I. Purpose of Procedure (Principle)

To standardize the process for collection of quality blood samples both peripherally and through skin puncture using standard materials and technique.

II. Scope

This procedure applies to all Dartmouth-Hitchcock Laboratory staff who has undertaken training in the collection of blood samples.

III. Definitions

Unique patient demographic identifiers: Full Name, Date of Birth (DOB), medical record number (MRN), Social security number (SS#)

IV. Specimen Requirements

Specimens are required to have at least two unique identifiers in the outpatient setting and three unique identifiers in the inpatient setting, with the name being one of them (unique identifiers are indicated below with an asterisk)

- Patient name*
- Patient MRN*
- Patient date of birth*
- Social Security number*
- Collection date and time

V. Equipment, Reagents and Required Records/Forms

A. Personal Protective Equipment

All employees must adhere to Universal precautions: Treat all body specimens as if they are potentially infectious. Use Personal protective equipment. Refer to the policies for Personal Protective Equipment (PPE) on the D-H Health and Safety Manual in the procedural assistance.

Wear lab coats and gloves whenever potentially infectious materials may be generated or contamination is reasonably anticipated. Use eye protection devices such as goggles or glasses with solid side shields, or chin- length face shields whenever splashes, spray, spatter or droplets of blood or other potentially infectious materials may be generated and eye, nose or mouth contamination can be reasonably anticipated.

B. Equipment

- Computer
- Specimen Label Printer
    - The blood drawing area provides a Chair or Bed. The area must be wide enough for the patient's arm to rest comfortably. The patient's elbow should be supported by the arm of the chair or a pillow that will allow the arm to remain straight. Some outpatients prefer lying down, in which case a lounge chair may be used.
    - Blood Collection Safety Needles are available in sizes, 21 and 22 gauges. We also have 21, 23, 25 and 27 gauge butterfly needles available.
    - Plastic Needle Holders are used to hold the needle on one end and the vacuum tube on the other, there are special needle holders for blood culture bottles.
    - Blood Collection Vacuum Tubes are designed to draw a predetermined volume of blood. Tubes with different additives are used for collecting blood specimens for specific types of test. The color of the rubber stopper capping the tube is used to identify these additives.
    - Tourniquets are used to help distend the veins for ease in venipuncture.
    - Antiseptics are individually packaged 70% isopropyl alcohol wipes are used to clean the venipuncture site for most specimens (do not use for alcohol orders).
    - Gauze 2x2 inch can be folded and taped to the puncture site to control bleeding after the specimen is collected. Patients on Coumadin often need a pressure bandage.
    - Sharps Disposal Container: An OSHA acceptable, puncture proof container marked "BIOHAZARD" with a top wide enough to drop the needle and holder attached into it.
    - Cold Compress may be used to revive patients who have fainted or become dizzy
    - Disinfectant: A plastic bottle of disinfectant is available for cleaning up small blood spills and drawing stations
    - Gloves: Non Powdered non- latex gloves are available in sizes extra small to extra large.

    Note: Dartmouth-Hitchcock Policy on Latex precautions can be viewed by link at the end of this procedure

    - Lancet Finger stick
        - Pink lancet: Incision depth 1.8 mm
        - Blue lancet: Incision depth 2.0 mm
    - Lancet Heel Stick
        - Tenderfoot Incision depth 0.85 mm length 1.75 mm
    - Chucks
    - Heel warmer pack
    - Alcohol pad/ soap
    - Sterile gauze

- Microtainer tubes
- Bandage

C. Reagents – N/A

D. Required Records/Forms

Laboratory Requisitions completed with patient demographics, test orders and diagnosis codes and ordering provider.

VI. Equipment Calibration/Process Validation

System validation on file in the Laboratory Information Systems (LIS) office

VII. Quality Control/Process Control

Ensure that labels are affixed properly and match patient demographics

VIII. Procedure and Calculations

A. **Select Site for blood collection**

1. Factors to consider in site selection:
   a. Avoid extensive scarring or healed burn areas
   b. Do not obtain specimens from the arm on the same side as a mastectomy without approval from the provider as lymphostasis may occur. Document approval on requisition.
   c. Avoid areas of hematoma when possible.
   d. If an arm has an IV inserted, one may draw below it but never above it when the IV fluid is running. If an IV is running, if possible, draw from the other arm. If this is not possible obtain the specimen from a site distal (below) the IV. It is not necessary to shut off the IV if the specimen is obtained **below** the IV site.

      Note: If the only option is to draw above an IV site which has fluid running, the IV fluid must be shut off for 15 minutes before collecting the specimen.

   e. Do not obtain specimens from an arm having a cannula, fistula, or vascular graft. If grafts and/or fistulas are present in both arms with one not working, call the provider and obtain approval for drawing in that arm. Document the approval on the lab requisition.
   f. Never draw blood from a person that is being transfused with blood products.

