Bassett Healthcare Network

The Mary Imogene Bassett Hospital Clincal Laboratory:

CLP:

Title (no LTR): SPECIMENCOLLECTION

Revision: 1.0

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Last Approved Time: 12/17/2020 9:18:20 AM

SPECIMEN COLLECTION

I. INTRODUCTION

a. Venipuncture and skin puncture procedures are the most routinely performed invasive procedures ordered by clinicians. It is imperative that phlebotomists introduce themselves to patients, correctly identify patients and perform venipuncture/skin puncture procedures according to protocol.

II. PHLEBOTOMIST INTRODUCTION TO PATIENTS

a. Phlebotomist introduces him/herself to patient
b. Explains he/she is from the Laboratory
c. Notes that the physician ordered blood work and samples need to be obtained
d. **Outpatients:** provide privacy for patient by drawing curtains when available

III. AGE RELATED SPECIFIC INSTRUCTIONS

a. Staff must be assessed annually for competence in age-specific related instructions. Documentation for competence must be done by direct observation.
b. See Appendix A for maximum amounts of blood to be drawn from patients younger than 14 years.

IV. PATIENT IDENTIFICATION PROTOCOL

a. To properly identify the patient, the phlebotomist will ask the patient their first name, last name and date of birth
b. **Inpatients:** compare name and date of birth with the patient's wristband
c. **Outpatients:**
    i. Clinic patient from a location such as a Cancer Treatment Center (CTC), Dialysis, etc. that has the potential of being transfused in an outpatient location within 3 days from the day of collection ***with a signed Patient Identification Card at the time of specimen collection***
    ii. Scheduled Pre-op and Cardiac Surgery patients having a surgical procedure within 30 days from the date of collection ***with a signed Patient Identification Card at the time of specimen collection***

V. PERSONAL PROTECTIVE EQUIPMENT FOR THE PHLEBOTOMIST

a. Lab coats, buttoned, must be worn by all phlebotomy personnel when performing phlebotomy procedures

b. Gloves must be worn while performing all venipuncture or skin puncture procedures and removed between every patient
c. Protective eyewear must be worn if there is a potential for splashing and contamination of phlebotomist's mucosal membrane
d. **Inpatients:** For isolation patients refer to Procedure for Performing Phlebotomy on Isolation Patients

VI. THE VENIPUNCTURE PROCEDURE

a. Phlebotomy should never be attempted with a standing patient. Assessing a patient's level of anxiety and providing comfort and compassion before the venipuncture procedure may help reduce the pain they experience during the process. A calm, confident manner will reassure the patient.

b. PREPARATION OF THE VENIPUNCTURE EQUIPMENT

i. If a syringe is used, connect the syringe to a butterfly needle with a Luer Lock connector collection set. The syringe plunger should be tested by pulling and pushing it slightly to facilitate easy movement during the venipuncture.
ii. If a vacuum-tube venipuncture system is used, twist off the back protective plastic sheathing of the double-pointed needle, and twist the needle into the hub. Assemble the necessary Vacutainer tubes for the requested testing
iii. The remaining equipment, disinfectant or alcohol prep, gauze pads, tourniquet, gloves, and a bandage should also be prepared at this time. It is advisable to have extra vacuum sample tubes available

