This document applies to	☒ All Horizon	☐ Saint John Area	☐ Fredericton and Upper River Valley Area
	☐ Moncton Area	☐ Miramichi Area	

Horizon Health Network

Regional Phlebotomy Manual

Policy and Procedures

Version 4

Laboratory Medicine Program

February 14, 2020

Table of Contents

Introduction

Phlebotomy is performed to obtain blood specimens for the purposes of diagnostic evaluation, analysis of patient responses to treatment, for type and antibody screen or crossmatching, and blood culture to assist in the confirmation and identification of causative organisms in bacteremia and septicemia. Blood tests are one of the most commonly used diagnostic aids in the care and management of patients and can yield valuable information about nutritional, hematologic, metabolic, immune and biochemical status.

Maintaining their integrity is essential for several reasons:

- Veins are the major source of blood for laboratory testing
- Veins are routes for intravenous fluids and blood replacement.

In the case of patients with limited available venipuncture sites the phlebotomist must be skilled in venipuncture to avoid unnecessary injury to veins and surrounding structures.

This Manual directly affects all Horizon Health Network Healthcare professionals who are trained with their competence verified to perform phlebotomy by the following means:

- Venipuncture (evacuated tube, winged collection set, syringe method)
- Capillary collection
- Blood culture collection
- Collection by lines – Applies to nursing staff only

BACK TO TABLE OF CONTENTS

Glossary of Terms

Age of Consent: refer to HHN-SA-014 Consent To Treatment

Aliquot - a portion of a larger whole

Anticoagulant - An agent that is used to prevent the formation of blood clots. Anticoagulant may be present in blood collection tubes.

Arterial Venous (AV) Fistula – An AV fistula is the surgical fusion of a vein and an artery near the surface of the skin with easy access for kidney dialysis procedures.

Aseptic Technique – methods used during patient care to prevent microbial contamination.

Authorized Provider: Physicians, Nurse Practitioner, and Hospital Pharmacist that have the authority to order laboratory tests

BLS – Basic Life Support (previously referred to as CPR)

Biennial – Every 2 years

Blood Tube – Evacuated blood collection tube

CVAD – Central Venous Access Device

Consent – (refer to HHN-SA-014 Consent to Treatment)

Dead Space – As applied to needleless connectors, this is the internal space outside the intended fluid pathway into which fluid can move.

Dorsiflexion –The turning of the foot or the toes upward.

Ecchymosis - a discoloration of the skin resulting from bleeding underneath, typically caused by bruising.

Hand Hygiene - A comprehensive term that refers to hand washing, hand antisepsis and actions taken to maintain healthy hands and fingernails.

Hemoconcentration – The static pooling of blood within the veins below venous constriction due to prolonged touniquet application.Large molecules (e.g. proteins), coagulation factors and cells accumulate disproportionately.

IGRA - Interferon-Gamma Release Assays (IGRAs) – Blood Tests for TB Infection. Maybe also be documented or ordered as QuantiFERON©

LPN – Licensed Practical Nurse

LUM – Laboratory User Manual: located on Skyline – click HERE

MLA – Medical Laboratory Assistant

MLT – Medical Laboratory Technologist

NP – Nurse Practitioner

Peer Review – Evaluation of scientific, academic or professional work by others working in the same field.

Phlebotomy – phlebotomy will be defined as venipuncture, capillary collection, blood culture collection and collection from lines.

Phlebotomist – Any healthcare professional trained to draw blood competently by venipuncture, line or capillary method which includes (but is not limited to): LPN, MLA, MLT, NP and RNs.

PICC – Peripherally Inserted Central Catheter

PPE - Personal Protective Equipment

RN – Registered Nurse

RRT - Registered Respiratory Therapist

Venipuncture – A procedure in which a vein is punctured by inserting a hollow-bore needle through the skin.

BACK TO TABLE OF CONTENTS

Procedures

Site Selection

Careful selection of site is an integral part of the phlebotomy process. The preferred order for venipuncture sites is:

1. Arm (Antecubital: median cubital, cephalic and basilic veins)
2. Back of Hand
3. Wrist (excluding palm side)
4. Foot/ Ankle

Venipuncture is **not** to be performed**:**

- on an extremity with an active shunt or AV fistula, or central venous access device,
- from an area where a hematoma is present, unless no other site is available
- from an artery (excluding arterial blood gas collected by Registered Respiratory Therapist (RRT) and or trained nursing staff)

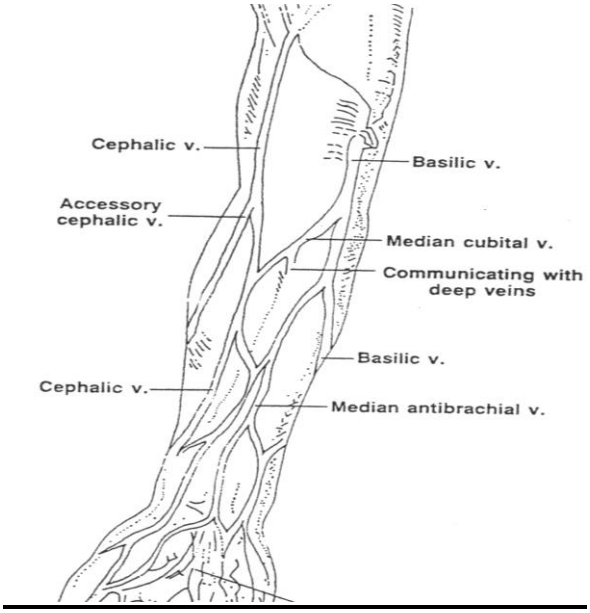
In circumstances when no other site is available, consideration may be given to these sites:

- proximal to an active IV site
- the foot
- same side as mastectomy

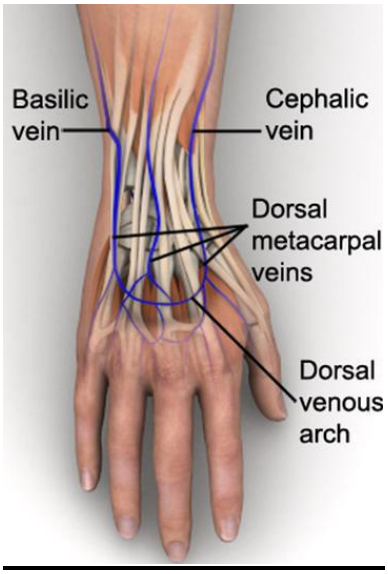
For Nursing ONLY: If collected proximal to an active IV site it must be documented on the tube label and if possible, notify lab directly.