2. **If a good vein can not be located, the following techniques may help:**

a. Sharply tapping the inner elbow with the index and second finger may cause the vein to dilate.
b. Massaging the arm from the wrist to the elbow to force blood into the vein and cause it to distend.
c. Apply a warm, wet towel or compress to the arm for 5 minutes to help the vein to dilate.
d. Have the patient dangle the arm for 5 minutes to distend the vein.
e. Always remember to check both arms.

NOTE: With any of these suggestions, it is important that the tourniquet is not left on for more than one minute as some test results may be affected. Localized stasis may occur resulting in hemoconcentration.

B. **Special collection circumstances**

- Blood Culture Specimens
    - Collect Specimens that are to be used for blood cultures from a sterile environment.
    - Refer to Blood Culture Collection Procedure for detailed instruction for the collection of Blood Cultures.

- Timed Specimens

  Occasionally tests need to be drawn in a timed sequence or timely manner. Some examples of these tests may be Glucose (tolerance and post prandial), troughs and peaks of certain drugs, tests for Coagulation therapy, and Cardiac enzymes. One may refer to the On-Line Laboratory Handbook under the specific test for a more exact explanation of timing procedures.

- Venipuncture on Children
    - Never tell a child that the venipuncture does not hurt, instead, tell the child that you will try to make it as painless as possible. Reassure the child that the procedure will not take long.
    - Whenever possible, collect blood on children in the outpatient pediatric room or in the "treatment" room provided on the floor.
    - On children less than 2 years, perform venipuncture using either a syringe with a 23 through 27 gauge butterfly needle with tubing attached to the plastic tube holder.

C. Venipuncture- Peripheral

1. Wash your hands with soap or Purell before and after each patient.
2. Select the appropriate tubes for the specimens to be collected.
3. Position the patient.
    - Verify the patients name and date of birth.

- Check the medical record number and patient name on the tube so that it corresponds to the barcode label.
- Ask the patient if there is an arm preference for drawing blood.
- Support the patient's arm by the blood drawing chair, bed or a pillow.

4. Apply the tourniquet 3 to 4 inches above the puncture site.
5. Ask the patient to make a loose fist.

   Note: Vigorous hand exercise like "Pumping" must be avoided as this can falsely elevate test results.

6. Select a good venipuncture site.
   - The larger, fuller median cubital veins are used most frequently for blood draw.
   - Hand veins are acceptable for venipunture.
   - Side and top wrist veins may be used for sample collection, DO NOT draw from inside wrist veins.
   - Lab Personnel DO NOT draw from other sites such as legs, feet, arteries, Picc lines, IV's Etc.
7. After assessing the patient's vein select the appropriate needle size for the location of the venipuncture site.
8. Clean the puncture site. Use the alcohol prep and make a circular pass of the puncture site and either let air dry or use sterile gauze and wipe once in a downward motion
9. Draw the appropriate tubes
   - Release the tourniquet
   - Remove needle
   - Cover venipuncture site with gauze and hold pressure to stop the bleeding
   - Dispose the needle in a biohazard sharps container.
10. Label the tubes in a vertical fashion with the patient name closest to the stopper.
11. Verify all blood tubes are correctly labeled before you allow the patient to leave the blood drawing area or before you leave the patient's bedside.

Note: Each phlebotomist has a two stick limit per patient for a total of 4 sticks. If unsuccessful, call the Vascular Access team. If a phlebotomist feels they will not be successful with an additional stick, the phlebotomist may call for backup or pass the draw to the Vascular Access team versus attempting to reach the two stick maximum.

D. Venipuncture Using a syringe

1. Use a disposable syringe with a 23 or 27 gauge butterfly needle for venipuncture on a patient that has difficult veins (fragile, rolling, hands etc...)
2. Ask for assistance to transfer the blood filled syringes in to the appropriate tubes using a transfer device.
3. Follow the order of draw for standards tubes or microtainers depending on container selected.

4. When assembling the equipment, place a sterile butterfly on the syringe.
    a. Proceed as in a routine venipuncture.
    b. After the required amount of blood has been drawn,
        - Remove the needle from the patients arm/hand by engaging the safety feature button
        - Place gauze on the arm to stop the bleeding
        - Dispose of the needle in the biohazard sharps container
    c. Transfer blood from the syringes into the appropriate tubes as soon as possible.
        - Tubes containing anticoagulant should be filled first using the appropriate transfer device.
        - Invert tubes to mix
        - Dispose of the syringes in a biohazard sharps container.
    d. Verify all tubes are labeled correctly before allowing the patient to leave the drawing area or before leaving the patients bedside.