c. APPLYING THE TOURNIQUET

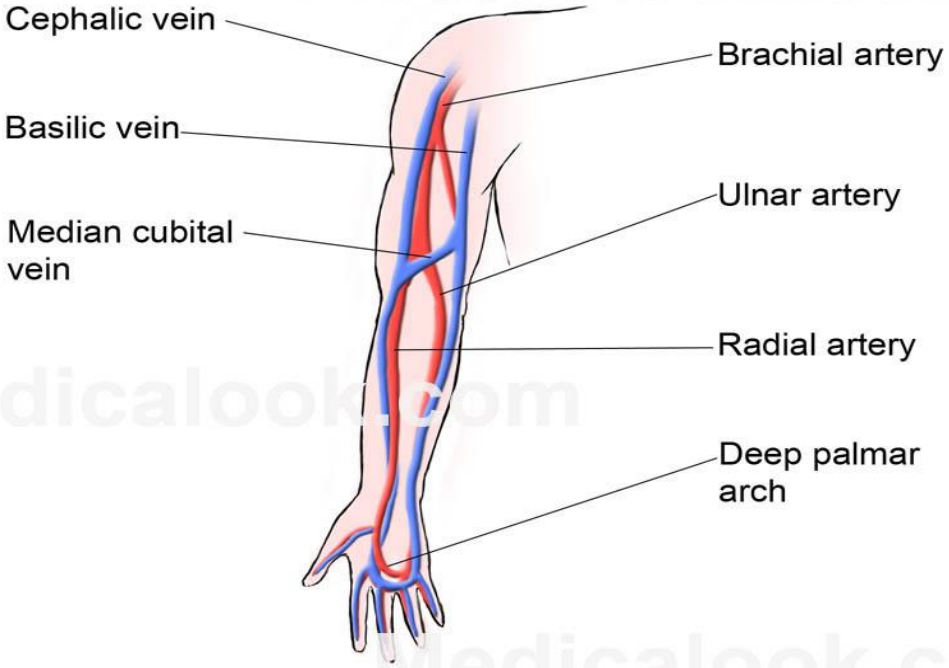
i. The tourniquet should be placed around the patient's arm midway between the elbow and shoulder above the site to be drawn, in order to slow blood flow and enlarge the vein.
ii. Place the tourniquet around the arm with ends up, stretch the tourniquet by pulling the tubing which is now in the front upward with the right hand, right hand crosses over the left
iii. Maintain the tension, and tuck a loop of tubing held in the right hand under the tubing which encircles the arm
iv. Gently check the tension on the tourniquet; if it appears too tight (painful to the patient) or too loose (slips on the arm), remove the tourniquet and repeat steps 1 to 4. The tourniquet should be just tight enough to cause to veins to enlarge, but not to occlude arteries.
v. The tourniquet is released by pulling the short end which is looped under
vi. Reverse these instructions for left-handed phlebotomists

d. SELECTING THE VEIN

i. After applying the tourniquet, palpate the area to feel for the veins (see diagram below)
ii. Palpating consists of gently pushing down on the inner elbow area with the index and/or middle fingers to locate and trace the path of the veins
iii. Veins adequate for venipuncture feel like elastic tubes under the skin which indent when pressed with finger
iv. Arteries pulsate with each heartbeat. Check to be sure site is not pulsating
v. Most common used veins are median cubital and cephalic
vi. If no likely vein is located, always examine the other arm
vii. If no adequate vein is found in either arm, it may be necessary to warm area by applying a wet washcloth or towel to the proposed site for 5-10 minutes. The heat will dilate the vein
viii. If an adequate vein is not found, it may be necessary to use veins in other sites, preferably the hand
ix. Other factors to consider when selecting venipuncture sites:
    1. Patients with intravenous fluids:
        a. Whenever possible blood should be collected from the arm opposite the IV to avoid contamination
        b. If unable to use an arm without a IV, always draw distal (below) to the IV
        c. If the patient is receiving blood products, drawing routine specimens is not recommended. Notify the nurse that blood can be collected after the transfusion has ended. *The recommended time frame post transfusion is 1 hour.*
            i. **There are 3 tests (TROPI, LYTES, or Blood Cultures (BLC) that can be collected STAT during a transfusion.** Other specials requests for STAT draws during transfusion of blood products can be cleared through the pathologist-on-call.
        d. Any specimen drawn during blood product transfusion must have a "transfusion in progress" sticker attached to it. This comment must also be entered into the LIS at the "enter/edit" function when receiving these specimens in the laboratory.
        e. It is not recommended to draw above an IV. On these rare occasions it is recommended to request nursing staff to turn off the IV for 2 to 5 minutes before drawing the sample. Draw 3 mLs of blood to discard and then collect the specimens. Notify nursing immediately that you have completed the draw so the IV can be restarted
    2. Patients Post intravenous fluids:

a. Intravenous replacement of calcium, magnesium, and phosphorus is common among acutely and critically ill patients
b. The electrolyte replacements protocols *recommend that calcium, magnesium, and phosphorus levels be drawn no sooner than 1 hour* after the termination of an intravenous infusion of any of these electrolytes, in order to avoid false elevations

