



دائرة المختبرات الطبية و علم الأمراض
Department of Laboratory Medicine and Pathology

COLLECTION OF BLOOD SPECIMEN MANUAL 2024-2026

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1. INTRODUCTION:

1.1 Scope:

To standardize the venous and arterial blood specimen collection procedures for medical laboratory testing. These guidelines are appropriate for adoption by all healthcare providers responsible for blood specimen collection in outpatient and inpatient settings.

1.2 Standard Precaution:

All patients and laboratory specimens are treated as infectious and handled according to “standard precautions”. This includes and not limited to:

- 1.2.1 Personal protective equipment (PPE); i.e., gloves, closed shoes, mask, gown, etc.
- 1.2.2 Hand hygiene practices.
- 1.2.3 Follow the corporate waste management practices. All contaminated items such as gloves and tourniquets discarded in clinical Biohazard waste (Yellow waste).
- 1.2.4 Maintaining a clean work environment by daily disinfectant of work surfaces, and clear phlebotomy arms’ chairs after each patient.
- 1.2.5 Adheres to the use of safety needles. Recapping a used needle is not recommended.
- 1.2.6 Personnel reasonably expected to have direct contact with body fluids shall be identified and offered hepatitis B vaccinations.
- 1.2.7 If respiratory protection is needed because of potential exposure to an infectious agent by aerosol or droplet, personnel should use a properly fit-tested filter respirator (N-95 or higher).

1.3 Definitions:

- 1.3.1 **Phlebotomy** – the act of drawing or removing blood from the circulatory system through puncture to obtain a specimen for analysis and diagnosis.
- 1.3.2 **Venipuncture**- the puncture of a vein for surgical or therapeutic purposes, or for collecting blood specimens for analysis.
- 1.3.3 **Vascular Access Devices (VAD)**- a device inserted temporarily or permanently into a vein and /or artery to allow access to the circulatory system for the administration of fluids or medications, or various procedures.

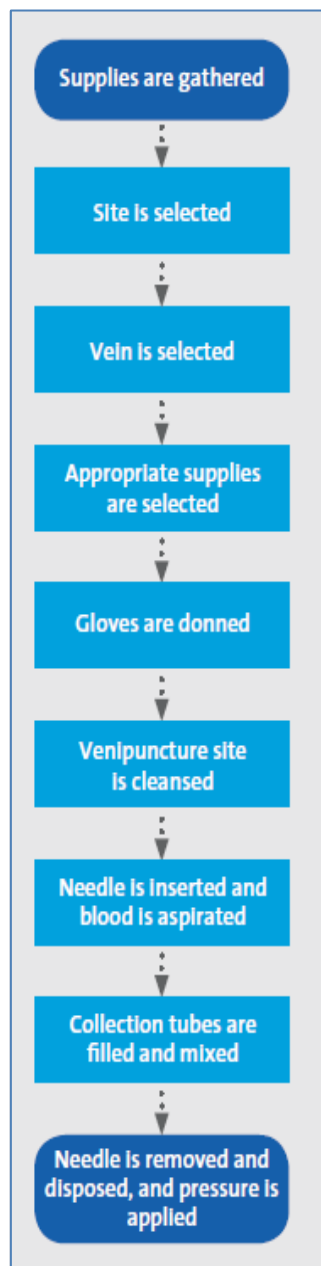


Figure 1. Blood Collection flow chart

2. BLOOD SPECIMEN COLLECTION PROCESS

2.1 Patient registration:

- 2.1.1 Proper patient identification begins at the registration process. Registration occurs when a patient is admitted to a hospital for a long-term or short-term care facility.
- 2.1.2 Collection test request: Upon patient receiving blood collection, test request – manual or electronic- must be checked and ensure that the information entered is accurate.
- 2.1.3 Approach the patient:
 - 2.1.3.1 The collector must observe at inpatient area for conditions and details related to the procedure; including but not limited to signage, bracelets, specific precautions, presence of ID wristband, obstacles preventing access to patients, patient position, presence of IV lines, VAD, or fistulae.
 - 2.1.3.2 The specimen collector (Phlebotomist / Nurse) identifies herself or himself and states her or his purpose.
 - 2.1.3.3 Sleeping patients must be awakened before proceeding.
 - 2.1.3.4 The healthcare provider (Phlebotomist / Nurse) must demonstrate empathy and respect upon approaching the patient.

2.2 Patient Identification

- 2.2.1 Patients shall be actively involved in the identification process and shall be educated on the importance of correct patient identification if he/she is conscious and oriented.
- 2.2.2 The specimen collector must ensure that the blood specimen is drawn from the right patients.
- 2.2.3 The two main identifiers shall be the patient's full name and Health Card (HC) Number/(QID)Number. HC number is known as a Medical Record Number (MRN) and contains eight digits.
- 2.2.4 In Outpatient settings, verify patient identification using the patient's full name and HC number (Valid Health card), and the information given shall be cross-referenced with details in the patient's medical record.
- 2.2.5 For visitors' patients, should bring their passports original / (GCC ID) or copy as an identifier.
- 2.2.6 Any discrepancies are identified; specimens are not to be collected until all inconsistencies are resolved.
- 2.2.7 For Patients who are unable to participate in the identification verification process, the healthcare provider must ask a relative, a friend, or other healthcare professional (assigned nurse/ physician) to identify the patients. Document the process and representative information.

2.3 Pre-collection requirements:

The phlebotomist must comply with all pre-collection requirements.

- 2.3.1 Providing information and obtaining consent:
 - 2.3.1.1 Explain to the patient about the laboratory testing and specimen collection.
 - 2.3.1.2 Blood collection must not be performed against the patient's or guardian's consent. The phlebotomist must report the patient's objections to the physician or other healthcare professional (assigned nurse/ physician).

2.3.1.3 Physiological Factors.

- 2.3.1.3.1 Some specimens require collection at a specific time or fasting requirements. Time and diet restrictions according to the test restrictions are necessary to ensure accurate test results.
- 2.3.1.3.2 Timed tests must be collected at the precisely specified intervals, examples are: The glucose Tolerance Test (GTT), cortisol, digoxin, Growth Hormone, etc., and more information can be found in the internal lab guide.
- 2.2.1.3.3. No food or liquid, chewing gum, or other objects should be in the patient's mouth at the time the specimen is drawn.
- 2.2.1.3.4. Politely ask the patient not to use the mobile or take photos during the procedure.

2.4 Hand Hygiene

The phlebotomists or health care provider who will perform the collection must perform hand hygiene before contacting patients according to **(refer to CL 7241: HAND HYGIENE)**

2.5 Assess the patient.

- 2.5.1 To ask the patients if there are any complications or conditions with blood collection, for example: latex allergy, and shock cases.
- 2.5.1 If a patient with a history of syncope (faint) must be recumbent (horizontal) by proper reclining chair or bed.
- 2.5.2 No food, liquid, chewing gum, or other object should be in the patient's mouth at the time of specimen collection.

2.6 The position of the patient:

- 2.6.1 Specimens must be collected with the patient positioned comfortably in a seat or recumbent position. The arm should be placed horizontally or slanted slightly downward on a suitable support (armrests, table).
- 2.6.2 Assist the patient in extending her/his arm into the proper position. Must not forcibly extend the arm of a patient if the full extension is not possible due to stroke, injury, or other circumstances.
- 2.6.3 Patients must sit in a chair with safety features to provide support and prevent falls. If it is not available, collection must be collected with the patient in a recumbent position.
- 2.6.4 Patient in a wheelchair, ensure secure the chair to prevent movement during the procedure.
- 2.6.5 Not to collect specimens when the patient is sitting at an examination table or the side of the bed.
- 2.6.6 Adjust the patient's bed, if necessary, to facilitate arm extension.

2.7 Home collection:

- 2.7.1 Patients must be placed in a recumbent position or a chair with arm support.
- 2.7.2 Do not put your equipment on or near food.
- 2.7.3 Ensure patient safety since there may not be any help available if the patient faints.
- 2.7.4 Ensure patient confidentiality and the privacy of the patient's home.

2.8 Specimen Collection:

2.8.1. Phlebotomy Supplies:

- 2.8.1.1. Supplies must be inspected for defects and used within the expiry date.
- 2.8.1.2. Devices MUST NOT be pre-assembled by the collector before the patient is identified.

2.9. Select the site:

- 2.9.1. The preferred venipuncture site is the antecubital fossa, if not unavailable, the vein on the back of the hands can be used.
- 2.9.2. Arterial puncture **SHALL NOT** be considered an alternative to venipuncture because results will not be equivalent for many analyses and complications.
- 2.9.3. Veins on the palmar surface of the wrist and the lateral wrist above the thumb to the mid-forearm must not be used.
- 2.9.4. Draw must not be performed on the scalps of newborns, or ankles because of the potential of significant medical complications.

Sites That Must Not Be Used	
Sites	Rationale
Fistula, arm with a fistula, or vascular graft.	Threatens the integrity of fistula and vascular grafts, which can lead to serious patient complications.
Arteries	Risk of misinterpretation of results and patient mismanagement if arterial blood is used rather than venous blood. (Note: Arterial and venous blood specimens are not equivalent for many analytes).
Veins on the lateral and palmar surface (underside) of the wrist.	Increase the risk of nerve, tendon, and arterial involvement.

