and shall be documented with the following identifiers:

    a. Patient's name and MRN (medical record number) or HAR (hospital admission record), usually documented by the NICU (Neonatal Intensive Care Unit) on this sticker before it is sent to the Blood Bank.

    b. Patient's ABO/Rh

    c. Patient's wristband number

    d. Donor unit number

    e. The ABO/Rh of the donor unit

    f. Product description, including the blood product code and suffix

    g. Any special attributes (e.g., irradiated, CMV negative, HbS negative, etc.)

    h. Expiration date and time

E. Labeling of Aliquots / Identifiers

1. The component face label of an aliquot shall contain the following identifiers:

    a. Donor unit number

    b. The ABO/Rh of the donor unit

    c. Product description, including the blood product code and suffix

    d. Any special attributes

    e. Expiration date and time

F. Computer Modification

1. The following flows are used to prepare syringes and aliquots in the Blood Bank computer:

    a. Blood Bank CDM, *Syringe Preparation*

    b. Blood Bank CDM, *Dividing Blood Products*

2. After computer modification, a new product description label must be affixed to the parent and to the syringe or aliquot.

    a. For ISBT units, a product description label will be generated by the computer.

    b. For codabar units, the appropriate Shamrock label will be used for the product description. The suffix should be handwritten.

G. Second Verification (Cosigning) of Syringes and of Aliquots

1. After labeling a syringe or aliquot and after affixing the crossmatch tag, a second technologist must ensure the accuracy of the label. To document that this second verification was performed, the second technologist will document the "Cosigner" section on the *Blood Product Division / Syringe Preparation Log* (the log). The second technologist will verify:
    a. That the following information on the crossmatch tag and blood product label match:
        i. The ABO/Rh of the donor unit
        ii. Donor unit number
        iii. Product description, including the blood product code and suffix
        iv. Any special attributes
    b. That the expiration date and time on the blood product label is correct:
        i. In order to verify that the expiration date and time on the label is correct, the cosigner must first verify that the preparation date and time is correct as document on the log.
        ii. The cosigner will then independently determine the expiration date and time as indicated in the *Expiration Dates / Times of Syringes and Aliquots* section of this document (this table is copied as a job aid on the reverse side of the log).
        iii. The cosigner will then verify that the expiration date and time on the labels of both the parent and aliquot are correct.
2. **If for any reason the technologist is unable to obtain a cosigner (e.g., alone in the laboratory on a weekend), then an internal variance must be documented**.

H. Issue the Aliquot before the Parent

1. An aliquot or syringe shall be issued before the parent components. For example:
    a. An aliquot is prepared from a platelet pheresis using a closed system. The aliquot has an expiration time of 4 hours from the time the weld was made, and the expiration date / time of the parent remains unchanged. The aliquot is issued before the parent because the aliquot expires before the parent.

I. Determining whether to Aliquot Incompatible Donor Units

1. As indicated in Transfusion Medicine policy, *Warm Autoantibody Investigations* and Transfusion Medicine policy, *Investigation of Incompatible Crossmatches*, if donor RBC units are incompatible, then:
    a. It is not necessary to aliquot phenotypically matched donor units.

b. It may be necessary to aliquot donor units that are not phenotypically matched, or that are only "partially phenotypically matched".

J. Syringes for the NICU

1. All blood products sent to the NICU should be sent in a syringe, as opposed to an aliquot bag.
2. Any exceptions to this practice must be cleared with the patient's caregivers in advance. Blood is filtered as part of the syringe preparation. Blood issued in an aliquot bag must be filtered at the time of blood product administration.
3. Since only 30 mL or 60 mL syringe sets are available and since an additional 5 mL should be added to each syringe for priming, on some occasions it may be necessary to issue multiple syringes. In these cases, communication with the caregivers is important. For example:
    a. The NICU requests 62 mL of RBCs for a newborn. The Blood Bank should prepare 2 syringes, and should communicate with the caregivers about expiration times of the syringes and the anticipated transfusion times to prevent unnecessary wastage. An acceptable means of preparing the total of 62 mL RBCs would be as follows:
        i. First: Prepare and issue a 30 mL syringe with 20 mL RBCs (plus 5 additional for priming).
        ii. Second: Prepare and issue a 60 mL syringe with the remaining requested 42 mL (plus 5 mL for priming). This second syringe should be prepared after communication with the caregivers, so that the syringe will not expire before the anticipated transfusion time.