A. Venipuncture:

Appropriately selected veins provide the avenue of entry for transfusion, infusion and therapeutic agents: a patient/client's treatment may depend on maintaining integrity of veins. A healthy vein is elastic and rebounds on palpation.

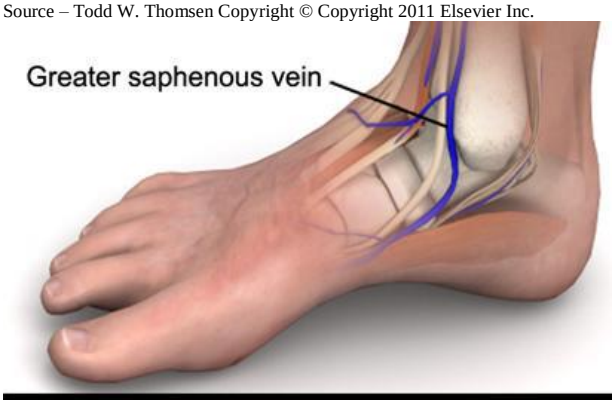


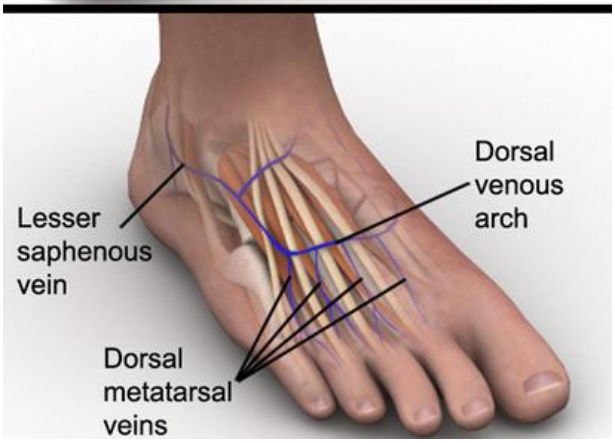
The most common sites for venipuncture are in the antecubital area of the arm, where the median cubital, cephalic and basilic veins lie close to the surface of the skin and are the most prominent.



Source – Todd W. Thomsen Copyright © Copyright 2011 Elsevier Inc.

Wrist (excluding palm side), and hand veins are acceptable for venipuncture, but are not the preferred sites.





Source – Todd W. Thomsen Copyright © Copyright 2011 Elsevier Inc.

LAB ONLY: An Authorized Provider's order is required to perform venipuncture on an ankle or a foot. Lab must complete a phlebotomy deviation form prior to collection.

B. Capillary:

Select appropriate site for the patient/client being collected. The skin puncture site must be warm and not swollen (edematous) because accumulated fluid in the tissues will contaminate the blood specimen.

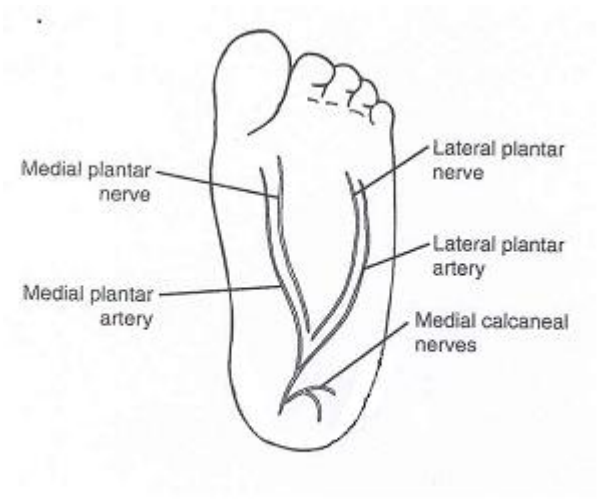
Heel Puncture (less than 1 year)**:**

- The outer aspect of the heel is the best puncture site. To mark the safe area, draw an imaginary line extending posteriorly from a point between the 4th and 5th toes and running parallel to the lateral aspect of the heel, and another line extending posteriorly from the middle of the great toe and running parallel to the medial aspect of the heel. (This will minimize damage to the posterior nerve and artery). In almost all infants, the heel bone is not under these areas.
- Puncture site is to be at side of the heel to prevent damaging the posterior nerve and artery, and the longitudinal fat pad, which could interfere with walking.
- See diagram below (the darkened areas on the sides of the heel indicate the safe puncture zones).
- Avoid puncturing the central area of the foot as this has the potential to cause injury to nerves, tendons and cartilage.
- Avoid puncturing the posterior curvature of the heel (back of the heel) to avoid puncturing the calcaneus (heel bone), and calcaneal nerves.
- The puncture shall not be through a previous puncture site which may be infected.

NOTE: The big toe should only be used as a last resort when other sites are exhausted. Excessive crying may adversely affect the concentration of some constituents (e.g., leukocyte count). Consult with caregiver before proceeding with collection.

Reprinted/posted with permission of Wadsworth Center, New York State Department of Health

Heel puncture should be made parallel to the length of the foot in the shaded area on the diagram.



Alternate view of heel – showing arteries and nerves

Diagram by Horizon Health Network 2016

Finger Puncture (Adult and Children greater than and equal 1 year):

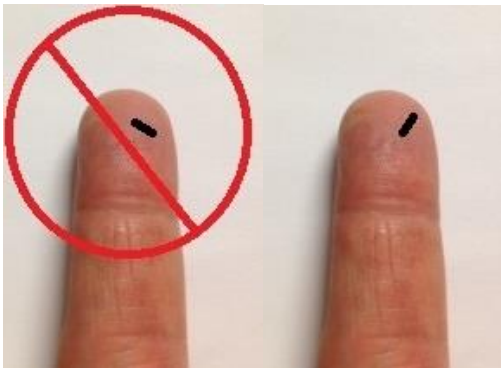
After 1 year of age a child's finger is the preferred site for puncture for capillary blood collection. Do not puncture the fingers of a newborn or infant less than one year old. The distance from the skin surface to the bone in the thickest portion of the last segment of each finger of newborns varies from 1.2 mm to 2.2 mm. The bone could easily be injured with lancets.

