

Fairview Health Services  
 Department Laboratory/Nursing  
 Section Acute Care: Collection  
 Category Provision of Care

**Subject BLOOD COLLECTION BY SKIN PUNCTURE**

**Purpose** Skin-puncture collection is useful for collection of minimum amounts of blood from pediatric patients. It is applicable for patients with thrombotic tendencies, geriatric patients, or other patients in whom venous access is limited or minimum blood loss is required.

**Policy** Ensure consistent technique to prevent patient infection or injury.

**Procedure** 1. Identify the Patient

*All patients must be positively identified before specimen collection is performed.*

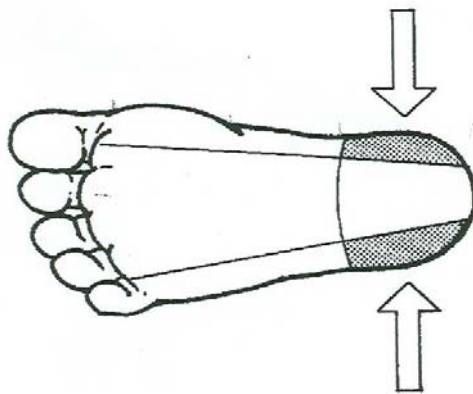
- a. For inpatients, patient's ID band must exactly match full name and identification number on the request forms and all specimen labels or a match must be performed using barcode technology.
- b. For outpatients, ask patient (or parent) to state his or her full name and birthdate.

2. Considerations

- a. The skin-puncture site must be warm, and should not be edematous (swollen) because accumulated fluid in the tissues will contaminate the blood specimen.
- b. Contamination with povidone-iodine may falsely elevate potassium, phosphorous, uric acid, and bilirubin.
- c. Avoid puncturing patient more than two times. Ask another phlebotomist to perform the skin-puncture.
- d. Identify allergies to latex, bandaids, iodine, alcohol or tape.
- e. Check communication board in patient's room for special needs such as hard of hearing or directions to avoid left or right arm.

3. Selection of Site

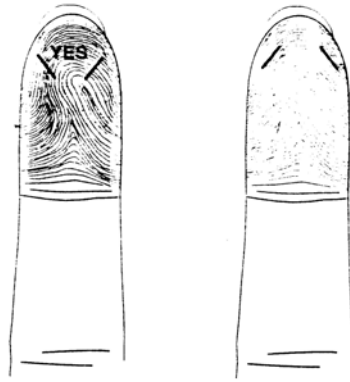
- a. The lateral or medial plantar surface of the heel.



Heel puncture is generally performed on infants <1 year of age.

- Perform puncture perpendicular to lines of footprint on plantar surface medial to a line drawn posteriorly from middle of big toe to the heel, or lateral to a line drawn posteriorly from between the fourth and fifth toes to the heel. Do not puncture posterior curvature of heel.
- Do not puncture deeper than 2.0 mm.
- Do not puncture central area of infant's foot (arch).
- Do not puncture through a previous puncture site.

- b. The palmar surface of the distal phalanx of a finger.



Finger Puncture is generally performed in children or adults.

- Do not puncture fingers on side affected by mastectomy.
- The recommended site is the palmar surface of the distal phalanx (end segment of the finger) of the middle or ring finger of the non-dominant hand. The puncture should be made in central, fleshy portion of finger, slightly to side of center and perpendicular to whorls (grooves) of the fingerprint.
- Do not puncture fingers of infants <1 year.
- Do not puncture deeper than 3.1 mm.

- c. Skin-puncture of the earlobe is not recommended.

4. Assemble Supplies

- Gloves (non-sterile)
- Alcohol prep or povidone iodine pads
- Gauze
- Microcollection containers and caps
- Lancet or calibrated puncture device
- Bandage
- Pressure bandage for heelstick patient with Hemophilia or von Willebrand's Disease
- Infant heel warmer

5. Put on Gloves

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| Always wear gloves and observe Standard Precautions when collecting biological specimens. |
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6. Warm the Site

Skin-puncture blood is a mixture of blood from arterioles, venules, and capillaries and contains interstitial and intracellular fluids. The proportion of arterial blood is greater than that of venous blood due to the greater pressure in arterioles than venules. Since skin has a low energy requirement, venous blood in the skin is more like arterial blood, especially when the puncture site is warmed.

Warming can increase blood flow seven-fold. Because warming primarily increases arterial blood flow, specimens from warmed sites are called "arterialized skin-puncture blood". The skin-puncture site must always be warmed when collecting a blood gas.

- To use infant heel warmer, squeeze the pack until a pop is heard. Knead the pack to mix well. Apply to site.
- Alternatively, wrap the site for a minimum of three minutes with warm, moist cloth at a temperature no higher than 42° C. This temperature can be achieved by placing cloth under hot tap water until it is hot to the touch, but does not cause discomfort.