E. **Special Considerations - Pediatric Patients**

1. **Site Selection**
    a. For children 2 years and up, venipunctures are usually performed.
    b. For children 1 – 2 years, finger sticks or venipuncture is performed. Generally venipuncture provides a better quality of specimen.
    c. For infants 6 months to 1 year, a finger may be used depending on size of the finger. Generally the third (middle) of fourth (Ring) finger are used for collection.
    d. For newborns to 6 months, the heel is usually the site of choice as the fingers are too small for the trauma of skin puncture. It is also important to minimize blood loss from newborns.

F. **Skin Puncture**

1. Assemble necessary equipment
2. Wash hands and put on gloves.
3. Identify patient.
    - **Inpatient** - the patient's name and Medical Record Number on their ID bracelet much match the requisition or the computer label.
    - **Outpatient** - make initial ID by calling patient's name. This must be verified by asking or confirming with a parent or guardian the birth date of the patient.
4. Select the appropriate Microtainers for the specimens to be collected. Any Microtainers

containing additives should be tapped to dislodge additives from the walls and stopper.

5. Position the patient.
   a. for Finger Sticks: The patient should be seated with his or her non-dominant arm resting comfortably on the blood-drawing chair arm support or on the bed.
   b. for Heel Sticks: The baby should be held by another adult if possible. Remove the baby's clothes and blanket so they will not interfere. A protective barrier should be placed under the baby. Protect the person holding the baby from possible blood contamination. If there is no one available to assist, position the baby either on their back or stomach in the center of the examination table.

   NOTE: for infants up to the age of 6 months, the heel is usually the site of choice as the fingers of infants are too small for the trauma of a skin puncture.

6. Select the puncture site.
   a. for Finger Sticks: For children and adults
      - Use the 3rd or 4th finger of the non-dominant hand. The outer and upper region of the fingertip, halfway between the center of the finger pad and the edge of the fingernail, is the site of choice.

   b. for Heel Sticks:
      - Avoid previous heel stick sites
      - The site should be on the plantar surface of the heel, beyond the lateral and medial limits of the calcareous (heel bone). The heel bone is very close to the surface of the skin at the back of the heel, and could be damaged by a puncture in this area.
      - The puncture should NEVER be performed on the central area of the infant's foot (area of the arch).

7. Reassure the patient by explaining the procedure

8. Warm the puncture site, if necessary
    - Use a warm, wet washcloth, heel warmer or chucks to warm the puncture site for at least 3 minutes.
    - Warming the site to 42 C can increase blood flow up to sevenfold.
9. Cleanse the puncture site. Use the alcohol or soap and water to clean the area vigorously. Allow the area to air dry or dry the skin with 2x2 gauze before the continuing.

    Note: If the site is not allowed to dry, possible contamination from the cleansing agent may occur when collecting the sample.

10. Open the puncture device package, being careful not to contaminate the side with the cutting device.
11. Perform the skin puncture as follows For Finger Sticks:
    a. Exert pressure on the finger tip by holding it with your index finger and thumb. Pressure should be directed upward.
    b. Use the device to make a quick puncture into the site selected. Release it according to manufacturer's instructions.
    c. Release the finger and wait for the first drip of blood to form.
    d. Wipe away the first drop of blood. Avoid excessive squeezing or "milking" as tissue fluids will interfere with testing.
    e. Collection of Lavender microtainers should be drawn first, with other types of microtainers following. Wipe puncture site between microtainers collection to prevent cross contamination and ensure further bleeding.

    - **(Sarstadt) Lavender microtainers**
        1. Be sure vent on the collection top is facing upwards.
        2. Place collection top at 45 degree angle to the drop of blood. Blood will flow by capillary action down the top and into the tube. Do not shake the tube as the capillary action may be lost.
        3. Fill the microtainers between the 250- and 500 microliter mark.
        4. Remove collection top and replace cap. Mix gently 5-7 times.

    - **"Scoop" type microtainers**
        1. Touch the top of the collector to the under surface of the drop and channel blood flow in groove of collector.
        2. Blood will flow freely through the collector and down the tube wall.

3. When collection is complete, replace the collector with appropriate cap.
4. Always try to avoid "scooping" along the skin. This method will pick up micro clots that may interfere with testing.

f. Apply pressure to stop the bleeding.

12. For Heel Sticks:
    a. Grasp the foot firmly and puncture the selected site.
    b. Release the foot and allow the first drips of blood to form.
    c. Wipe away the first drop of blood and avoid excessive squeezing.
    d. Hold the foot firmly and collect the blood. The same steps can be following as in steps e and f of the finger stick procedure.
    e. Release the foot and allow the baby to kick from time to time as this will increase the blood flow.
    f. Wipe the site between specimen collections.
    g. When specimen collection is complete, hold gauze on the puncture site and apply mild pressure until the bleeding stops. Do not apply tape.
13. Dispose of the puncture device in the biohazard sharps container.
14. Seal or cap the tubes.
15. Invert to mix
16. Confirm that the patient feels or looks normal and the bleeding has stopped