Heelstick or Fingerstick

PATIENT PREPARATION

1. Verify patient identification according Hospital SOP 6000-12 Patient Identification and laboratory procedure Gen101_Patient Identification.
2. Verify diet restrictions. Ask the patient or nursing staff to verify that diet restrictions have been followed before the blood is collected.
3. Reassure the patient. The phlebotomist must gain the patient's confidence and assure the patient that, although the blood collection will be slightly painful, it will not take long. When drawing a child, special effort must be made to smile and **speak softly** to reduce the child's fear. Speak also to the parents, if present, and introduce yourself and explain what will happen. **Allow the parent to hold the baby if requested.** (See the Special Situations section of procedure CC101_Blood Collection – Venous.)

INTERFERING SUBSTANCES/LIMITATIONS/SPECIFICITY

1. There is no known clinically important difference in the concentration of any chemical constituent between serum and heparinized plasma obtained by skin puncture; however, when the concentrations of chemical constituents in serum or plasma from skin-puncture blood have been compared to those in serum from venous blood, statistically and/or clinically important differences in the concentrations of glucose, potassium, total protein, and calcium have been reported. Except for glucose, the concentration of these analytes is lower in skin-puncture blood.
2. Data on coagulation testing using skin puncture specimens are not available. All coagulation testing must be performed on specimens collected by venipuncture.
3. Errors in blood glucose determination caused by contamination with alcohol have been reported.
4. Betadine (povidone iodine) shall not be used to clean skin-puncture sites; blood contaminated with Betadine may have falsely elevated levels of potassium, phosphorous, or uric acid.
5. Hemolysis may occur in skin-puncture blood for the following reasons:
   - Residual alcohol at the skin-puncture site.
   - Scooping or scraping blood drops along the skin instead allowing blood to flow freely.
   - Strong repetitive pressure (milking) of the finger or heel.
   - A large percentage of skin-puncture blood specimens are collected from newborn infants who have increased red blood cell fragility and high packed cell volume; hemolysis thus is more likely to occur in blood obtained from newborn infants.
6. Significant discrepancies between the packed cell volume of blood obtained by heel puncture and that obtained by venous sampling have been reported. The discrepancies may be exaggerated when the extremity is cold and capillary blood flow is slow.

7. The differences in venous and skin-puncture blood should not restrict the use of skin-puncture blood. However, the technique of specimen collection must be taken into consideration when interpreting the results of blood analyte determinations. Therefore, accurate documentation and changes need to be imputed upon receipt using the workload input code of CPC.
8. **Warming the site can increase blood flow seven-fold.** Warming dilates the capillaries and increases arteriolar flow, decreasing the changes in blood composition caused by tissue respiration. The resulting arterialized sample is similar enough to arterial blood in terms of acid-base parameters to allow clinical decision making.
9. Lactic Acid levels should not be collected by capillary puncture.

PRINCIPLE

This procedure describes the steps to follow for collecting a capillary blood specimen by skin puncture. For most laboratory tests, blood obtained by venipuncture is the preferred specimen. However, when venipuncture is not possible due to poor vein selection or other special circumstances, many tests can be performed on capillary blood specimens obtained by fingerstick or heelstick. Blood specimens obtained by skin puncture are especially important in pediatrics because, with this technique, small but adequate amounts of blood can be obtained with minimal trauma to the patient. For pediatric patients less than two years of age, no more than 2 cc. of whole blood should be obtained per collection. (The phlebotomist must contact the nursing station for clarification on how to proceed if greater than 2 ml of whole blood will be required.)

Blood obtained by skin puncture is a mixture of blood from arterioles, venules and capillaries and contains interstitial and intracellular fluids. Composition is affected by the blood flow to the skin at the time of specimen collection, the relative proportion of arterial and venous blood and the composition of venous blood in the skin. It is important to note that there are differences in the composition of blood collected by skin puncture and that of blood collected by venipuncture.

Instructions regarding type and amount of specimen to be collected, need for special timing for collection, types and amounts of preservatives or anticoagulants, need for special handling between time of collection and time received by laboratory, and conditions for transport and storage can be found in each individual test procedure.

SUPPLIES/EQUIPMENT

1. Alcohol packets, Central Supply #MDS090735
2. Gauze- Sponge 2 x 2, non-sterile, Central Supply #1028575.
3. Microtainer tubes, part numbers vary.
4. Cardinal Heather Gentle Heel Lancet. Newborn CS# MMDS/20051
5. Blue BD Contact Activated Lancet, BD #1013710.
6. Infant Heel Warmers, Chemical, squeeze activated, OM/MEDL/MDS138007
7. Gloves, Central Supply #'s vary.