Sites That Should Be Avoided	
Sites	Rationale
Extensive scarring, healed burns	Palpation and needle insertion complications. Inability to detect the adverse reaction.
Hematoma	May cause discomfort and potentially alter test results.
Above and below infusing fluid or from VAD	Possible contamination of specimen with IV fluid.
Inflamed sites (including tattoos)	Patient discomfort and possible complications
Edematous sites	Potential for altered test results
Feet or Ankles	Risk of clot-forming especially in bedridden patients
Extremity affected by stork and injury	Inability to detect adverse reactions, e.g., Nerve injury, pain, infection.
Mastectomy	Risk of infection and lymphedema if the arm on the side of mastectomy is used

Table 1. Site Selection limitation when collecting Venous blood specimens.

2.9.5. Select the vein.

- 2.9.5.1. Apply a Tourniquet to facilitate vein palpation and specimen collection by prioritizing the antecubital veins for safety. Place the tourniquet around the arm 3-4 inches (7.5 to 10 cm) above the intended venipuncture site.
- 2.9.5.2. Tourniquet application **MUST NOT** exceed **ONE MINUTE** before accessing the vein to prevent patient complications and ensure accurate test results. Complying with this will prevent Hem-concentration.
- 2.9.5.3. If the tourniquet is placed for longer than one minute before accessing the vein, it must be released and reapplied after two minutes before the venipuncture is performed.

- 2.9.5.4. A non-latex tourniquet must be used to prevent latex sensitivity and allergic reactions.
- 2.9.5.5. A single-use tourniquet is recommended to avoid the spread of healthcare-acquired infections.
- 2.9.5.6. Construction must not be excessive or uncomfortable for the patient.
- 2.9.5.7. For patient comfort, the tourniquet may be applied over clothing to prevent pinching of the skin, or gauze can be used as a barrier between the tourniquet and the patient skin.
- 2.9.5.8. Always check the second arm for alternative and better veins before performing the venipuncture in the first arm.
- 2.9.5.9. The vein assessment determines the vein's depth, size, direction, and health condition.

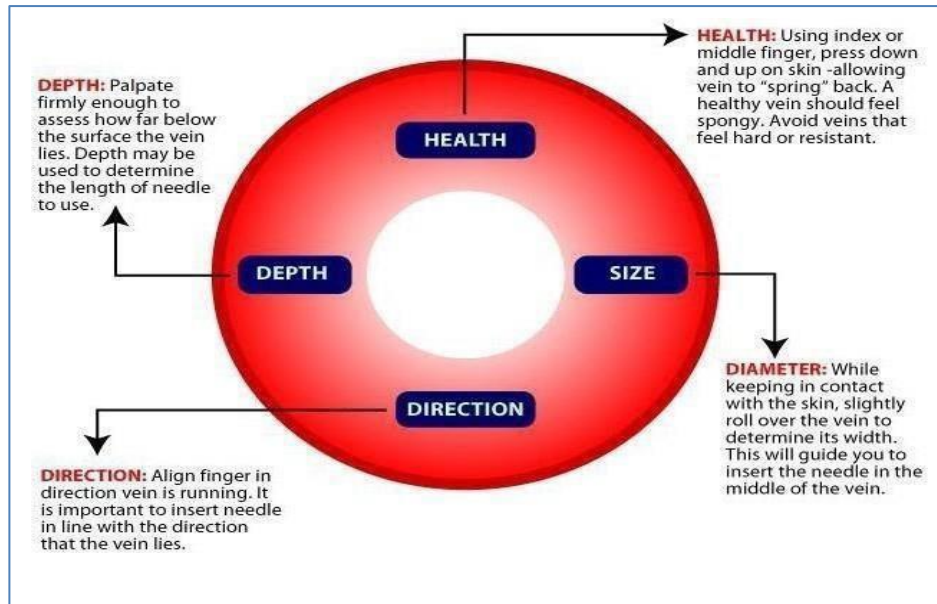


Figure 2 Vein assessment. CAP competency 2017.

2.10. Antecubital anatomy:

- 2.10.1. Antecubital vein location varies from person to person. There are two basic vein distribution arrangements the "H-shaped" and "M-shaped."
- 2.10.2. The "H-shaped" pattern is in most populations including the cephalic, median cubital, and basilic veins.

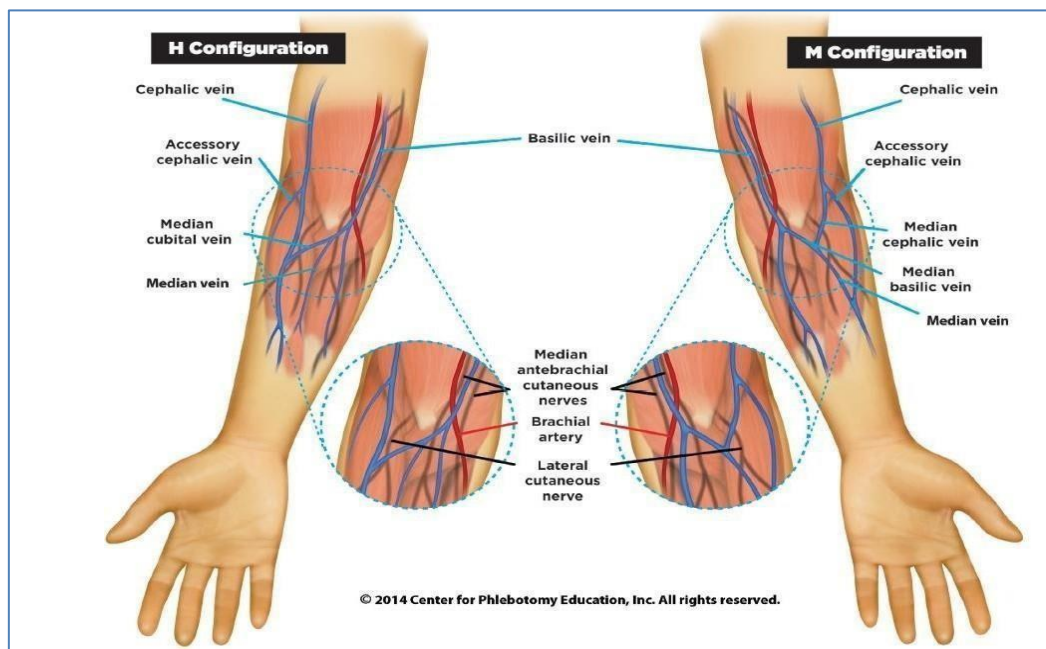


Figure 3. Superficial veins of the arm.

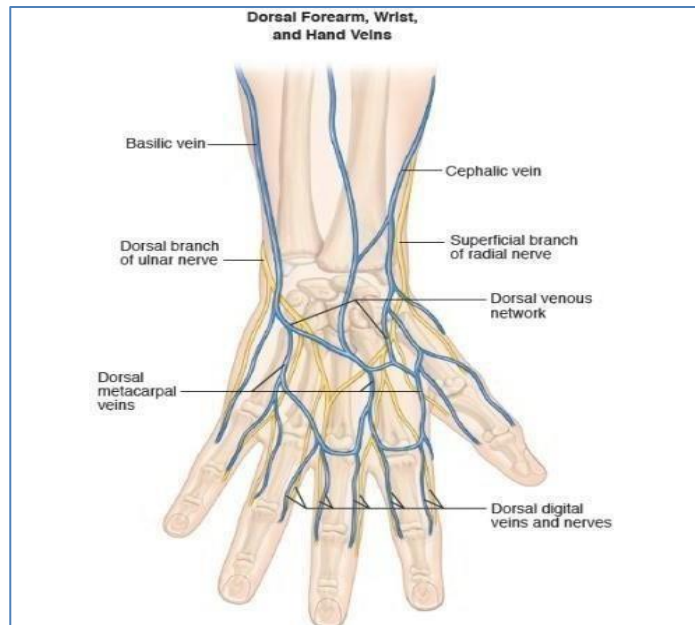
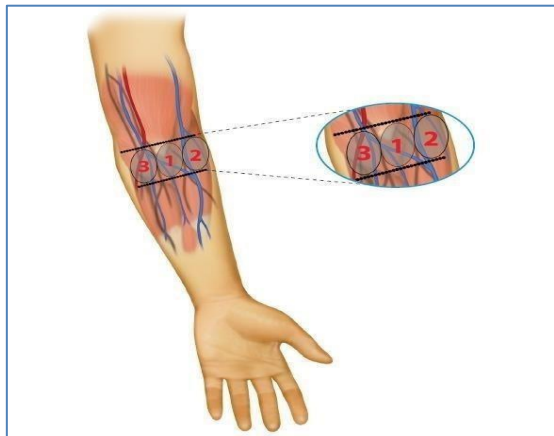


Figure 4. Hands veins. GP41, 7th ed, p.15 (Antecubital veins locations)

2.10.3 Prioritizing veins according to risk can minimize the potential for injury and complications. Vein selection is as follows:



First: Veins in the medical aspect (Centre), i.e., **Median**, and lateral aspect of the medical cubital veins

Second: Veins in the lateral aspect (Outer), i.e., **Cephalic** vein and accessory cephalic vein.

Third: Veins in the medial aspect (Inner), i.e., **Basilic** vein and medial aspect of the medial cubital vein

Figure 5. Prioritization of antecubital veins. GP41, 7th ed, p.21

2.11. Clenching the fist:

- 2.11.1. It is not a mandatory requirement. Veins become more prominent and more accessible to enter when a patient forms a fist.
- 2.11.2. Patients must not be instructed to vigorously open and close the hand (pumping) which can cause significant elevations in the potassium concentration in the specimen collected.

2.12. Phlebotomy supplies:

The phlebotomist/collector must inspect all supplies for possible defects and check the expiration date. Devices must not be preassembled by the collector before the patient is identified.