The following guidelines shall be observed:

- The optimal finger to be used is ring or middle finger, because the thumb has a pulse and the index finger may be more sensitive or callused.
- The puncture shall be on the palmar surface of the distal phalanx and not at the side or tip of the finger, because the tissue on the side and tip of the finger is about half as thick as the tissue in the center of the finger (see Figure below).

Diagram by Horizon Health Network 2016

- The index finger may be used as a last resort.
- The fifth finger (pinky/ baby) **must not** be punctured as the tissue depth is insufficient to prevent bone injury.
- The non-dominant hand may have fewer calluses.



Picture by Horizon Health Network 2016

Finger puncture should occur across the fingerprint as shown in the diagram. The puncture should be made perpendicular to the ridges of the fingerprint so the drop of blood does not run down the ridges.

BACK TO TABLE OF CONTENTS

Patient/Client Identification Process

Identification of the patient/client is the most crucial step in collection of laboratory specimens.

- **Unique** identification is required to ensure results are reported on correct patient/client.
- The phlebotomist **must** ensure that the blood sample being drawn is from patient/client indicated on the label.
- **Misidentification of a patient/client may be life threatening** as diagnoses and therapies depend on test results.

Patient/client identification includes all of the following:

1. Patient/client's full name
2. Patient/client's date of birth
3. Minimum 1 unique number, such as:
   A. NB Medicare or other provincial health card
   NOTE: Pictures or photocopies of Medicare Cards are not acceptable as per NB Medicare policy YourNewBrunswickMedicareCard. Exceptions are given to Nursing or Special Care Home residents.
   B. Medical record/ Permanent Patient/Client Record Number (PPRN) / Chart
   C. RCMP
   D. Military
   E. Correctional Institute
   F. IFHP – Interim Federal Health Program
   G. US Health Insurance

NOTE: Passport number, immigration or refugee number and drivers licenses are only accepted if no other numbers or identification exists for the patient/client. If patient presents with no identification, the Patient Identifcation Confirmation Form **LAB-1237-18-F00004 Patient Identification Confirmation Form** must be completed.

PROCEDURE:

Outpatient Department

1. Confirm the patient/clients identity by having the patient/client state their full name and date of birth.
2. Compare unique number to label and requisition (if applicable)
3. Compare information on **each** test label for that patient/client.
4. Correct any discrepancies before blood is drawn.
5. After collection, label all specimens with patient/client information in the presence of the patient/client, using computer generated labels, identification tags from manual requisitions, or manually write on the specimen collection tubes.

Inpatients and Emergency Department Patient/Clients

1. Confirm patient/clients identification by having patient/client state their full name and date of birth. Compare information on **each** test label for that patient/client.
2. Check patient/client's hospital armband for name, birth date and unique identifier. Compare information on **each** test label for that patient/client. If the patient/client **does not have an armband have unit staff place an appropriate armband on patient/client before proceeding.** In rare cases it may not be possible to attach a band to the patient/client (Burn patient, neonatal…). In these cases, check the issued armband and have the patient/client identified by nursing. Document that the patient/client was identified in this manner on the requisition, (paper or electronic), and include name of the person verifying identification
3. Correct any discrepancies before blood is drawn.
4. After collection, label all specimens with patient/client information in the presence of the patient/client, using computer generated labels, identification tags from manual requisitions, or manually write on the specimen collection tubes.

For Lab ONLY: Patient/client who is unable to communicate (including unconscious):

1. Ask nursing, a relative or a friend to identify the patient/client by name, identification number and /or birth date. Document the name of person verifying the identification on the requisition (paper or electronic).
2. Compare data with the information on the requisition and each test label. For inpatients, compare the data with those on patient/client's identification armband, which **must** be attached to patient/client.
3. Correct any discrepancies before blood is drawn.
4. After collection, label all specimens with patient/client information in the presence of the patient/client, using computer generated labels, identification tags from manual requisitions, or manually write on the specimen collection tubes.

Note: HHN-PC-004 Deaf and Hard of Hearing Patients policy offers sign language interpretation and/or assistive listening devices for all patients who identify themselves as Deaf or hard of hearing.

Patient/client who is unidentified (John/Jane Doe):

1. The patient/clients will be assigned a name and given a unique identifier until positive identification is established
   NOTE: Once the patient/client is positively identified it is the responsibility of Health Records Management to merge the accounts. There may be a time period in which the patient/client may have 2 arm bands (correct positive identification arm band and the John/Jane Doe armband).

Anonymous patient/client testing: (example: a patient requesting their identification remain anonymous) See local area Lab User Manual

BACK TO TABLE OF CONTENTS

Equipment and Supplies

In preparing for venipuncture, it is important to review the requisition or specimen test labels to determine required materials and supplies. Ensure all required equipment is within easy reach during the procedure. The most common assembly for blood collection consists of a double pointed needle, plastic tube holder or adaptor, and a series of vacuum tubes with rubber stoppers of various colours to indicate the type of additive present.

General supplies include the following:

- 10% povidone iodine (for serum alcohol collection)
- 70% alcohol swabs
- 2% Chlorohexidine with 70% alcohol Swabstiks/wipes (for blood culture collection)
- Adhesive bandage or tape
- Blood Culture bottles (aerobic/anaerobic/pediatric)
- Blood tubes, as required.
- Discard tubes, as required
- Gauze
- Gloves (latex free disposable)
- Needle as determined by venipuncture site:
    - straight needles 20g, 21g, 22g
    - butterfly, winged needle 21g, 23g
- Sharps container
- Specimen bags (plastic)
- Specimen labels
- Tourniquet (latex free)
- Transfer device used with butterfly/winged needle and syringe
- Tube holder (single use, or if multiple use must be cleaned between patients)
- Hand Sanitizer
- Appropriate Personal Protective Equipment (PPE) as needed. Ex. Lab coat, gown, mask, etc.

A well-stocked blood collection tray or collection cart should be maintained with all of the necessary supplies and equipment. Inspect all supplies for possible defects and applicable expiration dates.