7. Cleanse the Site

- Cleanse skin-puncture site with alcohol prep pad (70% isopropyl alcohol).
- Thoroughly air dry site before puncture; residual alcohol will cause specimen hemolysis.
- If povidone-iodine is used to prepare site, cleanse with alcohol prep pad.

8. Puncture the Site

To avoid contaminating patient's bedding with blood, place cloth or disposable diaper under the site

- a. Grasp patient's finger firmly between thumb and index finger.
- b. Grasp patient's heel firmly but gently with the index finger wrapped around foot supporting the arch, and thumb wrapped around ankle and below puncture site.
- c. Use appropriate device to puncture site:
  - For infant heelsticks, use automated device calibrated for incision 1 mm deep and 2.5 mm long.
  - For premature infant heelsticks, use automated device calibrated for incision 0.85 mm deep and 1.75 mm long.
  - For fingersticks, use lancet according to manufacturer's guidelines on depth.

9. Collect the Specimen

- a. Wipe away first drop of blood (which may contain excess tissue fluid) with gauze.
- b. A drop of blood will form over puncture site; when tip of microcollection tube touches this drop, blood flows into tube by capillary action.
- c. Blood flow is increased by holding puncture site downward, and gently applying intermittent pressure to surrounding tissue (or proximal to puncture site when blood is obtained from a finger). Periodically relieve pressure so blood flow returns to area.
- d. If an adequate puncture has been performed, 0.8 - 1.5 mL of blood can be collected from a single puncture site.
- e. For best collection use microcollection tubes with capillary straws, do not let air into straw; keep straw level and continue adding blood until appropriate amount is met.

**Order of Collection**

|                              |   |
|------------------------------|---|
| 1 <sup>st</sup> : Hematology | The specimen must be free-flowing to obtain adequate specimen. Mix frequently during collection to minimize chance of clotting.   |
| 2 <sup>nd</sup> : Blood Gas  | Only collect prior to potassium if the patient is crying. The specimen must be free-flowing, contain no bubbles, and be mixed frequently during collection, and before capping.   |
| 3 <sup>rd</sup> : Potassium  | The specimen must be free-flowing to prevent falsely elevated potassium (with or without hemolysis). If the specimen is difficult to obtain, separate potassium from other chemistries by placing blood into separate container. For best results potassium should be collected in gas capillary tube or microcontainer with collection straw. Scoop tubes may cause hemolysis. |
| <i>NOTE:</i>                 | <i>Mix microcontainer with additive by inverting 8-10 times; give tube a quick shake to remove blood from bottom of closure.</i>  |

10. Aftercare

- a. Keep site elevated.
- b. Apply pressure to site with gauze until bleeding stops, usually 1-2 minutes. Inform the patient's nurse if bleeding time is extended. For patients with a known bleeding disorder (Hemophilia, von Willebrand's Disease, or Hemophilia Clinic patient), immediately apply direct pressure to puncture site until bleeding stops for up to 10 minutes, even if blood was not obtained. Apply clean gauze pad underneath elastic pressure dressing (e.g., Coban or Co-Flex) on all puncture sites.
  - For inpatients, dressing must remain for at least 2 hours (12 hours is preferred). Notify patient's nurse elastic pressure dressing must remain on puncture site(s) for at least 2 hours.
  - For outpatients, elastic pressure dressing must remain on site(s) for 12 hours.
- c. Use precaution if applying bandages to skin puncture sites of infants under 2 years of age. Adhesive bandages may irritate the skin of young children or tear the skin of premature infants when removed. An infant or young child could aspirate the bandage and choke.
- d. Ensure all supplies are removed from bedside and patient is secure.

11. Label the Specimen Containers

- a. Apply labels to containers at the collection site after blood is collected. Check name on each label to verify again that the name on the label matches the patient's name.
- b. Record total blood collection volume if required.

12. Handle Blood According to Specimen Requirements

Handle blood specimens according to specific specimen requirement, e.g., place specimen container on ice, at 37 C, or protect from light as needed.

13. Prepare the Specimen Containers for Transport to the Lab

Transport the labeled blood specimen containers with the required request forms to the laboratory using a sealed specimen transport bag.

- References
1. NCCLS. Procedures and Devices for the Collection of Diagnostic Capillary Blood Specimens. Approved Standard – Fifth Edition. NCCLS document H4-A5 [ISBN 1-56238-538-0]. NCCLS, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898, USA 2004.
  2. McCall RE, Tankersley CM. Phlebotomy Essentials, 2<sup>nd</sup> Edition. J.B. Lippincott Company, 227 East Washington Square, Philadelphia, PA 19106. 1988.
  3. Strasinger SK, Di Lorenzo MA. Phlebotomy Workbook for the Multiskilled Healthcare Professional. FA Davis Company, 1915 Arch Street, Philadelphia, PA 19103. 1996:267-269.

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