- 2.12.1. Needles: Select the appropriate device and needle gauge based on the vein characteristics and volume of blood to be collected.
- 2.12.2. Tubes: must be selected according to the test requested and a laboratory requirement.

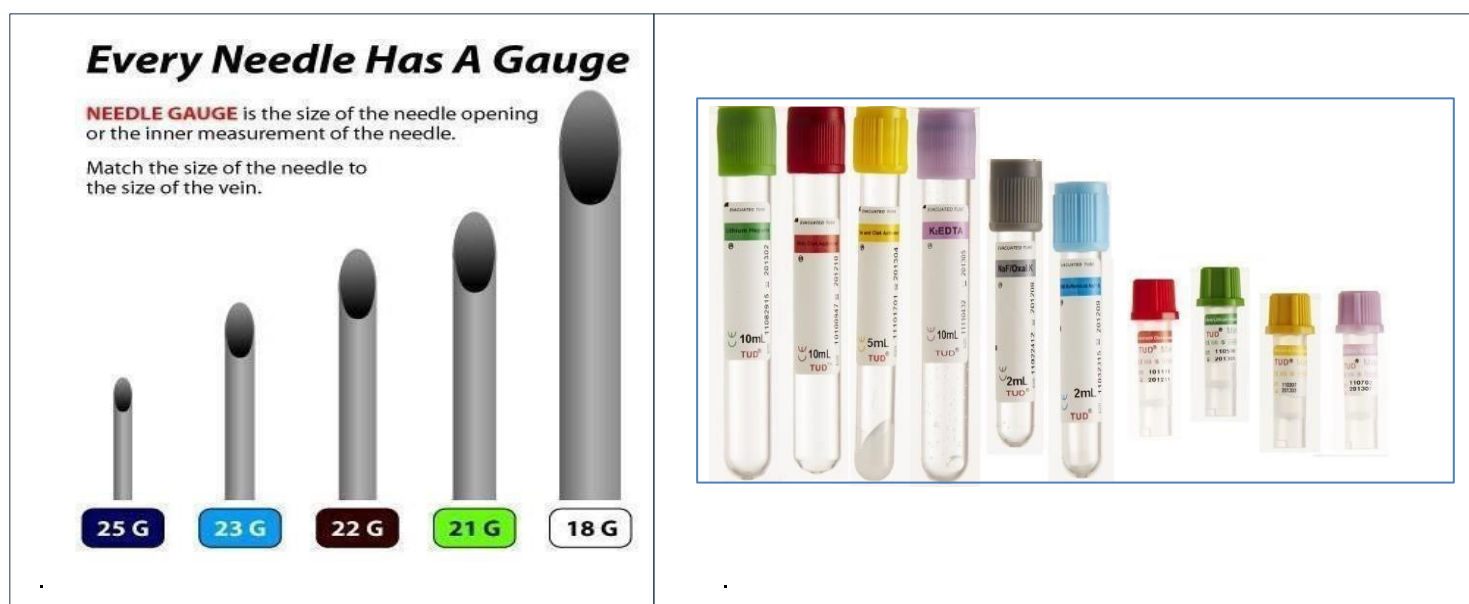


Figure 6. Tubes and needle sizes

2.13 Gloves are donned:

The phlebotomist or collector must put new gloves on before the venipuncture is performed for each patient, with consideration of latex hypersensitivity. It is not allowed to remove the fingertips of the gloves.

2.14. Clean the site and apply a tourniquet:

The venipuncture site must be cleaned to minimize microbiological contamination of the specimen and patient infection.

- 2.14.1. Clean the site with a 70% isopropyl alcohol pad or solution. If the specimen is being collected for blood alcohol level, use a non-alcohol-based cleaner.
- 2.14.2. Allow the area to dry. This prevents any burning sensation experienced when venipuncture is performed and prevents hemolysis of the specimen collected.
- 2.14.3. **Clean the site in up and down and back and forth friction scrub, for at least 30 seconds or according to manufacturer's recommendation (CL7246) and allow it to dry.**

2.14.4. If the site re - palpation after cleaning, the site must be cleaned again.

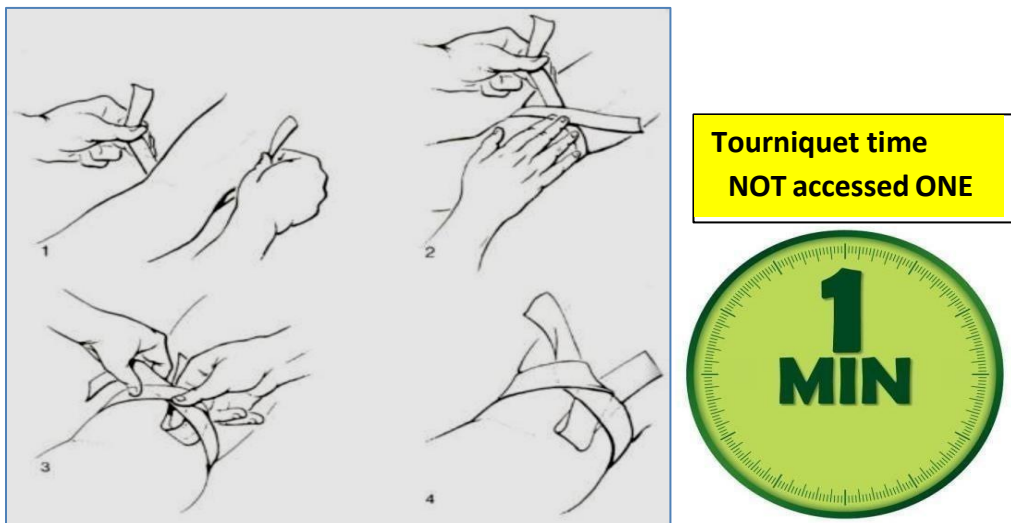


Figure 7. Apply the tourniquet.

2.15. Perform the Venipuncture:

2.15.1 When using evacuated tubes, the following steps must be performed:

- 2.15.1.1. Ensure the patient's arm or other venipuncture site remains in a downward position to prevent reflux or backflow from the collection tube into the vein.
- 2.15.1.2. Hold the patient's arm firmly and distal the intended puncture site. Draw skin taut to anchor the vein 1 to 2 inches (2.5 to 5 cm) below the venipuncture site in such a manner that anchoring does not impede needle insertion.
- 2.15.1.3. Anchoring the vein from above is not recommended due to the risk of an accidental needle.
- 2.15.1.4. To prepare the patient to inform the patient that venipuncture is about to occur. Be prepared for any sudden unexpected movement or adverse.
- 2.15.1.5. Puncture the vein with steady forward motion in the direction of the venous with the bevel up and keep the needle in line with the vein and at an angle of 30 or less.



Figure 8. Needle Angle of Insertion. GP\$, 7th ed. p.24

- 2.15.1.6. Maintain needle placement while advancing the tube using the fingers of the holder to stabilize the device until the tube fills.
- 2.15.1.7. When using a winged blood collection set, maintain needle placement by holding or otherwise securing the device throughout the collection.
- 2.15.1.8. Do not allow the patient the pump hand. Instruct the patient to open his or her hand if the fist is performed.
- 2.15.1.9. Release the tourniquet as soon as blood flow is established to minimize hemoconcentration unless is felt that the vein collapsed.
- 2.15.1.10. Remove the last collection tube from the holder **before** removing the needle from the vein.
- 2.15.1.11. Remove the needle in one smooth motion without lifting or pressing down on it.

2.16 When using the syringe method:

The traditional venipuncture syringe should be avoided for safety reasons. If the condition requires a syringe collection, the following procedure is recommended:

- 2.16.2.1. Assemble the needle and syringe. Break the seal of the plunger according to the manufacturer's instructions, ensuring all air is expelled before use.
- 2.16.2.2 Repeat points (2.15.1.4 to 2.15.1.11).
- 2.16.2.3. When transfer of blood from a syringe to a blood collection tube is required:
 - 2.16.2.3.1. When transferring blood from a syringe to a blood collection tube; activate the safety feature of the needle or winged blood collection set as soon as the needle is withdrawn. Remove and discard the assembly and apply a safety transfer device to the syringe.
 - 2.16.2.3.2. Immediately insert the first tube into the safety transfer device and pierce the closure with the needle. Allow the tube to fill without applying any pressure to the plunger. Follow the same order of drawing.

2.17. Collection tubes:

- 2.17.1. Follow the recommended order of drawing (table 2).
 - 2.17.2. All additive tubes should be filled to their stated volumes. Closure **MUST NOT** be removed to fill tubes or transfer blood from one tube to another, even the same type.
 - 2.17.3. Allow blood to fill the tube until the maximum stated volume is reached (vacuum is exhausted).
 - 2.17.4. When the tube is filled remove the tube from the needle /holder and mix immediately by gentle inversion.
 - 2.17.5. Release the tourniquet as soon as possible, after the blood begins to flow.
- The order of drawing is the same for specimens collected by syringe or tube holder; the purpose is to minimize cross-contamination when multi-sample specimens are collected that avoid possible test result errors due to additive carryover.

1.		Blood culture bottle
2.		Sodium Citrate tube (Light blue closer)
3.		Serum tubes, including clot activator and gels (red, gold closures).
4.		Heparin tubes with or without gel (dark green, light green closures).
5.		EDTA tubes (lavender, pink closures)
6.		Sodium Fluoride/potassium oxalate glycolytic inhibitor (gray closure).
7.		Trace elements tubes (Lithium Heparin and EDTA), Royal or dark blue closure.