Always place the tray on top of a clean single-use barrier that may be discarded at the completion of the collection (e.g., an incontinence pad or paper towel).Placing the blood collection tray anywhere within the inpatient's bed space creates a risk for transmission of pathogenic micro-organisms. If tray is placed on dedicated patient specific equipment, it must be cleaned with a hospital approved cleaner/disinfectant wipe before being taken to next patients room or bedspace. The blood collection tray should never be placed on a floor. Collection carts with wheels are optimal.

The necessary equipment to perform the procedure, along with the appropriate laboratory requisition and/or labels to complete the process, are all that should be brought to the bedside.

Collection carts and trays must be left outside all isolation rooms.

Gloves
As per routine practices, latex-free gloves are to be worn for all venipuncture procedures. Although gloves offer protection, they do not provide complete protection against hand contamination, therefore, hand hygiene must always be performed before and after glove removal and as per HHN-IC-005 Hand Hygiene.

Needles
The venipuncture site selected for the blood specimen will determine the needle and accompanying equipment to be used. Needles for venipuncture may have a safety mechanism that must be prepared prior to collection, then activated immediately after collection, prior to sharps disposal. They are either a needle or a winged/butterfly needle with/without a luer adaptor.

Needles must always be sterile and are manufactured with a paper seal holding the cap in place or in a sealed peel-apart package. If this seal has been broken in any way, discard the needle and obtain a new one. The tip of a venipuncture needle is bevelled or slanted at the end. It must be inspected for any burrs or defects at the tip that could cause undue trauma at the site or difficulty in removal of the needle. If there is a visual defect the needle must be discarded. Needles and winged/butterfly blood collection sets come in varying lengths and gauges and are individually colour coded according to their respective sizes. The multi-sample needle has a sharp point at both ends with one end being shorter than the other. The long end covered by a cap is used for insertion into the vein, and the shorter end covered by a rubber sheath is secured into the tube holder.

The gauge number indicates the diameter or bore of the needle lumen. A large gauge number indicates a small bore needle, while a small number indicates a large bore needle. The sizes can range from 20g-23g, with 21g-23g being the most commonly used for an adult. The BD 25 gauge Ultra Touch Push Button Blood collection set has a ultra-thin wall five bevel cannula and are comparable regular 23 gauge needle for hemolysis.Needle length can also vary from 1, 1 ¼ to 1 ½ inches.

The 21g needle is ideal for most punctures as it provides good blood flow with little or no discomfort to patient upon insertion.

The 22g needle is an excellent choice when:
- an unsuccessful venipuncture is anticipated such as: fragile veins, elderly patients
- patient is on anticoagulant therapy
- patient is an adolescent

For difficult draws, such as a hand vein, a 23g winged/butterfly needle is also an option as the small bore of the needle is less likely to collapse or traumatize small delicate veins. This size is the best choice for neonates, infants/toddler and children.

Vacuum blood collection tubes are placed into the holder and pierced by the sheath covered needle, allowing several tubes to be collected without leakage of blood as the tubes are changed (a multi-sample needle).

Although winged/butterfly needle blood collection sets offer benefits to obtaining a specimen from veins outside of the antecubital area, and can be coupled with a syringe to control the amount of vacuum being applied, phlebotomists must be aware of the following drawbacks and **not consider them as a routine device for blood collection in adults**:

- The tip of a winged/butterfly needle is more blunt resulting in a more painful puncture for the patient.
- These needles are too short to access deep veins.
- These collection sets are considerably more expensive.
- **Very importantly**, these sets are associated with a high risk of accidental needle stick injuries. The extension tubing attached to the needle causes it to become more cumbersome to control and place safely into the sharps disposal container, making activation of the safety mechanism crucial prior to sharps disposal.

Winged/butterfly needle blood collection sets have wings or tabs on either side of the needle allowing the collector to draw the specimen at a lower angle with greater control of insertion. Types of winged/butterfly blood collection sets are those with:

- no luer adaptor to be attached to a syringe for careful control of vacuum being applied during the draw, as in the case of small fragile veins. This requires use of a transfer device to transfer the specimen from the syringe to the vacuum blood collection tubes.
- a luer adaptor and tube holder allowing for multiple specimens to be drawn directly into the appropriate blood collection tubes.

Needles must always be discarded in a sharps container immediately following use.

Transfer Devices

To safely transfer blood or other body fluids from a syringe into a collection tube or blood culture bottle, a transfer device should be used. These devices reduce the risk of needle stick related injuries and maintains specimen integrity.

Transfer Device examples:

Courtesy of Greiner Bio-one.Reprinted with permission.

Courtesy and © Becton, Dickinson and Company.Reprinted with permission.

Blood Culture Bottle Transfer Device

Blood Collection Tubes

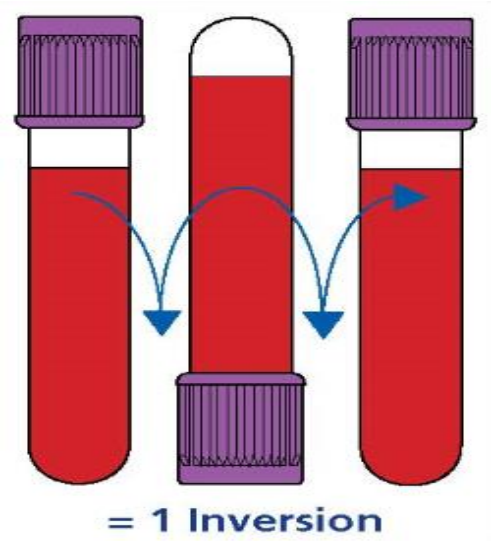
Venous blood collection tubes are sterile and may be plastic or glass and have an expiry date. Each comes with a colour- coded rubber stopper to identify the additive compound inside, which ensures that the correct tube is used for a specified test. Different blood tests require different types of blood specimens, and collection of the blood into the wrong type of tube will result in the venipuncture having to be repeated.

Blood collection tubes are also manufactured to withdraw a pre-determined volume of blood by vacuum to ensure the correct ratio of specimen to additive is maintained. It is important to completely fill each tube so that this ratio is correct. Some tubes are designed for a low-volume draw and contain less vacuum and proportionally less anticoagulant and can be used for difficult viens, infant draws, children or geriatric's.