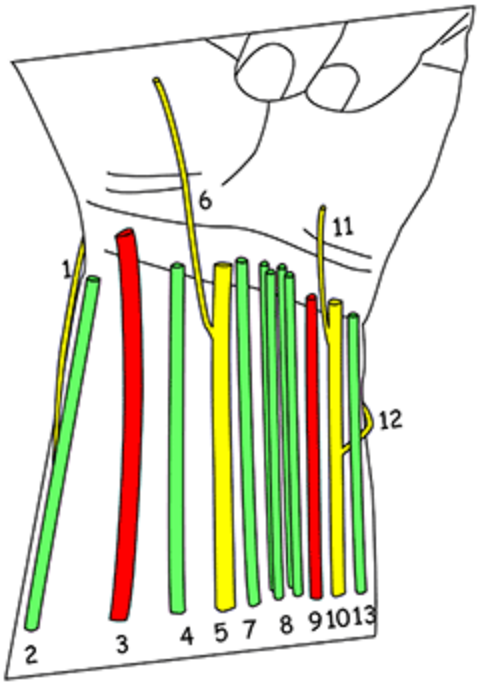
3. Mastectomy Patients
    a. Do not draw blood from the side on which the mastectomy was performed (now or in the past), because of lymphostasis
4. Dialysis Patients
    a. Do not draw from arm which has a fistula for dialysis apparatus hookup that is active or in use
    b. If the fistula is inactive, phlebotomy can be performed below
5. P.I.C.C. Lines
    a. Patients who have these lines should have blood drawn from the opposite arm if possible. If it is necessary to use the same arm follow these precautions
        i. Call the Authorizing Provider to confirm using the arm with a P.I.C.C line. Have the provider place the note to document use of that arm in the patient's chart.
        ii. **DO NOT** place the tourniquet above the P.I.C.C. line. The tourniquet may be placed 2-3 inches below P.I.C.C. insertion site.
        iii. Bloods may be drawn from the lower 1/3 of the arm or the hand.
6. Do not leave the tourniquet on the patient's arm for more than 1 minute.
    a. This causes discomfort to the patient
    b. May cause chemical changes in the blood sample, resulting in erroneous results (hemoconcentration).



e. VEINS THAT ARE OFF LIMITS

i. It is **NOT** okay to perform venipuncture on the palmar surface of the wrist and the lateral wrist above the thumb to the mid-forearm. If you place your four fingers starting at the wrist going up the arm, **THIS AREA IS OFF LIMITS** to draw blood from. There is an increased risk of nerve, tendon, and arterial involvement which will cause harm to our patients and they could potentially lose use of that hand. The picture just below depicts all of the nerves, tendons and arteries that are in the wrist so you can see it is very risky to perform phlebotomy in that area. Even if you think it is your last resort to draw the patient's blood, **PLEASE DO NOT DO IT**.

