

PROCEDURE NO.: SC 027

SUBJECT: The Venipuncture Procedure - Pediatric

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Approved By/Title: _____

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Purpose:

Obtaining blood via venipuncture from infants may be difficult and potentially hazardous, obtaining large quantities of blood, especially from premature infants, may result in anemia (see table below). Puncturing deep veins in children may cause:

- 1) Cardiac arrest
- 2) Hemorrhage
- 3) Venous thrombosis
- 4) Reflex arteriospasm and gangrene of an extremity
- 5) Damage to surrounding tissue or organs (e.g., puncturing the apex of the lung or piercing the trachea)
- 6) Infection
- 7) Injury from restraining the infant or child during the collection procedure

Responsibility:

All health care workers who collects blood on pediatric patients.

Materials:

23 gauge Safety-Lok butterfly
luer adaptor
pediatric vacutainer holder
3-5 ml syringe
21 or 22 gauge single sample needle
pediatric size tourniquet (non-latex if child is allergic)
70% isopropyl alcohol swab
2 x 2 gauze sponges
pediatric vacutainer tubes
tube holder
adhesive bandage (for older children only) or paper tape
disposable gloves

Policy:

In order to reduce these risks the following guidelines have been established:
Skin puncture is the recommended collection method however, there may be times when a venipuncture is necessary. (i.e. blood cultures, lead levels) If a venipuncture is done on a child younger than two years of age, the site should be limited to superficial veins (i.e., the femoral vein is not recommended). A 23g butterfly needle attached to a syringe should be used. Vacuum method is acceptable if using pediatric vacuum tubes.

Obtaining large quantities of blood from an infant, especially from premature infants, may result in anemia or cardiac arrest. To ensure that maximum volume has not been exceeded, the total volume drawn at one time must be recorded in the child's chart.

See Chart Below

Maximum Amounts of Blood to be Drawn From Patients Younger than 14 Years

Patient's Weight		Maximum Amount to be drawn at any one time (mL)	Maximum Amount of blood -cumulative to be drawn during a given hospital stay (1 month or less-mL)
Pounds	Kilograms (approx.)		
6-8	2.7-3.6	2.5	23
8-10	3.6-4.5	3.5	30
10-15	4.5-6.8	5	40
16-20	7.3-9.1	10	60
21-25	9.5-11.4	10	70
26-30	11.8-13.6	10	80
31-35	14.1-15.9	10	100
36-40	16.4-18.2	10	130
41-45	18.6-20.5	20	140
46-50	20.9-22.7	20	160
51-55	23.2-25.0	20	180
56-60	25.5-27.3	20	200
61-65	27.7-29.5	25	220
66-70	30.0-31.8	30	240
71-75	32.3-34.1	30	250
76-80	34.5-36.4	30	270
81-85	36.8-38.6	30	290
86-90	39.1-40.9	30	310
91-95	41.4-43.2	30	330
96-100	43.6-45.5	30	350

A. Introduction

1. Introduce yourself. Be warm and friendly, establish eye contact, and show concern about the child's health and comfort. You first should instill a trust and confidence in parent and child.
2. Correctly identify the patient.

Note: A hospitalized infant has an ID band and usually is referred to by their last name.

3. Find out about the child's past experience with blood drawing.

4. Ask parent how cooperative the child might be.
5. Explain and demonstrate the procedure in a language the child will understand. Proper preparation with help alleviate fear and diminish the “hurt”.
6. Explain that if the child holds still, you will more likely be successful.
7. Be honest with the child who asks whether the puncture will hurt.
8. Encourage parent involvement, which has been found to be beneficial in easing the child’s anxiety. Parental behavior influences the child’s behavior during the procedure.
9. The best location for a painful procedure is a treatment room away from the child’s bed or playroom. If the child cannot be removed, draw the curtain for privacy and to avoid upsetting the roommate as well.
10. Use equipment which is less threatening. Shorter needles, colorfully printed lab coats, special Band-Aid or sticker are some examples.