Table 2. Recommended Order of Draw

- 2.17.7. After filling any tube immediately, the phlebotomist /collector must mix blood gently by inverting the tube slowly for the required number of inversions per the manufacturer's instructions. For multiple tube collection, tube can be inverted while the next tube is filling. Avoid mixed vigorously that cause hemolysis.

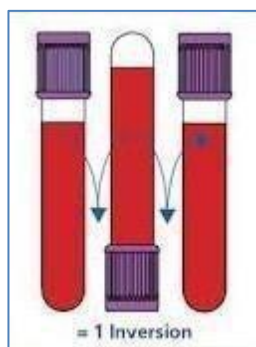


Figure 9. How to perform tube inversion

COLOUR CODE	TUBE TYPE	DETERMINATIONS	INVERSIONS
Blue Purple	Blood Culture	Aerobic followed by anaerobic	8-10 Times
Light Blue	Sodium Citrate	For coagulation determinations on plasma specimens	3-4 Times
Red	Serum	For serum determinations in chemistry	5-6 Times
Gold	SST ^{II} Advance	For serum determinations in chemistry - with gel separator	5-6 Times
Orange	RST	For serum determinations in chemistry - with Thrombin based clotting agent and gel separator	5-6 Times
Green	Heparin	For plasma determinations in chemistry	8-10 Times
Light Green	PST ^{II}	For plasma determinations in chemistry with gel separator	8-10 Times
Lavender	EDTA	For whole blood hematology determinations	8-10 Times
Pink	Cross Match	Crossmatch tubes for blood transfusion patients	8-10 Times
Grey	NaF/NaEDTA	For glucose determinations	8-10 Times
Royal Blue	Trace Element	For trace element, toxicology and nutrient determinations	8-10 Times

Figure 10. Vacutainer order of draw and mixing guidelines.

- 2.17.8. When a **winged collection set** is used for venipuncture, and a coagulation tube is the first tube needed, the phlebotomist must first collect a discard tube to prime the tubing of the collection set and ensure proper blood and anticoagulant ratio. The discard tube must be non-additive or a coagulation tube and does not to be filled.
- 2.17.9. **TB QuantiFERON tubes**: prefer to collect separately if there is difficulty pricking patients two times the **TB QuantiFERON tubes** to be last of the draw.

- 2.17.9.1 If the patient has a set of vacuum tubes belonging to QB QuantiFERON, follow the order of draw on figure 1 and then figure 3.
- 2.17.9.2 Fill (0.8-1.2 ml/each tube) and invert 10 times.
- 2.17.9.3 If the level of blood in any tube is not close to the indicator line, it is recommended to obtain another blood sample.

A. Grey tube marked 'Nil Control'
B. Green tube marked 'TB1'
C. Yellow tube marked 'TB2'
D. Purple tube marked 'Mitogen Control'



2.18. Needle removal, disposed of, and pressure applied:

- 2.18.1. The phlebotomist/collector must remove the needle, place a clean gauze pad lightly over the venipuncture site, and immediately activate the safety feature, some devices activated before the needle is removed from the vein, following the manufacturer's instructions.
- 2.18.2. Then apply pressure to the site. The patient may assist in applying direct pressure if a phlebotomist is monitoring the site to ensure the pressure is adequate.
- 2.18.3. Patients must not be allowed to bend his/her arms at the elbow; this technique is not adequate to prevent hematoma formation.
- 2.18.4. Cotton and rayon balls are not recommended; because of the possibility of dislodging the platelet's plug at the venipuncture site.
- 2.18.5. Needles must be discarded safely in a sharp container.
- 2.18.6. Needles must not be re-sheathed (recapping), bent, or broken.

2.19. Labeling of Specimens:

- 2.19.1. Specimens' tubes must be labeled immediately after the collection and in the presence of the patients.
- 2.19.2. Information required are:
 1. Patient's first and last name.
 2. Patient medical record number (MRN).
 3. Collection date and time.
 4. Collector identity (electronic sign).
- 2.19.3. The label must be applied to the tubes in a manner that ensures all the information is visible. Position the barcode labels carefully in tubes.
- 2.19.4. For manual or handwriting labeling, each tube must be labeled at the time of the collection by the information required and the collector's sign, date, and time. Information must be verified to match the information into the LIS or written on the paper records.
- 2.19.5. If more than one specimen is expected to be collected, i.e., glucose tolerance tests (GTT), collection time must be added to the label.

2.20. Post-Venipuncture Care:

- 2.20.1. Check the bleeding is stopped from the venipuncture sites for any hematoma. The prolonged bleeding site must be observed at least five to ten seconds before bandage. If bleeding has not stopped, pressure must be applied if necessary to stop the bleeding.
- 2.20.2. When the bleeding stops apply a gauze bandage or self-adhering bandage tightly around the arm to keep the pad in place. Latex-free adhesives must be available.
- 2.20.3. Instruct the patient to leave the bandage on for at least 15 minutes. Moreover, to pay attention to any pressure on the arm to protect the wound site.

2.21. Specimen Handling and Transportation:

Some specimens required special handling. Proper transport conditions must be maintained to preserve specimen integrity. For additional information, refer to lab guide and CL7067 policy.



Figure 11. Placed tubes in upright positions on a specimen rack.

3 Blood Specimens That Cannot be obtained:

Repositioning the needle without establishing vein location is considered blind probing and must not be performed. This can be painful and result in nerve damage, arterial puncture, or hematoma.

- 3.1 When collection fails; the tourniquet and needle must be removed, activate the safety needle, and apply pressure to the puncture site.
- 3.2 Any additional attempts must start from the beginning of the procedure, another site or arm is preferred. Never use the same needle for re-puncture. It is advised that the same phlebotomist can attempt venipuncture no more than **twice**. If possible, another phlebotomist can perform it; unless there are no alternatives, the phlebotomist must obtain consent from the patient to perform an additional attempt.
- 3.3 If the specimens cannot be obtained, this must be recorded along with the phlebotomist ID, if at INPT wards, the Nurse in charge or a physician should be notified.
 - 3.3.1 When blood does not flow upon needle insertion, the phlebotomist must assess the situation before considering the following technique:
 - 3.3.2 The needle placement is too shallow; advance it slightly farther.
 - 3.3.3 The needle has penetrated too far into the vein; withdrawal is slight.
 - 3.3.4 If the vein collapses upon the needle of the bevel needle; release the vacuum pressure (remove the tube or release the syringe plunger), wait for the vein it fills, and reapply the vacuum pressure. If blood flow

cannot be established, a repeat puncture may be necessary using a smaller needle and or smaller volume tube.

- 3.3.5 Apply another tube of the same type in case the current one is defective.

4 Other Difficult Situations:

Patients may present with a variety of conditions that can challenge the phlebotomists or collectors:

Situation	Difficulties	Recommendation
Elderly patients	Difficulty in locating veins, decreased vein elasticity, rolling, collapsing or fragile veins, dehydration, and low blood pressure make locating veins difficult.	Pre-warming venipuncture sites help to locate veins. Anchor veins securely to prevent rolling. Using small needles, low-volume tubes, or syringes with gentle pulling pressure prevents the vein from collapsing.
Obese patients	Deep veins, challenging palpation, and locating a vein. Rolling veins may present.	Longer needles help access the deeper vein. Bariatric chairs are recommended to outpatients to prevent discomfort and embarrassment. Pre-warming sites can help. Using a vein finder may enhance vein location.
Oncology patients	Chemotherapy can alter vasculature and affect vein patency and palpability. Rolling veins.	Same techniques for Elderly patients
Needle-phobic patients	Fear of needles, a negative encounter with sharps, pain.	Present yourself with confidence, and complete procedure as quickly as possible. Reclining the patients, using distraction techniques, exercise an abundance of patience and compassion to help patients.
Cognitively Impaired and combative patients	Unpredicted and sudden motions and behaviors.	An additional person or employee to assist is recommended to immobilize the patient. If phlebotomist feels that procedure cannot be performed safely, assistance should be requested or notify physician or caregivers. Do not place equipment within reach of the patient. A clean gauze pad should be ready in case of needle violently removed.
Venipuncture in pediatric patients	Can result pain and anxiety.	Apply reducing stress strategies include giving patient a role to play, distraction and interactive games

Table 3. Difficult situations in phlebotomy

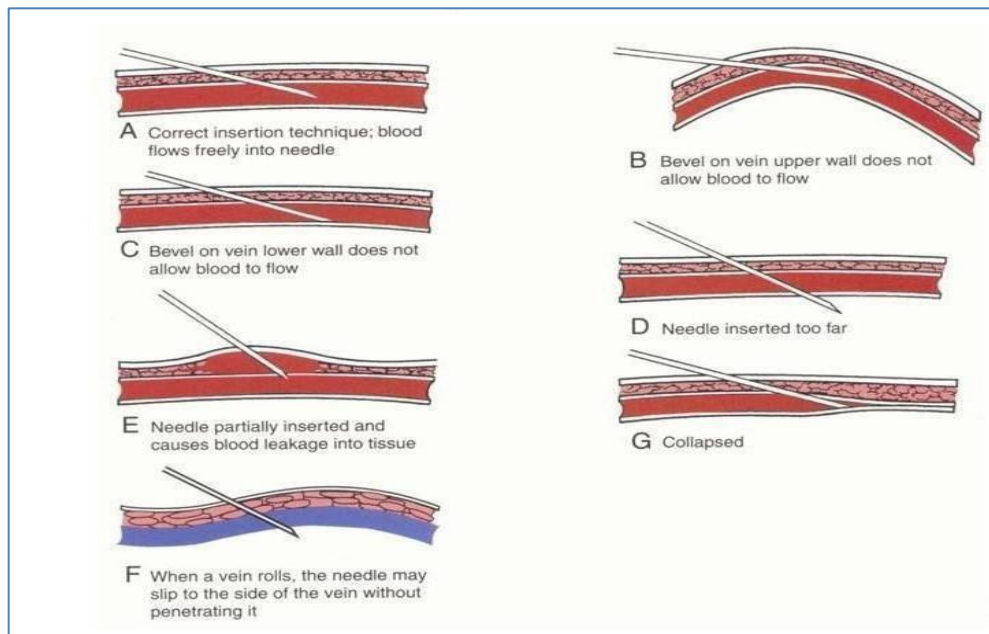


Figure 12. Needle positioning and failure to draw blood.