Inadequately filled tubes may result in the following:

- inaccurate results
- rejection of specimens
- recollection of specimens

When obtaining a specimen, if the blood collection tube does not transfer the specimen into tube by vacuum, consider the tube faulty and obtain a new one. **Never inject blood specimens into a tube**, as this may cause the tube to break or the stopper to pop off exposing the health care provider to risk. The rubber stopper is never to be removed.



Because blood collection tubes contain a chemical additive, it is also important that the specimen be properly mixed with the additive to ensure the specimen can be processed by the lab. Holding the tube upright, gently invert the tube 180° and back. Repeat the movement as prescribed for each tube type according to the correct order of draw.

Keep specimens upright as much as possible. This is recommended by the manufacturer.

Picture provided by Horizon Health Network.

Blood Culture Bottles

Blood culture bottles contain a solution that provides a rich, nutrient growth medium in which all micoorganisms known to cause sepsis can multiply to detectable levels.

Blood specimens are transferred into the blood culture bottles with the assistance of a vacuum similar to the blood collection tubes; however, blood culture bottles will not stop filling at a preset volume. This becomes significant when choosing a blood collection system that allows drawing of the specimen directly from the patient into the culture bottle. In this case, the outside of the bottle must be marked before starting to ensure the appropriate fill volume. This must then be monitored during the draw, so it is important that the culture medium in bottle remains upright.

If the liquid blood culture medium were to come into contact with the sampling needle inside rubber top of the bottle, there is a risk of it inadvertently being drawn up into the needle and therefore into the patient. This must be avoided at all times.
Specimens for anaerobic culture must not have any air enter the blood culture bottle during transfer of the specimen, as minute amounts can compromise the anaerobic environment. When using a winged collection set attached to a holder inoculate the aerobic tube first as it will purge the air from the tubing. When collecting into a 20 mL syringe and inoculating the bottles using a transfer device, inoculate the anaerobic bottle first so that the air bubble closest to the plunger will not be in danger of contaminating the anaerobic bottle.

If drawing both aerobic and anaerobic cultures and the specimen obtained is less than the minimum recommended for both (i.e. less than 10ml total), place the specimen into the aerobic bottle rather than dividing inadequate amounts between two vials.

Tube Holder

The tube holder is a plastic sleeve into which the double-ended needle or winged/butterfly with a luer adaptor can be attached. Studies have shown that tube holders become contaminated with trace amounts of blood even after one use therefore **single use** holders must be discarded after each use, and reusable holders must be cleaned and disinfected as per manufacturers directions between patients.

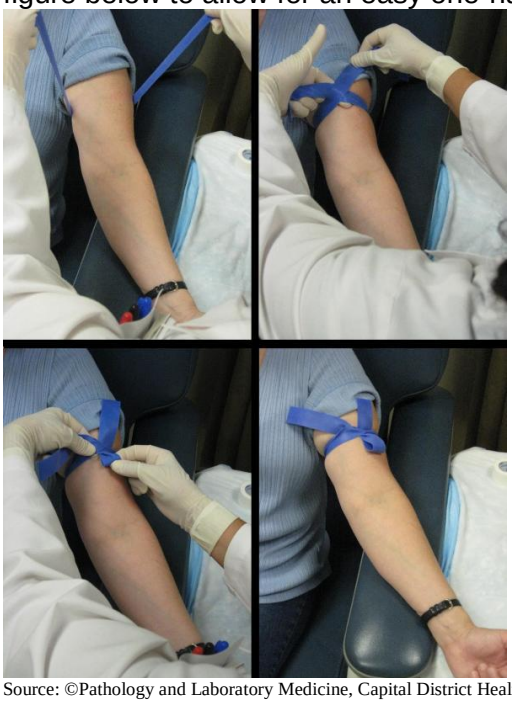
Tourniquet

A tourniquet is a disposable flat latex-free strap

- must be cleaned and disinfected with a hospital approved disinfectant between all patients
- discard when tourniquet shows signs of deterioration such as cracked, loss of elasticity
- must be discarded when visibly soiled

The tourniquet is placed flat on patient, and applied at a minimum of 8-10 cm above intended venipuncture site and with only enough tension to restrict venous blood flow. When possible, tourniquet may be placed over patient's sleeve. A blood pressure cuff may also be used to distend the veins during venipuncture by inflating it to a level of 40 mmhg, as long as it does not interfere with the selected venipuncture site.

If the skin appears blanched (appearing white or pale) above and below the tourniquet, it is too tight. Palpate distal pulse below tourniquet. If pulse is not palpable, reapply tourniquet more loosely. A loop of the tourniquet should be tucked between the tourniquet and the arm as in figure below to allow for an easy one-handed release.



Source: ©Pathology and Laboratory Medicine, Capital District Health Authority, 2013

Tourniquet time should not exceed one minute as this may result in hemoconcentration and infiltration of blood into tissue, resulting in erroneous test results.

Cleaning and Disinfection of Phlebotomy Equipment

The recommended minimum cleaning and disinfection level and frequency for non-critical patient equipment is as follows:

Item	Required disinfection	Minimum Frequency	Instruction
Tourniquet	Clean & Low level disinfection[30]	Between patients	Wipe each tourniquet with a hospital approved disinfectant wipe. Ensure tourniquet stays wet for one minute.[34] Discard at the end of day. If visibly soiled discard immediately.
Tube Holder	As per manufacturer's recommendation	Between patients	Single use holders recommended. Discard after use. If a multi-use holder, clean as per manufacturers recommendation between each patient
Phlebotomy Chair	Clean & Low level disinfection[30]	Daily and when soiled	Wipe chair with a hospital approved disinfectant wipe. Ensure chair stays wet for one minute.

BACK TO TABLE OF CONTENTS

Order of Draw

In order to avoid cross-contamination of anticoagulants/additives or bacterial contamination of blood cultures, correct order of draw will be followed when performing all blood collections. Cross-contamination of anticoagulants and/or additives can adversely affect the test results. **NEVER pour blood from one tube into another**.