B. Positions for restraining a combative child:

1. The physical restraint of the child by a supportive parent is the best situation. The parent holds the child in their lap and wraps their legs around the child’s so that the child cannot kick the phlebotomist.
2. In the horizontal position, the child lies supine, with the phlebotomist on one side of the bed and the parent on the other. The parent gently but firmly leans over the child, restraining the near arm and body while holding the opposite extended arm securely. Neonates and infants younger than 3 months usually do not require restraint.
3. In the event the child cannot be restrained without potential physical injury, discontinue attempt and notify nurse or physician. Pharmacological means may be necessary. These can only be administered by a nurse or physician.

- a. EMLA (Eutectic mixture of local anesthetic)
Topical emulsion to be applied 60 minutes prior to venipuncture. Not to be used on a child allergic to local anesthetics or younger than 1 month.

C. Age Specific Behavior

Stage (age)	Fears and Concerns	Proper Parent Behavior
Newborns (0-12 months)	Totally dependent on parents and other adults. Trust that adults respond to basic needs.	Parent should hold infant as an aid to collector and to comfort child.
Infants and toddlers (12-24 months)	Little fear of danger. Fear of separation from mother. Limited language and understanding.	Parent should assist in holding, explaining to and comforting child.
Preschoolers (3-6 years)	Greater body awareness. Fear injury to body. Play years.	Parent may be present to provide emotional support and assist in obtaining child's cooperation.
School-age (7-12 years)	Fear loss of self-control. Less dependent on parent. More willing to participate.	Child may not want parent present.
Teenagers (13-18 years)	Actively involved in anything concerning the body. Embarrassed to show fear. May act hostile to mask fear.	Child may not want parent present.
Special problems Mentally Challenged	Fears similar to age-appropriate behaviors above, based on developmental level.	Parent should stay with patient and assist if necessary.

D. Dorsal Hand Vein Technique

The dorsal hand technique is appropriate for neonates and infants who are Younger than 2 years old.

1. Wash hands and place on gloves.
2. Identify the patient.
3. Prepare and organize venipuncture equipment. A 23g butterfly attached to a 3-5 ml syringe is preferred when performing a dorsal hand venipuncture. Keep equipment out of the view of toddlers.

4. Select the hand that has easily visible veins. Warm the site if hand is cold. No tourniquet is necessary. The blood collector's middle and forefinger will encircle the infant's wrist and are used to apply pressure to distend the dorsal veins. By placing the blood collector's thumb against the infant's fingers, the infant's wrist can be flexed downward as the dorsum of the infant's hand is examined.
5. Be careful not to bend the wrist too much or the vein may collapse. Lightly palpate for a vein. Once the vein has been located, release the finger tourniquet.
6. Disinfect the site with 70% isopropyl alcohol swab in concentric circles. Let alcohol air or pat dry with 2 x 2 gauze sponge.
7. Reposition fingers around infant's wrist and flex infant's hand. The needle should be angled 15 degrees to the skin. The skin should be pierced 3-5 mm distal to the vein, then advanced slowly and carefully until vein is punctured.
8. As soon as blood appears in the tubing of the butterfly, pull the syringe plunger to fill with blood. Make sure not to exceed maximum daily blood volume.
9. Release fingers from infant's wrist and remove needle and hold direct pressure on the puncture site with 2 x 2 gauze sponges until bleeding stops. **Do not** use an adhesive bandage as this could be a potential choking hazard.
10. Engage Safety-Lok feature on butterfly needle by holding the yellow sheath in one hand then pull on tubing with the other. Disconnect butterfly from syringe and discard into Sharps container.
11. Connect 21 or 22 gauge single sample needle to syringe to transfer blood into vacuum tubes.
12. Without removing vacuum tubes from tube holder, insert needle into tubes and fill appropriately. Let vacuum draw the blood into the tubes. Never force blood into the tubes. Dispose syringe and needle into Sharps container. Do not disconnect needle.