8. Band aids, CS #covi/44119 (small) and #1028694 (large).
9. Posey Newborn Bracelet POSE #1067313.
10. Sharps container, Central Supply #1030035.
11. Heparinized capillary ABG tubes

REFERENCED PROCEDURES

1. SOP 6000-12 Patient Identification
2. Gen101_Patient Identification
3. CC101_Blood Collection – Venous
4. SOP 8800-17 Hand Hygiene
5. CC104_ Specimen Labeling
6. CC105_Specimen Transport

PROCEDURE

1. Cleanse hands according to SOP 8800-17 Hand Hygiene.
2. Put on gloves.
3. Verify patient identification according procedure Gen101_Patient Identification.
4. Select site for blood collection. **Only unwrap a baby just enough to get to the heel.**

IF . . .	THEN . . .	AND AVOID . . .
Heelstick *Used for newborns and infants less than one year old*	▪ Choose the medial and lateral areas of the plantar (bottom) surface of the heel. ▪ Area determined by drawing imaginary lines extending back from the middle of the large toe and from between the fourth and fifth toes. Here the distance between the skin and heel bone is greatest. ▪ (see Figure 1).	▪ previous puncture sites ▪ the curvature of the heel ▪ the arch of the foot ▪ edematous tissue Avoidance of these sites prevents complications such as infection or nerve injury.
Fingerstick *NOT for newborns – Used for adults and pediatrics*	▪ Choose the middle and/or ring fingers. ▪ Incision should be perpendicular (not parallel) to the finger print grooves. ▪ (see Figure 2)	▪ the side or top of any finger. ▪ the little finger. ▪ fingerstick collections on newborns ▪ edematous tissue Avoidance of these sites prevents complications such as infection or nerve injury.

Figure 1

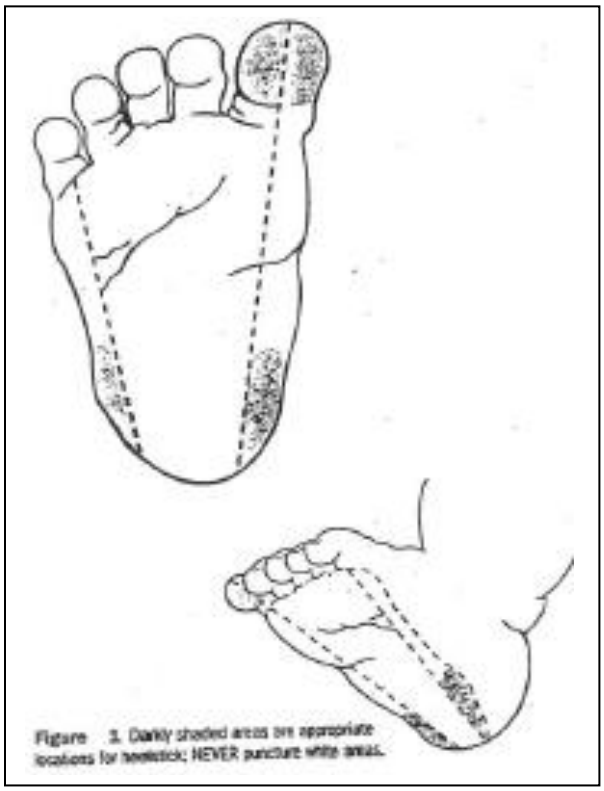
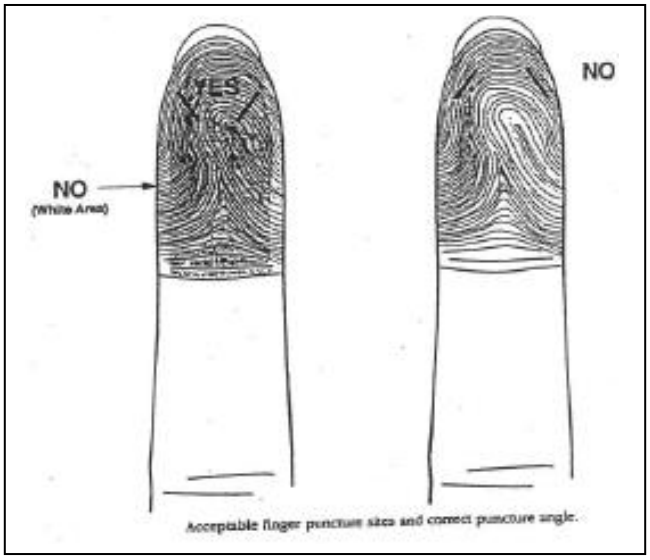


Figure 2.