VENTRAL ASPECT OF WRIST



Structures radial to ulnar side:

1 Superficial branch of the radial nerve (emerging posterior to brachioradialis)
2 Brachioradialis
3 Radial artery
4 Flexor carpi radialis
5 Median nerve with its palmar cutaneous branch (6)
7 Palmaris longus
8 Flexor digitorum superficialis (4 tendons)
9 Ulnar artery
10 Ulnar nerve with its palmar cutaneous branch (11) & dorsal cutaneous branch (12)
13 Flexor carpi ulnaris

f. CLEANSING THE PUNCTURE SITE

i. Once an adequate vein has been located, cleanse the venipuncture site with an alcohol prep pad soaked with 70% isopropyl alcohol. Wipe the site in a circular motion, starting at the center and moving to the periphery.
ii. Allow to dry, do not wipe with a gauge pad
iii. If a blood alcohol is ordered, substitute a Betadine swab for skin disinfectant
iv. If the venipuncture site is palpated again, it must be cleansed again and re-dried.

g. PERFORMING THE VENIPUNCTURE

i. After removing the needle cover, quickly inspect the needle tip, a blunt or bent tip may hurt the patient and damage the vein
ii. The vein should be anchored during the puncture by placing the opposite thumb about one inch below the puncture site and pressing down while stretching the skin of the arm toward the hand.
iii. The needle is introduced under the skin, bevel up.
iv. The backs of the fingers of the preferred drawing hand rest on the patient's arm while the needle enters the vein at about a 15 degree angle to the arm.
v. When using a syringe, pull back gently on the plunger without altering the position of the vein. When using a Vacutainer, upon entrance into the vein push the

Vacutainer tube as far as it will go into the holder. This is done by grasping the base of the holder with the first and second fingers and pushing the thumb against the bottom of the tube.

1. Do not push the holder, as it could force the needle through the vein
2. When the needle is properly positioned in the vein, blood will flow into the vacuum tube.

vi. When the desired amount of blood has been obtained, cover the puncture site with gauze (do not press), and activate the safety device per manufacturer's instructions. Discard entire needle assembly in appropriate sharps container

vii. Instruct the patient to apply pressure to the area. If the patient is unable to hold the gauze in place, the phlebotomist must hold pressure for 2-3 minutes.

viii. Inspect the puncture site. If most of the bleeding has stopped, a bandage may be applied. Occasionally a patient may not stop bleeding readily due to disease or medication. In such a case, continue pressure for at least 5 minutes and wrap with co-flex.

h. COLLECTION WITH MULTIPLE SAMPLE TUBES

i. Multiple samples are easy to collect with the vacuum tube system. A special needle which has the shorter end covered by a rubber sleeve is used to keep blood from escaping from the needle into the holder while tubes are being changed

ii. Once a specimen tube is filled, grasp the holder tightly with one hand and remove the specimen tube from the holder with the other hand

iii. Insert a new tube all the way into the holder.

iv. If no blood appears, the needle may have slipped out of or through the vein. Correct the problem by moving the needle backward or forward in the arm very slightly

v. If still no blood appears, the tube may have no vacuum. Remove the tube, and replace it with a new one.

vi. Repeat steps b and c for each subsequent tube that you wish to fill. After filling the last tube, release the tourniquet and remove the needle in the manner previously described.

vii. When collecting several tubes of blood, it is a general rule of thumb to collect those tubes containing an anticoagulant last. If more than one tube contains an anticoagulant, the tubes should be collected in the following order:

1. Blood Cultures (if ordered)
2. Blue Top: Citrate tube
3. Red or Gold or Orange Top: Plastic with or without gel separator
4. Green Top: Heparin-containing tube
5. Lavender or Pink Top: EDTA-containing tube
6. Gray Top: Oxalate/fluoride-containing tube

7. Mix tubes as soon as they fill with blood while the next one is being filled in the holder. This will avoid having to draw the patient again because of a clotted specimen

i. PREPARING THE PATIENT FOR PAIN MANAGEMENT

i. If the patient complains of a sharp, shooting pain up his/her arm or down his/her fingers discontinue the phlebotomy procedure.
ii. If the patient develops a hematoma at the puncture site, ice can be applied.
iii. If the patient complains of more than usual pain after the phlebotomy procedure is completed, ask them if they would like to see their provider for further assessment of their pain. Any incident of this kind should be fully documented with an RL-6 report describing in detail the phlebotomy procedure.