13. Gently invert additive tubes and label tubes with:
 - a. Patient's name
 - b. Medical record number
 - c. Date
 - d. Time of draw
 - e. Blood collector's initials
14. Notify the infant's nurse of the total blood volume collected, or record in appropriate log.

E. Venipuncture at Other Sites

The procedure for performing venipunctures on children older than 2 years is similar to that of adults. The differences include the necessary preparation of the child and parent, assistance in restraining the child, and the size of the venipuncture equipment.

1. Wash hands and place on gloves.
2. Identify the patient.
3. Prepare and organize venipuncture equipment. A 23g butterfly attached to a pediatric vacutainer holder with luer adaptor and pediatric vacuum tubes can be used on prominent veins. For smaller veins use a 23g butterfly attached to a 3-5 ml syringe.
4. Restrain the child if necessary according to above recommendations.
5. Place a pediatric size tourniquet around the bicep muscle in the upper arm. Palpate for a vein in the antecubital fossa.
6. Once the vein has been located cleanse site in concentric circles with 70% isopropyl alcohol. Let air dry or pat with a 2 x 2 gauze sponge.
7. Anchor the vein by pulling skin down with thumb or index finger and thumb ("C" technique).

8. Make sure to keep needle out of sight from child. Enter vein with butterfly needle at a 15 to 30 degree angle. Check for “flash” of blood in the tubing. If no blood appears, gently redirect until “flash” appears.
9. As soon as blood appears in the tubing of the butterfly, pull the syringe plunger to fill with blood (butterfly/syringe method) or engage vacuum tubes into luer/holder (vacutainer method) and fill to capacity. Make sure not to exceed maximum daily blood volume. **(See volume chart)** After collection is completed, release tourniquet. Remove needle and hold direct pressure on the puncture site with 2 x 2 gauze sponges until bleeding has stopped. Apply a clean 2 x 2 gauze sponge folded into fourths and apply either paper tape (inpatients) or adhesive bandage (outpatients).
10. Engage Safety-Lok feature on butterfly needle by holding the yellow sheath in one hand then pull on tubing with the other. Disconnect butterfly from syringe and discard into Sharps container.
11. Connect 21 or 22 gauge single sample needle to syringe to transfer blood into vacuum tubes.
12. Without removing vacuum tubes from tube holder, insert needle into tubes and fill appropriately. Let vacuum draw the blood into the tubes. Never force blood into the tubes. Dispose syringe and needle into Sharps container. Do not disconnect needle.
13. Gently invert additive tubes and label tubes with:
 - a. Patient’s name
 - b. Medical record number
 - c. Date
 - d. Time of draw
 - e. Blood collector’s initials
14. Notify the infant’s nurse of the total blood volume collected, or record in appropriate log.

F. Order of draw

1. Vacutainer Method
 - a. red
 - b. blue
 - c. serum separator tube (SST)
 - d. green
 - e. lavender
 - f. gray

2. Butterfly/Syringe Method
 - a. blue
 - b. serum separator tube (SST)
 - c. green
 - d. lavender
 - e. gray
 - f. red

G. Rewards

If rewards are to be given, make sure they are age appropriate and you have permission from the nurse or parent. Food rewards are discouraged because of potential dietary restrictions. Colorful stickers or special band-aides are appropriate rewards.

References:

NCCLS Guidelines, June 1998 H3-A4 Vol. 18 No. 7 - Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard - Fourth Edition

NCCLS Guidelines - July 1991 Document H4-A3, Vol.11 No.11 - Procedures for the Collection of Diagnostic Blood Specimens by Skin Puncture - Third Edition

Phlebotomy Handbook, Blood Collection Essentials, Garza & Becan-McBride fifth edition, 1999 “Pediatric Procedures” pp. 311-315