5 Collection Proximal to an Intravenous Infusion site:

Collecting blood proximal to active intravenous (IV) sites is not recommended. However, if no options are available, the procedure followed is:

- 5.1 Ask the responsible caregiver to turn off the IV infusion for at least two minutes before venipuncture. Make sure the flow has been completely discontinued.
- 5.2. Apply the tourniquet just proximal to the vascular access devices (VAD), but not so close that may obstruct the procedure or constrict the catheter within the vein.
- 5.3. Perform venipuncture. Then notify the caregiver that collection is completed, and infusion may be restarted.
- 5.4. Document in the patient records that the specimen was obtained proximal to an active IV site with the type of fluid being infused.

6 Capillary Collection:

In this section, we are applying information that will ensure the quality of pediatric blood specimens that are not affected by pre-analytical errors.

6.1 Type of patients:

- 6.1.1 A healthcare setting can present many challenges when it comes to collecting blood specimens that are necessary for diagnosis and treatment.
- 6.1.2 If venipuncture is not possible, capillary puncture may be useful for:
- 6.1.3 Pediatric patients are:
 - I. Neonates and infants.
 - II. Critically ill children whose condition warrants such technique.
 - III. Children where venous access is not readily available.
 - IV. Children who require frequent medical procedures (chemotherapy).

6.1.4 Other difficult critical:

- I. Severely burned patients.
- II. Critically ill or oncology patients whose veins are used frequently to administer therapeutic medications or treatments.
- III. Geriatric or other patients with very fragile veins
- IV. Point-of-care testing procedures
- V. Extremely obese patients

6.2 Collection sites:

6.2.1 Collection by capillary puncture is **NOT** appropriate when conditions are present that include:

- I. Dehydration
- II. Edema
- III. Poor peripheral circulation.

Advantages of skin puncture technique:

- I. No need to use a vein.
- II. Sites can be easily rotated.
- III. The technique is easily taught.
- IV. Small but adequate testing volumes can be obtained.
- V. A specimen is always obtainable.

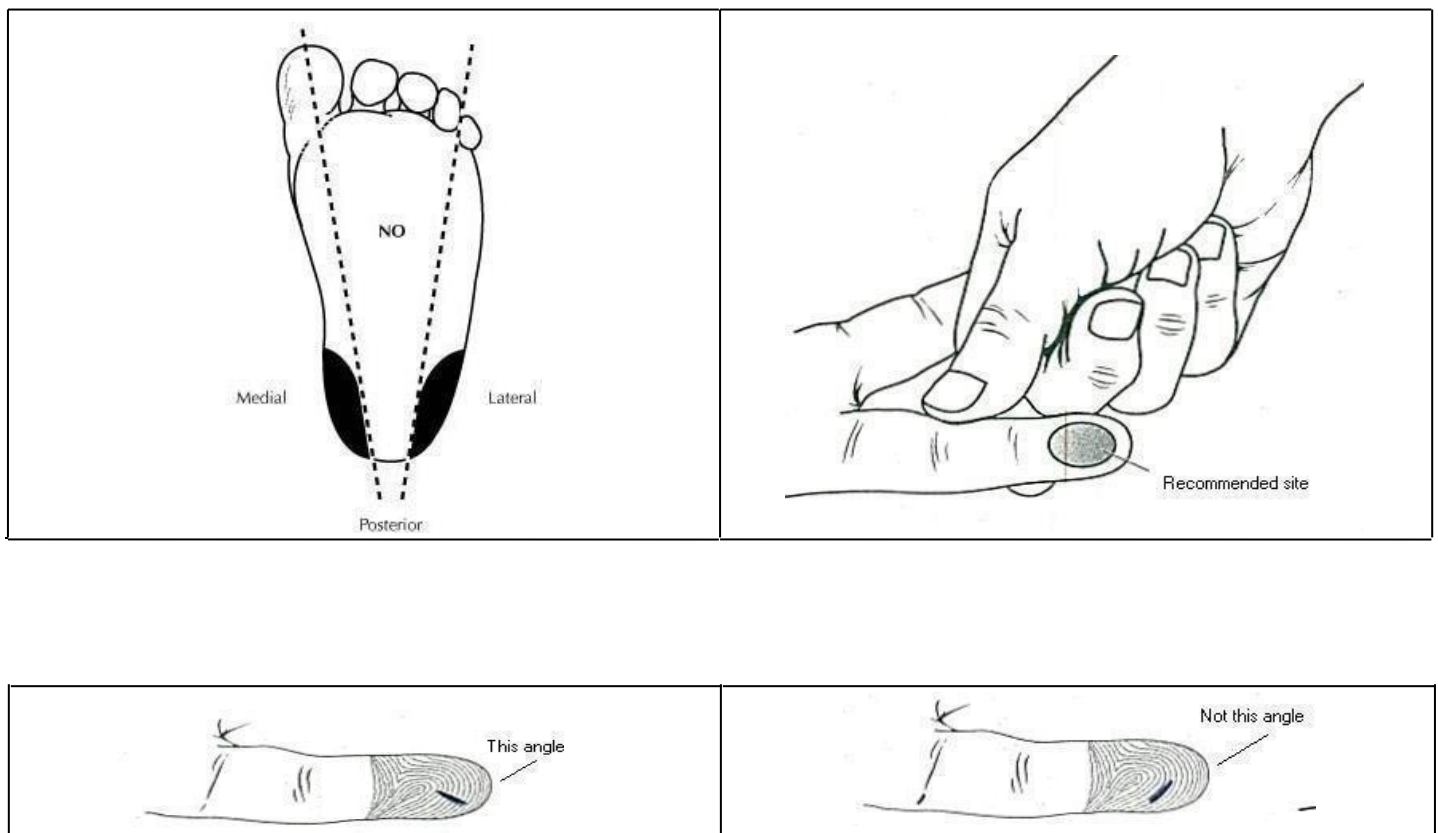


Figure 13. Capillary collection sites

6.3 Puncture Devices:

- 6.3.1 For children less than 1 year of age: the penetration depth of the device should not exceed 1.8mm, e.g., Neonate lancet or similar device.
- 6.3.2 For children over 1 year of age: the penetration depth of the device should not exceed 2.0mm

6.4 Capillary Collection Devices:

- 6.4.1 Skin-puncture specimens may be collected by capillary action into Micropipette:
 - Capillary tubes (heparinized or non-heparinized).
 - Micro collection containers
- 6.4.2 For a variety of semi-quantitative tests directly onto:
 - Special kinds of filter paper
- 6.6.3. Skin-puncture blood can be obtained from the:
 - Lateral or medial plantar surface of the heel
 - Palmar surface of the distal phalanx of a finger
- 6.6.4. Prepare list of items in your area:
 - Disposable gloves
 - Packaged alcohol swabs or pads.
 - Gauze swab
 - Micro collection tubes
 - Capillary tubes
 - Disposable retractable blood lancet device
 - Puncture-resistant sharps container

6.5 Patient Identification for Pediatric:

- 6.5.1 Ask the child to state his/her name if this is an older child or ask the parent or guardian to state the child's name if this is a young child or if the child is unable to provide the information.
- 6.5.2 Newborns that are not yet named may be identified by their last names and unique identification number. In some hospitals, the baby may wear a bracelet that cross-references to the mother.
- 6.5.3 An outpatient's name and birth date may be used for identification if ID bracelets are not used for outpatients, but the patient must verbalize the information (or the patient's parent or guardian can verbalize if the patient is not capable of providing this information). (Refer to CL 7026: patient identification).

6.6 Restraint and positioning

When performing a pediatric capillary sample, it is important to immobilize and position the child to safely perform the procedure and obtain the desired specimen. The following steps can be used to help achieve a positive outcome:

- 6.6.1 If possible, have the child sit on the parent's lap and instruct the parent to hug the child in a way that will keep the child still.
- 6.6.2 After the blood collection is completed, give positive reinforcement such as letting the child know that he/she did a great job.
- 6.6.3 If the parent or guardian objects to the procedure, do **NOT** proceed. Notify the clinical person who oversees the child's care.

6.7 Preparation of Patient's Finger:

- 6.7.1 Wash your hands with either an alcohol-based hand rub (if hands are not visibly soiled) or soap and water (if hands are visibly soiled) and wear new, properly fitting gloves for each patient.
- 6.7.2 Avoid puncturing a patient's finger if it is cold, cyanotic (blue), swollen, or inflamed.
- 6.7.3 The patient should be positioned so that their finger is steady and supported in a comfortable position.
- 6.7.4 With your thumb and index finger, grasp either the patient's long or ring finger about 1 inch from the tip of their finger.
- 6.7.5 With your other hand, hold the sides of the patient's finger.
- 6.7.6 Moving your supporting hand toward the tip of the patient's finger, apply a massaging motion to the fleshy portion of the finger.
- 6.7.7 Repeat this massaging process 5 or 6 times.
- 6.7.8 With the alcohol swab, cleanse the entire fingertip.
- 6.7.9 To reassure the patient before performing the skin puncture, you might say, "Ok this. will pinch for a second".