j. TRANSFER OF BLOOD

i. If a syringe is being used, blood must be transferred to the proper specimen tubes for transport to the lab by removing and discarding the needle and attach the hub of the syringe to the safety transfer device.
ii. Push the syringe needle through the stopper of a vacuum tube, thus allowing the vacuum to draw the blood into the tube. This can usually be done safely without hemolysis if the needle is 21 gauge or larger. Never push the syringe plunger during this transfer, as the additional pressure could force the rubber stopper off the tube and expel the specimen
iii. Tubes containing anticoagulant should be inverted gently back and forth at least 8 times to ensure adequate mixing of blood with the substance in the tube. Do not shake the tube, as this could cause hemolysis

k. FAILURE TO OBTAIN BLOOD

i. If blood does not flow into the syringe or Vacutainer tube, follow this procedure
    1. Feel the point of the needle under the skin with the index finger of your free hand. Determine the position of the needle point in relation to the vein
    2. If the needle is above the vein or not completely in the vein, slowly move the needle deeper in the vein
    3. If the needle has gone to the side of the vein, draw the needle back slightly, without pulling it out of the skin, and redirect the needle into the vein
    4. If the needle appears to have gone through the vein, slowly withdraw the needle until it is within the lumen of the vein, pulling back on the plunger at the same time if you are using a syringe. If a Vacutainer is being used, blood should flow into the tube when the needle reaches the vein lumen.
    5. If you are unable to obtain blood, discontinue the venipuncture as described on the previous page. Inform the patient that you were unable to obtain the

blood sample and would like to try again. If the patient agrees, check the other arm and repeat the venipuncture using new supplies

6. If blood is not obtained during the second attempt, assistance must be called. Someone else may have better luck at this point, and the patient will appreciate a fresh start with someone new.
7. The second or the "senior" phlebotomist will attempt to collect.
8. If the blood cannot be obtained by the phlebotomists in 4 total attempts, it is considered that other means must be followed to obtain the blood or after eight hours for the next shift.
9. Since the provider has access to other collection sites, it is their responsibility to collect the specimen.
10. If the ordering provider requests that the phlebotomists "continue to try to collect the specimen", this should be brought to the attention of the Phlebotomy Team Leader. If the conflict is not resolved, the Pathologist on call will be contacted to intervene.

l. HANDLING FAINTING DURING PHLEBOTOMY

i. Once phlebotomy has been initiated, and the patient exhibits symptoms of anxiety or apprehensive, the procedure should be stopped immediately.
ii. If the patient was in a sitting position, prevent the patient from falling and ask for assistance.
iii. If possible, cold compresses may be applied to the forehead and/or neck
iv. Juice may be offered to the patient
v. As soon as the patient can be moved, place them in an area where they may be placed in a reclining position, and elevate the feet and legs.
vi. Wait until the patient's condition has stabilized and they appear calm and alert. If necessary repeat the phlebotomy procedure.
vii. If the patient should lose consciousness
    1. Call for assistance
    2. Call the emergency number 3131 and report a "Medical Assistance"
        a. The responding personnel will assume responsibility for the patient's care. Follow any instructions they give you.
viii. If the patient did have a complication, as described above, an Incident/RL-6 report must be completed after all care has been given, and the patient has left the phlebotomy area.

m. PATIENT LABELING INSTRUCTIONS

i. Refer to the Laboratory Specimen Identification and Labeling Policy

n. PROPER DISPOSAL OF PHLEBOTOMY EQUIPMENT

i. Discard gauze, alcohol preps, and associated packaging in appropriate trash receptacle
ii. OSHA regulations mandate that needles may not be removed from their holder and that each holder must be discarded after single use. Utilize proper needle disposal in an appropriate puncture-proof container, being sure never to re-cap used needles

o. PRE-WARMING GUIDELINES – 'COLD AGGLUTININ'