K. Split Units for Transfusion Associated Circulatory Overload (TACO)

1. Patients that have an increased risk for TACO or a compromised circulatory system may have additional transfusion requirements. The Blood Bank shall honor any request from the patient's caregiver for a half unit, or a specific volume, as per the Nursing Blood Component / Product Administration: Adult and Pediatric Patients procedure.

L. Expiration Dates / Times of Syringes and Aliquots

System	Component	Expiration Date and Time		
		Parent	Syringe	Divided aliquot (in satellite bag)
Closed	RBCs	Remains unchanged	24 hours from the time weld made using the SCD, not to exceed original expiration of the parent RBCs.	Original expiration of the parent RBCs.
	Platelets	Remains unchanged	4 hours from the time weld made using the SCD, not to exceed	4 hours from the time weld made using the SCD, not to exceed

			original expiration of the parent platelets.	original expiration of the parent platelets.
	Thawed Plasma	Remains unchanged	24 hours from the time weld made using the SCD, not to exceed original expiration of the parent thawed plasma.	Original expiration of the parent thawed plasma.
	*Thawed Cryoprecipitate	Remains unchanged	Original expiration of the parent thawed cryoprecipitate.	Original expiration of the parent thawed cryoprecipitate.
Open	RBCs	24 hours from the time the system was spiked, not to exceed original expiration of the parent RBCs.	24 hours from the time the system was spiked, not to exceed original expiration of the parent RBCs.	24 hours from the time the system was spiked, not to exceed original expiration of the parent RBCs.
	Platelets	4 hours from the time the system was spiked, not to exceed original expiration of the parent platelets.	4 hours from the time the system was spiked, not to exceed original expiration of the parent platelets.	4 hours from the time the system was spiked, not to exceed original expiration of the parent platelets.
	Thawed Plasma	24 hours from the time the system was spiked, not to exceed original expiration of the parent thawed plasma.	24 hours from the time the system was spiked, not to exceed original expiration of the parent thawed plasma.	24 hours from the time the system was spiked, not to exceed original expiration of the parent thawed plasma.
	*Thawed Cryoprecipitate	Original expiration of the parent thawed cryoprecipitate.	Original expiration of the parent thawed cryoprecipitate.	Original expiration of the parent thawed cryoprecipitate.
*Individual thawed cryoprecipitate and cryoprecipitate pre-pooled at a blood supplier has an expiration time of 6 hours from the time of thaw, if pooled at Beaumont Health, the expiration time is 4 hours from the time of pool.				

VI. SUPPLIES:

A. Parent blood component
B. 30 mL or 60 mL Syringe Sets with 150 micron filter
C. Transfer bags (150 mL or 300 mL)
D. Hemostats

VII. EQUIPMENT:

A. Tube sealer

B. Terumo Medical Corporation Sterile Connection Device

VIII. QUALITY CONTROL (QC):

A. All welds made with the Sterile Connection Device and all seals made with the tube sealer shall be inspected. This inspection shall be documented on the *Blood Product Division / Syringe Preparation Log*.

B. If the weld or the seal closest on the tubing to a component is unsatisfactory, the system must be considered an open system and the expiration date must be modified accordingly.