A.Venous samples (Refer to Appendix B for the order of draw color chart)

1. Tubes/ Bottles for Blood Cultures
   a. Aerobic
   b. Anaerobic
2. Light Blue - Sodium Citrate
3. Black - ESR if collected in Sodium Citrate
4. Red Top tubes (all tubes without additives)
5. Gold - SST
6. Green – Heparin
7. Lavender – EDTA
8. Royal Blue – EDTA
9. Grey - Oxalate/ Fluoride
10. Light Yellow – ACD
11. Other (such as Interferon Gamma Release Assay - IGRA)

NOTE: IGRA tubes are available from the SJRH Microbiology and will be collected in the #11 slot in the following order:

1. Grey with white ring
2. Green with white ring
3. Yellow with white ring
4. Purple with white ring

B. Capillary samples (Refer to Appendix C for the order of draw color chart) :

1. Blood Gas
2. Lavender – EDTA
3. Tubes with other additives- Green, Gray, Yellow/Gold
4. Tubes without additives- Red

C. Syringe collection samples:

1. Blood Culture Tubes
   a. Anaerobic
   b. Aerobic
2. Follow venous order of draw from above

NOTE: If collecting into a syringe and transferring into microtainers, use the capillary order of draw.

D. **Venous blood gas collection with wingset**

Follow “A” above, collecting blood gas specimen at end. If only collecting blood gases, use a discard tube prior to ensure no air will get into the vacutainer tube/syringe, affecting results.

BACK TO TABLE OF CONTENTS

Maximum Blood Draw

Excessive blood collection can lead to complications such as phlebotomy-induced (iatrogenic) anemia. Monitoring the volume of blood collected from patients susceptible to phlebotomy-induced anemia is critical to ensure that frequent diagnostic sampling does not complicate patient care and/or threaten their well-being. The total volume of blood collected must be limited based on the patient's weight and the volume of blood.

1. **For pediatric patient/clients** weighing less than 100 pounds (lbs) 45.5 kilograms (kg), refer to the maximum blood draw volume **Appendix A**

   NOTE: For patients/clients less than six lbs (2.7 kg), maximum blood volume will be determined by the authorized provider.

2. **For a healthy, ambulatory adult**, no more than 5% of total blood volume can be collected in a single setting or in a 24 hour period. Average total volume for an adult equals 70 ml/Kg body weight. **NOTE**: Calculation: 70(ml/Kg) x patient weight(in Kg) x 0.05 = Maximum total blood draw/24 hours[29]

3. If volume is to be exceeded, approval from the authorized provider is required. Laboratory employees will document this approval on a Phlebotomy Deviation form (LAB-1237-REG-02-F00003), Nursing will document on nursing notes.

BACK TO TABLE OF CONTENTS

Complications/ Special Considerations

The phlebotomist may encounter complications while performing phlebotomy procedures. This section will outline various complications that staff may encounter, the steps to be taken to minimize risks and to respond appropriately. Where complications present on inpatient floors, Lab staff will inform the Unit Charge Nurse or delegate. The following complications are to be documented:

- Arterial Nick
- Convulsions/ Seizures
- Hematoma – Bleeding, greater than 15 minutes

Listed below are some commonly encountered complications and steps to be taken if complication is encountered: this list is not all inclusive.

1. Pediatric Patients:

For children, use comfort measures and developmentally appropriate interventions to decrease pain and anxiety during phlebotomy procedures. Topical anaesthetic (ex. EMLA cream) should only be used as a last resort. Example includes : skin to skin; breastfeeding; swaddling; positioning of child; non- nutritive sucking(soothers); sucrose solution; family presence; preparation of child and family; creating a calm environment; distraction; relaxation and coping techniques (See Appendix D).

2. Fainting/loss of consciousness:

Many patients/clients become dizzy, frightened, or faint at the thought or sight of blood. This may also occur when patients/clients are fasting. The phlebotomist will ask new or nervous patients/clients if there is history of fainting.

Course of Action: If the patient/client has a history of fainting or if the phlebotomist has reason to believe that the patient/client may faint, phlebotomist will move the patient from a sitting position to a lying/reclined position.

If patient/client indicates that they feel faint, phlebotomist may:

a) terminate the procedure and remove the needle as required
b) lower the patient's/client's head and arms if he/she is in the sitting position
c) ask patient/client to breathe deeply
d) request the assistance of a co-worker to move patient/client to a secure position
e) apply a cold wet towel to patient's/client's forehead and neck area
f) ask patient/client if he/she would like juice or water
g) remain with patient/client for at least thirty (30) minutes (for a clinic setting), or report to nursing to ensure patient is monitored (for inpatients)

If patient/client faints, the phlebotomist will:

a) terminate procedure
b) remove needle
c) place patient/client in a secure lying/ reclined position, request assistance from a co-worker to slide patient/client to the floor if necessary
d) apply cold compresses to patient's/client's forehead and/or neck
e) ensure patient/client who has fainted has recovered completely before being allowed to leave the department
f) request that patient/client remain in department for at least thirty (30) minutes

g) instruct patient/client not to drive for at least one hour
h) **for Lab ONLY**: ensure if patient/client does not recover fully, call a STAT medical assistance code or a Code Blue, depending on the Area. Clinics outside of a hospital setting will call 911.
    i. notify Phlebotomy Manager or delegate
    ii. generate an incident report if a code STAT medical assistance or Code Blue was required

3. Hematoma:

When area around puncture site starts to swell, usually blood is leaking into the tissue and causing an ecchymosis and/or hematoma. This complication can occur when the needle has gone completely through the vein, the bevel opening is partially in the vein, or not enough pressure is applied to the puncture site after puncture. The phlebotomist will make every effort to avoid situations that may cause ecchymosis and/or hematoma.

To prevent a hematoma when performing a venipuncture the phlebotomist will:
1. Ensure proper positioning of the needle in the vein.
2. Remove/loosen tourniquet before removing needle and within one minute of application.
3. Use major superficial veins.

Course of Action: If a hematoma begins to form:

a) immediately remove the tourniquet and needle
b) apply direct pressure to the puncture site for a minimum 2 minutes and reassess.
c) if bleeding continues past 15 minutes:
    i. recommend the out-patient/client go to the Emergency/Urgent Care Department
    ii. generate an incident report

4. Vomiting:

In the event of vomiting, there is the risk that the patient/client may aspirate some vomit.