6.8 Puncturing the finger of a child (greater than 1 year of age)

- 6.8.1 Pick up a sterile retractable lancet. Select the proper lancet size for the age and size (or weight) of the patient and volume of blood required.
- 6.8.2 With one hand, firmly grasp the lancet. With your other hand, firmly grasp the patient's finger to maintain control and provide the best access to the puncture site.
- 6.8.3 Hold the device firmly against the side of the pad of the finger. Activate the unit, the puncture should be across the lines of the fingerprint, not along the lines of the fingerprint.
- 6.8.4 Dispose of the blood lancet in an approved puncture-resistant sharps container.
- 6.8.5 The puncture should be performed on the palmar surface of the middle or ring finger, between the side and the center of the finger.
- 6.8.6 The puncture should be across the lines of the fingerprint, not along the lines of the fingerprint.

6.9 Skin punctures procedures:

- 6.9.1 Warm the puncture site for 1-2 minutes (if necessary) using a warm cloth not exceeding (42°C) or warming pack. This will help blood flow and is essential when specimens for pH and blood gas analysis are collected.
- 6.9.2 Do not wipe, fan, or blow on site to dry alcohol.
- 6.9.3 Wipe away the first drop of blood with a sterile gauze pad.
- 6.9.4 Position the puncture site downward on a plane below the heart after a puncture. This increases blood flow and allows gravity to keep the blood at the point of exit to avoid "run-off" and smearing.
- 6.9.5 Avoid squeezing the puncture site excessively as this action can hemolysis the specimen and contaminate it with tissue fluid and free hemoglobin.
- 6.9.6 If age-appropriate,
 - 6.9.6.1 Provide information to the child such as "You're going to feel a little poke now" and "I'm almost finished."
 - 6.9.6.2 Give praise and a reward, e.g., a sticker or special bandage.
- 6.9.7 Do not bandage skin puncture sites on infants or children less than two years of age. The adhesive can affect delicate skin and there is a risk of ingestion and choking should the bandage come off. Apply pressure to the site until stasis is complete instead.

6.10 Heel Prick Procedures:

- 6.10.1 Utilize appropriate techniques to warm the heel if desired. Heel pokes should not be performed on children over 1 year of age or if walking.
- 6.10.2 Wash hands and put on gloves.
- 6.10.3 Cleanse with 70% isopropanol and allow it to air dry.
- 6.10.4 Hold the patient's heel firmly enough to prevent sudden movements.
- 6.10.5 Use a puncture device with automatic retraction to prevent possible needle stick injury and built-in depth control to prevent puncturing the heel bone.
- 6.10.6 The depth of the skin puncture must not exceed 2 mm. The heel bone (calcaneus) may be located no more than 2 mm beneath the lateral and medial heel surfaces on a small infant and could be pierced if the puncture exceeds this depth, possibly resulting in bone damage.
- 6.10.7 Wipe away the first drop of blood with gauze to avoid diluting and contaminating the specimen with tissue fluid. It may be necessary to gently massage the heel to keep the blood flowing freely but avoid squeezing the heel excessively so that the blood specimen does not hemolysis and/or become contaminated with tissue fluid.
- 6.10.8 If blood does not flow freely, it may be necessary to repeat the process using a different site.
- 6.10.9 Allow the micro-collection tube to fill by capillary action; avoid continuously scraping the collection device opening against the skin to collect the blood.
- 6.10.10 Once the collection is completed, a clean gauze pad should be pressed against the puncture site until the bleeding stops. Adhesive bandages should not be used because they can cause irritation to the skin.

6.11 The order of draw for capillary tubes by skin punctures:

- 6.11.1 The order of drawing is a critical process that is necessary to eliminate or minimize the possibility of micro-clot formation in anticoagulated specimens.
- 6.11.2 The order of drawing is NOT the same as it is for specimens collected by venipuncture.
- 6.11.3 If venous blood is placed in a microtube, it is important to write the comment as venous blood because the reference range for the same test differs depending on the source of the specimen.
- 6.11.4 If more than one type of specimen is required from a skin puncture collection the following order of draw should be followed:

1.		Lavender top tubes containing the anticoagulant EDTA
2.		Tubes with other additives (such as heparin)
3.		Tubes without additives.

Table 4. Order of Draw of Capillary/Microtainer tubes.

6.12 Avoided techniques:

The following techniques have the potential to adversely affect test results:

- 6.12.1 Excessive squeezing of the blood into the micro collection device:
- 6.12.2 Drops of blood should be allowed to flow freely into the top of the micro-collection device and down the walls into the tube.
- 6.12.3 Do **NOT** scrape the device against the skin as this can introduce excess tissue fluid into the specimen and/or cause hemolysis of the red blood cells (RBCs).
- 6.12.4 Avoid strong, constant, or repeated pressure to reduce the potential for hemolysis and the

amount of tissue fluid introduced into the specimen, Blood flow is enhanced by applying gentle, intermittent pressure while holding the heel stick site or finger site downward.

7.0. Complication

Be prepared to deal with a reaction every time you do a venipuncture, there is no way to predict how a patient will react to a needle puncture. The collector must immediately report to the supervisor all complications and incidents occurring during the drawing and document it according to HMC policy, including exposure to blood and other infectious materials.

7.1. Hematoma Formation

- 7.1.1. Hematoma is caused by blood leaking into the tissue during or following venipuncture and is identified by rapid swelling at or near the venipuncture site.
- 7.1.2. If a hematoma begins to form during venipuncture, the collector must remove the needle immediately and apply pressure.
- 7.1.3. The collector must apply pressure over the puncture site for at least 2 minutes. A cold or compress or an ice pack must also be applied to relieve pain and reduce swelling.
- 7.1.4. Situations that can trigger hematoma formation are as follows:
 - I. The vein is fragile or too small for the needle size.
 - II. The needle penetrates all the way through the vein.
 - III. The needle is only partly inserted into the vein.
 - IV. The needle is removed while the tourniquet is still on.
 - V. Excessive or blind probing is used to locate.
 - VI. Reassure is not adequately applied following venipuncture.



Figure 14. Hematoma

- 7.1.5. To prevent a hematoma, the collector must:
 - I. Remove the tourniquet before removing the needle.
 - II. Maintain needle placement throughout the collection.
 - III. Remove the tube from the holder before needle removal.
 - IV. Before bandaging, take steps to determine whether the puncture site is sealed.

7.2. Accidental Arterial Puncture:

- 7.2.1. If the blood pulses into the collection system or fills collection tubes rapidly and is bright red, an artery has been punctured.
- 7.2.2. The collector must remove the needle immediately and apply direct forceful pressure to the puncture site for a minimum of five minutes and until active bleeding has ceased.
- 7.2.3. Inform the supervisor, or nurse –in-charge /physician; and document the incident.

7.3. Dizziness, Syncope:

- 7.3.1. Fainting or Syncope refers to the state of loss of consciousness and postural tone resulting from insufficient blood flow to the brain.
- 7.3.2. The collector must watch the patient for signs of fainting like pallor (paleness), hyperventilation, vertigo, dizziness, and light-headedness.
- 7.3.3. When an incidence of fainting occurs, the collector must discontinue immediately the procedure by releasing the tourniquet and discarding the needle to protect the patient and discarding the needle to protect the patient and himself from injury.
- 7.3.4. The collector must lay the patient flat or lower his/her head and arms. Recline chair is recommended for blood collection procedure.
- 7.3.5. Loosen tight clothing; ask assistance form relative if available.
- 7.3.6. Maintain the patient in recumbent (laying) position until fully recovered and continue monitoring.
- 7.3.7. The collector must call any nearby attending nurse, physician, or code blue team if the patient did not respond.
- 7.3.8. Never draw blood from a patient who is standing. A standing patient is more likely to faint than one who is sitting or lying down.



1. Discontinue immediately the procedure by releasing the tourniquet and discarding the needle to protect the patient and yourself from injury.
2. Lie down on his / her back, raise their foot above the level of their head, loosen tight, apply a cold compress to their forehead, and check their pulse.
3. call any nearby attending nurse, physician, or [code blue](#) team if the patient does not respond.
4. Report the incident.

Figure 15. Patient Faint during blood collection

7.4. Nausea and Vomiting

- 7.4.1. If patient feels nausea and vomits during venipuncture, the process must be terminated straight away.
- 7.4.2. The patient should be reassured and made as comfortable as possible.
- 7.4.3. The blood collector must ask the patient to breathe deeply and slowly.
- 7.4.4. The blood collector must apply a cold compress to the patient's forehead and provide him with an emesis basin (kidney dish) or bag.

7.5. Anxiety / Fear

- 7.5.1. Patients, especially children under the age of 12 or mentally disabled persons, may show anxiety or fear when they present for blood collection.
- 7.5.2. The collector must start by relieving the patients by explaining exactly what will happen and try to calm him down as much as possible.
- 7.5.3. The collector must communicate with the patient at each step he is taking to keep on reassuring him.