5. **Warm skin as needed to increase blood flow.**
   - To use the heel warmer, locate activator disc and grasp with thumb and forefingers of both hands. Flex (bend) activator disc. Knead the solution in the bag to soften and activate throughout. To hold in place, wrap the warmer around the heel and attach the strap to the other side.

6. Assemble collection supplies and test tubes near the patient.
7. Cleanse blood collection site with alcohol prep. Air dry or wipe with clean gauze prior to puncture. If you accidentally **or** purposely touch the cleansed area, rescrub the area with alcohol.

IF . . .	**THEN . . .**
Heelstick	▪ Remove the Gentle Heel device from package. Pull the green plastic ring protecting the internal sterile blade. *Note: DO NOT twist tab-twisting will bend the blade.* ▪ Raise the foot above the infant's heart level and place the blade-slot surface of the device flush against the heel. *Note: The blade path is indicated by arrow on device.* ▪ Ensure that both ends of the device are in contact with the skin (DO NOT jam into baby's foot) and depress the trigger. Immediately remove the device from the infant's heel. *Note: Adjust pressure as needed. More pressure increases blood flow.* ▪ Lower the heel to a position level with or below the baby.
Fingerstick	▪ Twist to remove the blue protective lancet cap on the BD contact-activated lancet. ▪ Place the end of the lancet flush against the finger and press into skin. Remove the lancet immediately. ▪ Wipe away the first drop of blood that appears with gauze.
Finger or Heel stick for ABGs	▪ Warm site with an infant heel warmer for 10 minutes immediately prior to specimen collection. ▪ Use heparin coated capillary tubes. ▪ For children > 1 yr. of age, the finger is the primary collection site. Use the fleshy surface of the distal phalanx of the finger alternating fingers each time (shown in Figure 2). Using a blue BD contact-activated lancet, make a puncture no more than 2 mm deep. ▪ For children and infants < 1 yr. of age, the heel is the primary collection site. **Do not** use the arch of the foot. Cleanse the site with an alcohol wipe. Use a Gentle Heel collection device to make the puncture. Use the plantar surface of the heel, beyond lateral and medial limits of the calcaneus, marked by the lines shown in Figure 1. ▪ When the tube is filled with no air pockets, cap it, mix the sample, and immerse in ice water. The sample should be analyzed as soon as possible. Specimens are stable up to 30 minutes at room temperature, or up to 2 hours if stored in ice water.

8. Wipe away the first drop of blood with clean gauze.
9. As the second drop of blood forms over the puncture site, begin to fill the microtainer/capillary tube to the appropriate volume. The order of draw for micro-collection differs from that of venipuncture; the EDTA specimen should be drawn first, followed by other additive specimens, and serum specimens are collected last.
10. Blood flow is enhanced by holding the site downward and gently applying continuous pressure to the surrounding tissue.

11. Allow blood drops to flow freely into the collector top and down the walls of the tube. If a drop of blood becomes lodged inside the collector top, a gentle tap of the tube on a hard surface is sufficient to move it to the bottom of the tube. When collecting an EDTA or capillary gas specimen, mix during collection and then immediately by inversion 8 to 10 times after capped.
12. When blood collection is complete, hold pressure with gauze to stop bleeding.
13. Bandage a fingerstick site using a small band aid. Bandage a Heelstick with a Posey Newborn Bracelet. If bleeding persists, ask nursing or parent to hold pressure until bleeding stops. *Note: DO NOT use Co-Flex when wrapping the heel of an infant, as it poses a threat to circulation. If using a small bandage place green time placed card by the name and inform parents or nurse of bandage and time placed.*
14. Discard supplies appropriately; discard Neat Nick device and BD contact-activated lancet into sharps container.
15. Label specimens according to procedure CC104_ Specimen Labeling.
16. Prepare specimens for transport according to procedure CC105_Specimen Transport.
17. Wash hands according to SOP 8800-17 Hand Hygiene.

REFERENCES

1. Procedures and Devices for the Collection of Diagnostic Capillary Blood Specimens, National Committee for Clinical Laboratory Standards, 2008
2. Procedures and Devices for the Collection of Diagnostic Blood Specimens by Skin Puncture, National Committee for Clinical Laboratory Standards, September 1999
3. Neat Neat Sweeping Action Heel Lancet, package insert, Hawaii Medical.
4. Phlebotomy Essentials, McCall and Tankersley. Lippincott Williams & Wilkins, p. 319-333, 2012
   Phlebotomy Workbook, Strasinger and DiLorenzo, F.A. Davis Company, p. 269, 1996.
5. Phlebotomy Techniques, Susan Phelan, MHS, MT(ASCP), ASCP Press, p. 45, 1993.