Course of Action: The procedure for dealing with a patient/client who is vomiting is:

a) if patient/client is sitting, have him/her lean forward and use an emesis basin or trash can
b) if patient/client is lying down, turn his head to the side and provide an emesis basin or trash can
c) provide patient/client with tissues or towels
d) apply cold compresses to patient's/client's forehead
e) be patient and compassionate, do not make patient/client feel that he/she is imposing on you, or taking too much of your time
f) **for Lab ONLY**: if out-patient/client does not recover fully, recommend patient/client go to Emergency/ Urgent Care Department – generate an incident report if this occurs

5. Convulsions/ Seizures:
Convulsions/ seizures may be caused by the patient's/client's pre-existing condition or a reaction to the pain caused by the needle.

Course of Action: If the phlebotomist observes that a patient/client is convulsing or seizuring, he/she will:
a) remove needle
b) do not place anything in patient/clients mouth

c) protect patient/client from hitting their head or hurting themselves without restraining movements of patient/client extremities completely
d) **for Lab ONLY**: take/recommend out-patient/client go to Emergency/Urgent Care Department or call a STAT medical assistance code or Code Blue, depending on Area. Clinics outside of a hospital setting will call 911
e) generate an incident report

6. Nerve Damage:

Nerves are neither visible nor palpable so phlebotomists must be knowledgeable about the location of nerves in the anticubital area. Nerve injury is an inherent risk of phlebotomy (venous or capillary), however most nerve injuries are the result of poor techniques.

To prevent nerve damage, phlebotomist will:
1. Be knowledgeable about location of nerves in the anticubital area.
2. Not enter the vein at an excessive angle of insertion.
3. Avoid excessive probing.

Signs that a nerve has been compromised include, but are not limited to:
- Shooting electrical pain sensation.
- Tingling or numbness down the arm to the fingers.
- Lack of grip strength and/or mobility of the arm.
- Sharp pain on insertion of the needle.
- Patient/client states: "I have never felt anything like that before."

Course of Action: If the phlebotomist suspects nerve damage, he/she will:
a) immediately remove needle and perform venipuncture on a different site, preferably opposite arm
b) ask patient/client to wiggle fingers and move arm
c) apply ice if necessary
d) inform out-patient/client if pain persists seek medical assistance
e) generate an incident report

7. Arterial Nick:

Arteries do not feel like veins. Arteries pulsate, are more elastic and have a thick wall. Because of the close proximity of the brachial artery to the basilic vein, phlebotomist will avoid drawing blood from basilic vein when possible.

Nicks to the brachial artery are not always evident. If undetected, hemorrhaging can occur and continue long after puncture.

In the event of an arterial nick or entering an artery instead of a vein, the blood entering the tube will be bright red and will enter the tube with great force.

Course of Action: If phlebotomist suspects an arterial nick or puncture, he/she will:

a) remove needle immediately
b) apply pressure for at least 10 minutes or longer until bleeding has stopped
c) apply ice if necessary
d) **for Lab ONLY**: take out-patient/client to the Emergency Department/ Urgent Care if bleeding persists for more than 10 minutes. Clinics outside of a hospital setting will call 911
e) inform patient/client that a bruise may occur
f) generate an incident report
g) place comment on patient/client requisition, (paper or electronic), using a canned text comment "Suspect Arterial Sample – Interpret results accordingly"

8. Prolonged/Excessive Bleeding:
A patient should stop bleeding within five (5) minutes of venipuncture. Patients/clients on anticoagulant therapy, arthritis medication, other medications, or inherited blood disorder may bleed for a longer period of time.

Course of Action: In the event of prolonged/ excessive bleeding, phlebotomist will:

a) inquire medication history/ bleeding disorder
b) continue to apply pressure until the bleeding stops
c) if bleeding continues for more than fifteen (15) minutes recommend the out-patient/client go to the Emergency /Urgent Care Department,
d) complete an incident report

9. Suspected Cardiac Arrest

For Lab ONLY:

i. Call Code Blue immediately. Clinics outside of a hospital setting will call 911.
ii. Initiate BLS. If not trained in BLS begin chest compressions by placing your hands mid-chest and pressing down hard and fast, more than once per second, at least 100 compressions per minute.

For In-Patients:

i. Call Code Blue immediately. Initiate BLS.

10. Collapsed Vein:
If a syringe plunger is withdrawn too quickly or vacuum draw of a tube is too great, the vein may collapse, especially when blood is being collected from smaller veins and veins in geriatric patient/clients.

Course of Action: The phlebotomist will:

a) pull slowly on the syringe plunger or use an evacuated tube with a smaller volume when performing a venipuncture procedure on patients/clients with smaller veins and geriatric patients/clients
b) not probe a collapsed vein
c) immediately remove needle if a collapsed vein is suspected
d) attempt procedure one more time using a smaller gauge needle/winged infusion set, and if unsuccessful after two attempts, ask another phlebotomist if possible to perform the procedure, to a maximum of four (4) total attempts

11. Tremors – if the patient/client suffers from tremors, when possible, have an additional employee hold the arm to stabilize the collection site.

12. Above/below IV – Documentation of specimens drawn above or below an IV site must be identified on the patient's/client's requisition. Only nursing can temporarily shut off an IV. **Blood should never be collected above an active IV site, (IV that is infusing), as specimen contamination is guaranteed.** LAB ONLY: Deviation form must be completed prior to collection.

Above (Proximal)- Collection above an IV is not recommended and should only be attempted when all other alternatives are exhausted. **Lab Personnel**: Ask nursing to turn off the IV infusion for at least 5 minutes and ensure that the flow has completely stopped before venipuncture. Clean hands, don gloves and apply tourniquet 3 to 4 inches above the antecubital fossa. Perform venipuncture ensuring that 5 ml discard draw is performed first.

Below (Distal)- Ask nursing to turn off IV infusion and ensure it has completely stopped for at least 2 minutes before venipuncture. Clean hands, don gloves and apply tourniquet between the IV and intended puncture site.[8]

NOTES:

- Due to paediatric volume challenges, nursing should be consulted before bloods are collected from the same arm with an IV.
- **NEVER collect above a PICC or Port-a-Cath insertion site. This can cause collapse or puncture of the line.**
- Blood can be collected above or below a saline lock, with no discard required.