7.6. Excessive Bleeding

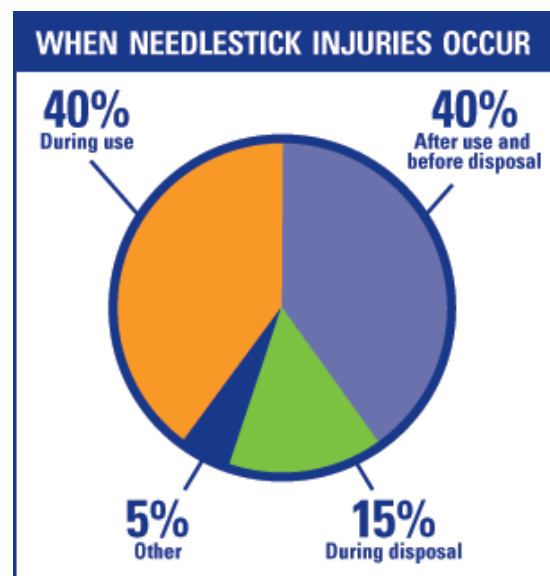
- 7.6.1. Normally, a patient will stop bleeding from the venipuncture site within a few minutes. However, some patients are on anticoagulant therapy like aspirin, may take longer to stop bleeding.
- 7.6.2. If bleeding endures, the collector must apply a firm pressure on the puncture site until the bleeding visibly ceases.
- 7.6.3. The collector can also advise the patient to hold his hand elevated above the level of his/ her heart.
- 7.6.4. If by any means, the bleeding didn't stop for more than 5 minutes, the collector must notify his or her treating physician.

7.7. Needle Injury:

1. Wash wounds and skin sites that have been in contact with blood or body fluids with soap and water.
2. Apply a sterile dressing as necessary and apply pressure through the dressing if bleeding is still occurring.
3. Encourage bleeding before washing well with soap and water.
4. If blood gets on the skin, irrespective of whether there are cuts or abrasions, wash well with soap and water.
5. If blood or body fluids get in the mouth, spit them out and then rinse the mouth with water several times.
6. If clothing is contaminated, remove clothing and shower if necessary.
7. Inform your Immediate Supervisor and/or Head of the Department immediately after the exposure.
8. An Occurrence, Variance and Accident (OVA) report through electronic incident reporting system and Blood and Body Fluids Exposure Report Form must be filled in within the same working day.
9. Visit the Staff Medical Center (SMC) immediately during working hours (7: am – 3 pm) /or Emergency Department (ED) after 3:00 pm.
10. It is recommended to collect the medical number of the patients in the incident to confirm medical history with your physician. It may need to collect extra samples from the patient to confirm selected tests.

Not all needle-stick injuries are preventable, but most of these injuries can be prevented by using safer needle devices.

Figure 16. Needle Stick Injuries



8. ORAL GLUCOSE TOLERANCE TEST (OGTT) (Trutol 75).

The glucose tolerance test is a laboratory method to check how the body breaks down (metabolizes) blood sugar. OGTT is considered as Timing test.

8.1. Patient Group:

- 8.1.1. Pregnant women older than 14 years of age.
- 8.1.2. Male, non-pregnant women, and pregnant women known to have diabetes mellitus (Type 1 or Type 2).
- 8.1.3. Male / Female less than 14 years of age.

8.2. PATIENT PREPARATION:

- 8.2.1. Patients have got proper explanation from Physician or Nurse at clinic about the test procedure.
- 8.2.2. Phlebotomist will explain the procedure, and make sure that the patient understands.
- 8.2.3. Obtain Fasting, 1 hr. and 2 hrs. samples according physician order for two hours without eating, drinking, or smoking.
- 8.2.4. Patients must be fasting for (8- 10) hours.

8.3. SPECIMEN REQUIREMENTS:

- 8.3.1. All blood samples collected on K Oxalate / Na F + EDTAK2 (Gray top) and must invert gently for (8-10) times (according to manufacturer's instructions).
- 8.3.2. All specimens sent to central processing (CSRP) in the regular transportation time does not exceed 12:00pm.
- 8.3.3. All three tubes must be labeled by: (patient's full name – HC number- Collection time- Collection Date- collector initial). Cerner labels contain this information.
- 8.3.4. For electronic orders: access power chart for test's request; print the label for each specimen collection time, and log in it in ordinary timing.
- 8.3.5. If manual request form is used; collection time must be written on with phlebotomist's initial on the request form and specimen labels.

8.4. BEVERAGE, CALIBRATORS, QC, SUPPLIES:

- 8.4.1. Glucose beverage bottles have many flavors (ex.: orange- lemon- cola fruit).
- 8.4.2. According to suppliers. Bottle size 296 ml.
- 8.4.3. Storage on Room Temperature.
- 8.4.4. To enhance the palatability, chill before serving. Protect from light, do not freeze, and discard empty bottles in domestic waste.
- 8.4.5. The beverage must be:
 - FDA approved.
 - Clear Instructions and precautions in English on the bottle.
 - Kosher-certified
 - Caffeine-free
 - Clinical References provided.
 - Expiry Date

8.5. STEP BY STEP PROCEDURE.

- 8.5.1. Confirm that the patient is fasting for at least 8 hours and understanding the procedure.
- 8.5.2. Identify the patient correctly by requesting the patient's health card using two identifiers: full name, and HC number.
- 8.5.3. Follow the venipuncture procedure.
- 8.5.4. Collect the Fasting sample in a gray tube and label it with (fasting label) If the patient has extra tests follow the order of drawing and log in with the same collection time if Cerner requests.
- 8.5.5. Instruct the patient to drink all the glucose solution quantity (within 5 minutes).
- 8.5.6. Start timing when the patient begins to drink.
- 8.5.7. Discard the plastic Beverage bottle in black waste.
- 8.5.8. Record the time and provide the patient with a note paper with all collection times.
- 8.5.9. Ask the patient that they must not eat, smoke, or drink anything except water.
- 8.5.10. After one hour obtain the second sample.
- 8.5.11. After the second hour obtain the third sample.
- 8.5.12. All tubes must be labeled immediately beside patient as mentioned above with collection time.
- 8.5.13. Log-in (Electronic sign) each specimen after collection on Cerner. Manual laboratory order registers the patient in the logbook.
- 8.5.14. Sending samples frequently – no need to accumulate them until patient finishes the procedure to CSRP with related request forms if applicable or transfer list.

8.6. Consideration issues:

- 8.6.1. Identify patients correctly every time.
- 8.6.2. Not to collect sample if patient delay more than 20 min and reschedule the test.
- 8.6.3. For pregnant, **three** samples will be obtained (Fasting, after 1 hour, & after 2 hours.)
- 8.6.4. For non-pregnant and Male patients, **two** sample will be obtained (Fasting – & after 2 hrs).
- 8.6.5. An attendance letter is given to patients explaining the taken time of the procedure upon request and approved by the out-patient department office.
- 8.6.6. It is **VERY** important to observe the patient during drinking for **ANY** discomfort at reactions. This includes feeling faint or dizzy, sweating, and nausea or pain in her stomach. If there is any obstruction during the test, the patient needs to consult the physician to repeat or reorder the test.

9. Blood Culture collection:

This section outlines the best practices of Blood Culture collection by venipuncture for all healthcare providers who are responsible for the collection and handling of blood specimens in both out-patient and in-patient.

9.1. Blood culture collection supplies:

- 9.1.1. BACTEC PLUS Aerobic/F Culture Vial Optimum blood volume for each vial is 8-10 mL of blood is acceptable (blue cap).
- 9.1.2. BACTEC PLUS Anaerobic/F Culture Vial Optimum blood volume for each vial is 8-10 mL of blood is acceptable (fuschia cap).
- 9.1.3. BACTEC PEDS PLUS Aerobic /F Culture Vial Optimum blood volume for each vial is 1-3 mL of blood is acceptable.
- 9.1.4. VACUTAINER BRAND Blood Collection Set ("butterfly") or 20 mL LUER-LOK sterile syringe with a 21-gauge needle; or 3 mL LUER-LOK syringe with a 23-gauge needle for Pediatric.
- 9.1.5. Transfer device
- 9.1.6. (3) ml Chloro –prep applicator (2% v/w Chlorhexidine gluconate, and 70% v/v Isopropyl alcohol).

- 9.1.7. Sterile gauze
- 9.1.8. Sterile gloves.
- 9.1.9. Tourniquet / Adhesive bandage.

9.2. Skin disinfection:

- 9.2.1. To minimize the risk of contamination with skin flora, blood culture collection sites require a 30 second friction scrub and disinfection with an appropriate disinfectant.
- 9.2.2. Tincture of iodine, multiple isopropyl alcohol preps, chlorhexidine gluconate, and povidone / 70%ethyl alcohol-combination are equivalent.
- 9.2.3. Chlorhexidine gluconate is recommended for adults, children, and older infants. Take more care with infants under 2 months of age, and it can cause irritation or chemical burns.
- 9.2.4. Always allow the disinfectant to dry completely.
- 9.2.5. The collector must not palpate veins after skin disinfection unless a sterile glove is worn or if disinfection, repeat it.

9.3. General considerations:

- 9.3.1. Blood culture test is usually ordered STAT.
- 9.3.2. A set of blood cultures means two bottles – one aerobic and one anaerobic or in the case of children only one pediatric bottle.
- 9.3.3. If two sets are requested; the time gap is **45-90** min.
- 9.3.4. If the volume drawn cannot exceed 10 ml, inoculate only the **aerobic**.
- 9.3.5. DO NOT refrigerate.
- 9.3.6. Check the expiry date of the bottles.
- 9.3.7. Use a new needle if the vein is missed initially.
- 9.3.8. It is preferable to take blood for culture separately.