IX. PROCEDURE:

A. Preparation of a Syringe

1. Select the parent component from which to prepare the syringe; mix contents of the component gently.
2. Select the applicable syringe (30 mL or 60 mL). Tighten all connections on the syringe set before use.
3. Close the pinch clamp on the syringe set.
4. Attach the syringe to the parent component. Do NOT use the middle port in which there may be a plug. The plug provides resistance.
    a. For a closed system (preferred method), use the SCD to weld the tubing of the parent to the tubing of the syringe.
        i. Inspect the weld as described in Transfusion Medicine policy, *Sterile Connecting Device Operation*.
    b. For an open system, penetrate the parent component with the distal piercing pin that is attached to the syringe.
5. Open the pinch clamp on the syringe set.
6. Hang the parent component upside down. Slowly pull the required volume from the parent component through the filter into the syringe.
    a. Avoid the introduction of air bubbles.
    b. Transfer an additional 5 mL for priming.
7. Holding the parent bag and tubing upright, dispose residual air from the syringe by gently pushing air back through the filter and tubing.
8. Close the pinch clamp on the syringe set.
9. Separate the syringe from the parent component by making seals with the tube sealer on each side of the filter.
    a. Leave sufficient tubing length on the parent component so that additional syringes may be prepared or for any additional compatibility testing.
10. Inspect the seal. If the inspection of the seal closest on the tubing to the parent or syringe is

unsatisfactory, the system must be considered an open system and the expiration date must be modified accordingly.

    a. Refer to the *Expiration Date / Times of Syringes and Aliquots* section of this document.

11. Document the *Blood Product Division / Syringe Preparation Log*.
12. Label the parent and the syringe and document the syringe preparation in the Blood Bank computer.
    a. Refer to the *Policies Related to Component Labeling* and the *Computer Modification* sections of this document.
13. If not immediately issued, return the syringe and the parent component to the appropriate storage location.

B. Preparation of an Aliquot (Divided Unit)

1. Select the parent component from which to prepare the aliquot; mix contents of the component gently.
2. Select the applicable transfer bag (150 mL or 300 mL).
3. Attach the transfer bag to the parent component.
    a. For a closed system (preferred method), use the SCD to weld the tubing of the parent to the tubing of the transfer bag.
        i. Inspect the weld as described in Transfusion Medicine policy, *Sterile Connecting Device Operation*.
    b. For an open system, penetrate the parent component with the distal piercing pin of the transfer bag.
4. Hang the parent component upside down. Allow the required volume to flow from the parent component into the transfer bag.
5. Separate the transfer bag from the parent component by making seals with the tube sealer.
    a. Leave sufficient tubing length on the parent component so that additional aliquots may be prepared or for any additional compatibility testing.
6. Inspect the seal. If the inspection of the seal closest on the tubing to the parent or aliquot is unsatisfactory, the system must be considered an open system and the expiration date must be modified accordingly.
    a. Refer to the *Expiration Date / Times of Syringes and Aliquots* section of this document.
7. Document the *Blood Product Division / Syringe Preparation Log*.
8. Label the parent and the transfer bag and document the transfer bag preparation in the Blood Bank computer.
    a. Refer to the *Policies Related to Component Labeling* and the *Computer Modification* sections of this document.

b. If not immediately issued, return the aliquot and the parent component to the appropriate storage locations.

X. REFERENCES:

1. Charter Medical Neonatal Syringe Set Instructions.
2. SCD® 312 Sterile Tubing Welder Operating Instructions, August 1999.
3. AABB, *Technical Manual*, current edition.
4. AABB, *Standards for Blood Banks and Transfusion Services*, current edition.

Attachments

Blood Product Division / Syringe Preparation Log

Approval Signatures

Step Description	Approver	Date
	Ann Marie Blenc: System Med Dir, Hematopath	6/3/2022
	Craig Fletcher: System Med Dir, Blood Bank	5/27/2022
Policy and Forms Steering Committe (if needed)	Gail Juleff: Project Mgr Policy	5/27/2022
Policy and Forms Steering Committe (if needed)	Brooke Klapatch: Medical Technologist Lead	5/27/2022
	Rebecca Thompson: Medical Technologist Lead	5/27/2022
	Brooke Klapatch: Medical Technologist Lead	5/18/2022