i. Normal body temperature is 37C. When fluids are removed from the body for analysis, the fluid will equilibrate to the ambient temperature (~25C). Some patients' conditions cause the blood to agglutinate (clump together) at temperatures below 37C. This phenomenon can lead to erroneous results, especially in Hematology and Blood Bank. To prevent this 'cold agglutination', the blood should be maintained at 37C throughout the pre-analytical and analytical phases.
ii. Previously known 'cold agglutinin' patients are marked in the LIS with an FYI comment. When the appropriate labels for tubes to be collected are printed, one 'footie' label will contain the comment. This means the blood must remain warm.
iii. Using a Thermos
    1. Thermoses with pre-warmed blood collection tubes are stored in the incubator #2 in Microbiology
    2. Remove thermos from incubator and bring to patient's side immediately prior to blood collection
    3. Prepare patient for venipuncture, keep tubes in closed thermos until ready to collect
    4. Collect blood into the appropriate tubes following established protocol
    5. Label tubes with the LIS labels in the presence of the patient and immediately return them to the thermos
    6. Bring thermos containing the collected tubes to lab as soon as possible after collection, no more than 3 hours
    7. Accession specimens following standard procedures, return tubes to thermos and deliver to the appropriate section
    8. After analysis, the tubes can be stored following standard storage protocol
    9. Replace tubes to thermos and return to incubator #2
iv. Using a Thermal SoftPak
    1. Assemble appropriate tubes, softpak and infant heel warmer
    2. Activate heel warmer and place inside the internal pocket of the thermal softpak
    3. Place needle and tube in bag to pre-warm as the patient is called to be drawn
    4. It is critical that the purple top tubes be pre-warmed for at least 1 minute
    5. When patient has been prepared and tubes are ready, collect and label blood tubes
    6. Return tubes to thermal softpak, discard needle

7. Deliver thermal softpak to the laboratory
8. Accession specimens following standard procedures, return tubes to softpak and deliver to the appropriate section
9. After analysis, the tubes can be stored following standard storage protocol
10. Discard infant heel warmer after use

VII. THE CAPILLARY PROCEDURE

a. This technique is useful for both adults and children when only small amounts of blood are required. Generally, a well-performed venipuncture is considered less painful and better specimen than is a capillary puncture. However, in some instances, such as obtaining a specimen from a small child, an apprehensive patient, or a patient with difficult veins, it may be necessary to use a capillary puncture.
b. The patient has poor veins for venipuncture
c. The patient has only one good vein, which is being saved for another procedure
d. The patient is extremely apprehensive about the venipuncture procedure
e. In some cases of apprehensive adults or older children, often merely explaining the procedure and the importance of obtaining "the best" specimen will convince them to allow a venipuncture to be performed. However, it is often necessary to perform capillary punctures
f. Capillary punctures may be performed on fingertips or heels of an infant
g. The site of choice is the distal-lateral aspect of the finger-tip. Usually the second for third finger is used. See figure below

h. PERFORMING THE CAPILLARY PROCEDURE

i. Assemble your equipment
    1. Gloves
    2. Lancet or controlled puncture device
    3. Alcohol preps
    4. Gauze pads
    5. Collection container, etc.
ii. Reassure the patient by telling him/her that you are going to take a blood specimen from his/her finger
iii. Choose a finger that is not cold, cyanotic (blue), or swollen. If the patient's hands are cold, they may be warmed by holding them under warm running water or by briskly rubbing them. An infants heel can be warmed using a heel warmer
iv. With the alcohol prep, cleanse the collection site to remove surface bacteria
v. Remove the puncture device from its container. Grasp the lancet between the thumb and forefinger of your dominant hand.

vi. Grasp the patient's finger between the fingers and thumb of your opposite hand. Your fingers should be on top of the patient's finger with your thumb supporting his finger. See figure below

vii. With a quick wrist motion make a puncture lateral to (on the side of) the ball of the finger and perpendicular to the lines of the fingerprint. See diagram below Depending upon what lancet device is used determines the depth of the cut.