9.4 Step by step procedure:

- 9.4.1. After assembling equipment and using universal precaution locate the vein. If pick a prominent vein is easily visualized because palpation must be avoided after site preparation.
- 9.4.2. Remove the plastic cap on each culture vial, being very careful not to touch the rubber stopper with your fingers. Wipe the tops of vials with a n alcohol swab and allow it to dry.
- 9.4.3. Use a side-to-side motion to scrub the site with Alcohol Swab for a full 30 sec; allow the site to dry completely (at least 30 sec).
- 9.4.4. Open the Chlora-prep package. Do not touch the sponge. Hold by the center of the handle in a horizontal position with the foam surface down. Pinch handles to break ampule at the dot. DO NOT CONTINUE TOSQUEEZE HANDLE.
- 9.4.5. Use a side-to-side motion to scrub the site with the friction pad for a full 30 sec; allow site to dry completely (at least 30 sec) before venipuncture. Do not touch the site after prep.
- 9.4.6. Pre-attached Push Button butterfly with holder can be used by the phlebotomist to monitor the volume collected the blood sample. A mark on the vial label. If the volume is not monitored, the stated maximum amount collected may be exceeded. This condition may adversely create a "false" positive result, due to high blood background.
- 9.4.7. If using a needle and syringe, typically a 20 mL syringe is used for adults. **Transfer device MUST use when transferring blood sample from syringe to bottle or tubes.** Draw 16-20 mL of blood for one blood culture set (aerobic and anaerobic). Aseptically inject 8-10 mL of specimen into each vial.
- 9.4.8. Re-tie the tourniquet if venipuncture is impossible without palpating again put on a pair of sterile gloves. It should be noted that at no time after the skin area has been cleansed should the

venipuncture site be touched, even with a sterile glove. Palpation should occur at least 1 inch above the actual.

- 9.4.9. Venipuncture site by sterile needle.
- 9.4.10. Transfer the blood sample according to volume needed by Syringe or by Transfer Devices.
- 9.4.11. Place the specimen bar code label identification vertically. Do not cover the bottle bar code or the bottom of the culture vial. Make sure that the collection site is written on the blood culture bottle.
- 9.4.12. Label each bottle by: Collector name, Date of collection, Time of collection, number of the set, Initial of the collector / phlebotomist, patient location (Bed). Do not place the label on the bottle bar code area.
- 9.4.13. After venipuncture, use a sterile gauze pad to press the site.
- 9.4.14. The inoculated BACTEC vials should be transported as quickly as possible to the laboratory.

9.5. Blood Volume

- 9.5.1. The volume of blood cultured is critical because the concentration of organisms in most cases of bacteremia is low, especially if the patient is on antimicrobial therapy.
- 9.5.2. In infants and children, the concentration of organisms during bacteremia is higher than adults, so less blood is required for culture.
 - Children: 1-3 mL of blood per venipuncture.
 - Adult: 8-10 mL of blood per venipuncture.

10. Vascular Access Devices and Infusions:

VADs include a wide range of infusion catheters and posts. The most common is the short peripheral catheter inserted on the arm or hand and used for infusion of fluid, medications, and blood products.

10.1. Intravenous Fluid:

- 10.1.1. Collecting blood from an arm that being infused with IV fluid carries a potential risk for erroneous and misleading test results.
- 10.1.2. Blood must be collected from the opposite arm without IV fluid.
- 10.1.3. It is recommended that specimens collected distal or proximal to an IV site.
- 10.1.4. If blood needs to be collected on an arm with IV fluid, you must follow these procedures:
 - 10.1.4.1. Ask the responsible health care professional to turn off the IV infusion for at least two minutes before venipuncture. Ensure that flow completely discontinued.
 - 10.1.4.2. Apply the tourniquet between the IV site and the venipuncture site.
 - 10.1.4.3. After performing the venipuncture, alert the responsible health care professional to restart the infusion again.
 - 10.1.4.4. Document in patient record when collection being from an arm with IV fluid.

11. Specimen Quality Concerns:

11.1 The quality of a blood specimen can be compromised by improper collection techniques. For that it is significant that all personnel performing blood collection be trained in the proper collection techniques and consequences.



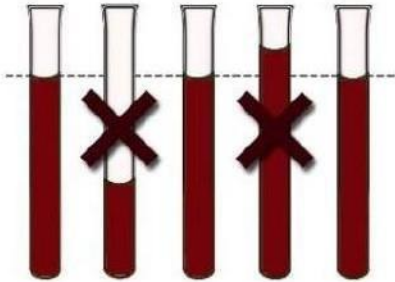
Pitfalls of collections	Ways to prevent
Hemoconcentration: A decrease in the fluid content of the blood, with an increase on protein-based blood components such as red blood cells.	<ul style="list-style-type: none"> • Release the tourniquet within one minute. • Do not excessively massage the area in the locating vein. • Do not allow the patients to pump the fist. • Ask the patient to release first once blood flow. • Do not probe or redirect the needle multiple times in search of vein.
Hemolysis: Damage or destruction of RBCs and release of hemoglobin into the fluid protein of a specimen, causing the serum color from pink (slight hemolysis) to red (gross hemolysis). 	<ul style="list-style-type: none"> • Drawing blood from a site with Hematoma. • Failure to remove away the first drop of capillary blood, which can contain alcohol residue. • Avoid collection through a VAD or during and IV valves. • When using a syringe: <ul style="list-style-type: none"> - Ensure needle fitted securely on a syringe to avoid frothing. - Avoid pulling the plunger back too forcibly. - Avoid forcefully transferring the blood to tube. • Tourniquet must not keep longer than one-minute on the arm or hand. • Avoid mixing specimens vigorously. • Use the proper needle size according to vein size and diameter. Avoid using large gauge for small needles and vice versa. • Transport specimens gently, vertical position and avoid shaking. • Excessive concentration of additives can cause rupture of RBC'S membrane.
Clotted specimens: Clotting occurs in a tube containing an anticoagulant. 	<ul style="list-style-type: none"> • Fill all blood collection tubes to the fill line. • Adequate tubes inversions. • Do not overfill tubes. • Leaving blood in a syringe too long before placing it in tubes. • Delay of placing blood in tubes.

Figure 17. Hemolyzed specimen

Figure 18. Clotted specimen

<p>Improper filled tubes:</p> <p>Tubes must fill until the normal amount of vacuum is exhausted. Under-filling or over-filling tubes result to incorrect additive –to- blood ratio.</p>  <p>Figure 19. Filling tubes</p>	<ul style="list-style-type: none"> • Directly draw into vacutainer tube until it finishes filling to the correct volume. • Check the tube expiry date. • Avoid manually filling of the tube (aliquoting). • Never pour two partially filled additive tubes to gather to fill one tube this effect blood-additive ratio. • Never collect tubes partially because to save time or obtaining large quantities of blood!
<p>Specimen Contamination:</p> <p>Usually as a result on improper collection techniques or carelessness.</p>	<ul style="list-style-type: none"> • Allow alcohol to dry. • Following the correct order of draw to minimize cross contamination of additives between tubes. • Use the proper antiseptic to clean the site (alcohol for routine venipuncture, or chlorhexidine gluconate for blood culture collection). • If the blood collected for Alcohol test; use another skin disinfectant or clean with soap and water. • Using sterile collection sets for blood culture. • All phlebotomy equipment is sterile by manufacture. Do not open tube cap and open the needle at the time of insertion.

11.2. When the collector receives feedback about the quality of the specimen from the laboratory or receiving area, you should document it in a feedback form.

11.3. Patients should be informed in a proper way. Some patients contacted by phlebotomists to repeat their tests before next appointment according rejection policy.

References

12.1 HMC policies and plans:

- CL 7026: PATIENT IDENTIFICATION
- CL 7051: LABORATORY HEALTH AND SAFETY PROGRAM.
- CL 7241: HAND HYGIENE
- CL 7251: MANAGEMENT OF OCCUPATIONAL EXPOSURE TO BLOOD AND BODYFLUID
- CL 7246: INFECTION CONTROL PRACTICES
- CL 7285: PERSONAL PROTECTIVE EQUIPMENT
- CL 7249: MANAGEMENT OF INFECTIOUS WASTE.
- CL 7233: CATEGORY OF ISOLATION PRECAUTIONS.

Lab guide (2017) , DLMP –HMC , retrieved from

[:https://itawasol/EN/how%20we%20work/Clinical_Services/Laboratory/Pages/default.aspx](https://itawasol/EN/how%20we%20work/Clinical_Services/Laboratory/Pages/default.aspx)

12.2 . So, you're going to collect a Blood Specimen. An Introduction to Phlebotomy. 12th edition. Northfield, IL: College of American Pathologists, 2007.

12.2. CLSI. Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard - Sixth Edition. CLSI Document H3-A6 (ISBN 1- 56238-650-6). CLSI, 940 West Valley Road, Suite 1400, Wayne, PA 19087-1898, USA, 2007.

12.3. CLSI. M47 principles and procedure for Blood Culture 2nd Edition.

12.4. Guide to Child-Friendly Blood Collection-published October 2010, version 2 – SickKids the Hospital for SICK CHILDREN.

12.5 2013 Pro Course: Challenges of Phlebotomy: Pediatric Blood Collection, Alternate Sites, and Difficult Draws – CAP Competency Assessment.

12.5. Oral Glucose Tolerance Test (O.G.T.T) (2012), Clinical and Translational Science Institute , retrieved from <http://www.ctsi.ucla.edu/research/files/docs/sop-ogtt.pdf> , accessed on 30th Oct 2017.

12.6. Mayo Clinic. (n.d.). Glucose tolerance test. Retrieved Jan 8, 2018, from <https://www.mayoclinic.org/tests-procedures/glucose-tolerance-test/basics/definition/prc-20014814>

12.8 CAP Laboratory General Check List, Version 8.21.2017.