viii. Using a dry, clean gauze, wipe off the first drop of blood, as this drop may be contaminated with tissue fluid

ix. Still holding the finger lightly, fill a capillary pipette or other collection container. The capillary pipette should be held in an almost horizontal position with the tip touching the drop of blood. The tube should not be allowed to touch the finger. A gentle squeeze and release action may be applied to the finger in an effort to obtain more blood.

x. When obtaining micro specimens, the following order of collection should be followed:

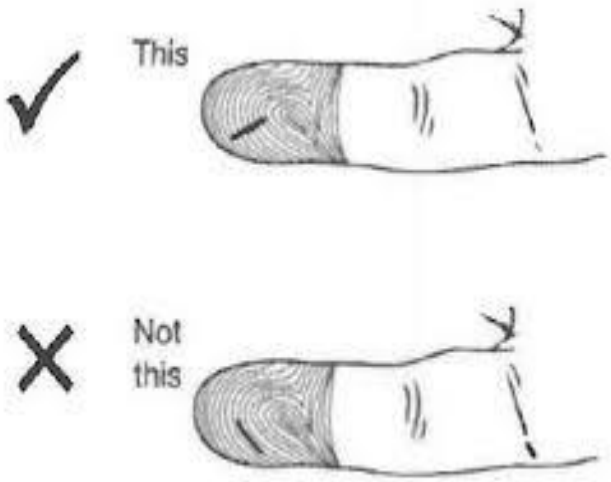
1. Smears/slides
2. ThromboTic
3. EDTA microtainer MAP tubes
4. Serum microtainers

xi. When sufficient blood has been obtained, place a clean, dry gauze over the site and ask the patient to press down with the thumb on the same hand until the bleeding is stopped. A bandage may be required to prevent leakage, however, the use of a bandage on the finger of a child under the age of 6 years old is not recommended, as the child may swallow the bandage or choke on it.

xii. Mix all tubes

xiii. All contaminated equipment should be disposed of properly. Bloodied gauze pads, as well as other contaminated waste, should be disposed of in a biohazard containers. Lancets and puncture devices should be disposed of in a puncture resistant biohazard container.

xiv. Label all specimens with the patient's name, MRN, date, time and initials of the phlebotomist.



i. ADVANTAGES AND DISADVANTAGES OF CAPILLARY PUNCTURE

i. Advantages:
   1. Capillary punctures are most commonly used to obtain blood samples from small children, as their veins are often very small. However, for some adult patients a capillary puncture is less frightening than a venipuncture
   2. Some physicians prefer peripheral blood smears made from non-anticoagulated capillary blood to those made from a venipuncture sample. The blood from a properly performed capillary puncture is generally considered to be equivalent to venous blood from a venipuncture.

ii. Disadvantages:
   1. The capillary puncture technique can only be used to obtain small amounts of blood
   2. The volume of blood collected by capillary puncture usually does not allow for retesting of the specimen should this be necessary
   3. Blood collected in microtubes tends to hemolyze more easily than that collected in full-size tubes
   4. Fingertips have more nerve endings than do arms. Therefore, a finger puncture can be more painful than a non-traumatic venipuncture

Appendix A

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

Patient's Weight Pounds	Patient's Weight Kilograms (approx.)	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)
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

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Title: SPECIMENCOLLECTION

Date Created: 12/13/2020 8:57:17 AM

Original Approver: Dr. Samantha Davenport

Metatags: Update, Added and Replaced

Approval Workgroup: MIB CLP Minor Changes Workgroup

Last Approved By: Sheldon, Natalie(Manager, Clinical Lab Services) (12/17/2020 9:18:20 AM)
Davenport, Samantha MD(Chief of Service, Laboratory) (12/14/2020 7:41:38 AM)
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Last Updated Time: 12/17/2020 9:18:20 AM

Folder Name: CLP\Phlebotomy Procedures