13. Patient/client with Burns:

Patients/clients with burns are highly susceptible to infection. When possible, burned areas will be avoided.

14. Diabetic Patient/Clients:

When a diabetic patient/client presents for blood work they may be experiencing hyperglycemia (high blood glucose), or hypoglycemia (low blood glucose). If the patient/client is not feeling well the patient/client should be prioritized so that the patient/client is seen to immediately. In the case of a hypoglycemic patient/client a drink or snack may be provided, if available, after the blood is collected.

15. Edema:

Some patients/clients develop abnormal accumulation of fluid in the intercellular spaces of the body. This swelling may be localized or diffused over a large area of the body. Excessive swelling can alter the composition of the blood passing through the affected limb. Veins in these areas are difficult to palpate. Avoid drawing blood from these sites.

16. Hemolysis:

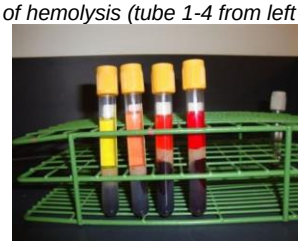
Hemolysis is the result of the rupture of erythrocytes, (red blood cells), and the release of hemoglobin into the blood. Depending on the degree of hemolysis, the serum/plasma may appear pink/red. Hemolysis can seriously affect test results and phlebotomist will make every effort to prevent hemolysis.

Hemolysis may be caused by, but is not limited to:

- Improper phlebotomy techniques such as using a needle that is too small, pulling a syringe plunger back too fast, expelling blood vigorously into a tube instead of allowing the vacuum to draw blood into the tube, and mixing tubes vigorously
- Exposure of blood specimens to extreme heat or cold
- Delay in transporting blood to the laboratory
- Residual alcohol at skin puncture site
- Milking of capillary collection site
- Collection/ improper collection using indwelling lines

NOTE: Some patients/clients may exhibit hemolysis from certain medical conditions.

Degrees of hemolysis (tube 1-4 from left to right, tube#1 is not hemolyzed)



Pictures by Horizon Health Network 2016

17. Mastectomy:

During mastectomy, patients/clients undergo the removal of lymph nodes which control fluid balance in the arm on the same side and produce infection fighting lymphocytes. Therefore, mastectomy patients/clients have an increased susceptibility to infection and a painful, long-lasting fluid imbalance (lymphoedema) when venipunctures and finger punctures are performed on the affected side. Blood drawn from the limb may be altered from that of the general circulation and may present physician with misleading results. Mastectomy patients/clients are susceptible to infection in the affected limb from even the smallest skin break. It is advisable that blood not be collected from the affected arm. Blood can be drawn only as a last resort and must have a completed **Phlebotomy Deviation form,** (Lab only), to use the arm on the side on which a mastectomy was performed**.**

Course of Action- Single Mastectomy*:*

a) If a patient/client informs the phlebotomist that she/he has had a mastectomy (breast removal), the phlebotomist will draw blood from the arm opposite the mastectomy site when possible.
b) Never use a tourniquet on the arm of the side that has had a mastectomy.

Course of Action- Double Mastectomy*:*

a) If patient/client informs the phlebotomist that she/he has had a double mastectomy and expresses concern about having her/his blood drawn and/or has signs of edema, the phlebotomist will not draw blood from patient/client.
b) The phlebotomist must have written permission from the Authorized Provider and patient/client will be informed of this process.
c) Never use a tourniquet.

18. Obesity:

Obese patients/clients generally have veins that are difficult to palpate and feel because their veins are much farther from the surface.

Course of Action:

a) The phlebotomist will attempt venipuncture only twice (2), maximum of 4 total attempts.
b) The phlebotomist will not probe excessively with the needle.
c) If a vein cannot be found refer to Site Selection for alternative sites or use a vein finder if available.

19. Petechia:

Small red spots appearing on a patient's/client's skin may indicate that minute amounts of blood have escaped into skin epithelium. This complication may be a result of a coagulation abnormality such as platelet defects or defective capillary walls. Petechia is very common in leukemia and chemotherapy patients/clients, which may result in prolonged bleeding.

Course of Action: In the event that petechia does appear and if the petechia advances;

a) recommend that they see their family physician or after hours clinic
b) generate an incident report

20. Osteomyelitis

Heel punctures for capillary sampling may cause osteomyelitis of the heel bone if puncture is too deep or puncture is performed outside the approved area. All phlebotomists must ensure correct procedures are followed for collection of heel punctures.

21. Sclerosed/Scarred/Thrombosed Veins/Skin Disorders:

Sclerosed veins are veins that have hardened as a result of inflammation and disease of interstitial substances. Patient's/clients' veins that have been punctured repeatedly often become scarred and feel hard when palpated. Thrombi are solid masses derived from constituents that reside in blood vessels. A thrombosis may partially or fully occlude a vein or artery and should be avoided. Blood is not easily collected from sclerosed/ scarred/ thrombosed veins.

The phlebotomist will avoid collecting blood from

- sclerosed/scarred/thrombosed veins
- sites with rashes, burned, scarred or otherwise injured
- sites with bruising
- sites with inflammation
- sites with infection

22. Skin Breakdown:

Skin breakdown can occur from repeated use of adhesive strips, particularly in the young or very elderly patient/client. This can be avoided by applying sufficient pressure at the puncture site until bleeding has stopped, and trying a paper tape product.

23. AV Fistula:

Blood should never be drawn from an AV fistula since access may induce an infection necessitating reparative surgery because of the potential for complications. All draws to an arm containing an AV fistula should be avoided. Authorization is required from the Authorized provider before taking blood from the arm with an inactive AV fistula.

BACK TO TABLE OF CONTENTS

Factors Affecting Blood Test Results

There are many variables that can affect test results. Knowledge of these variables and standardization of laboratory testing procedures are essential for correct interpretation leading to diagnosis and/or treatment of the patient/client.

Causes of error can be related to:

- pre-analytical factors with patient/client identification
- specimen collection
- handling and transport
- biological factors:
  - patient/client posture
  - time of collection
- physiological factors that influence results may include
  - age
  - activity
  - food ingestion
  - obesity
  - pregnancy
  - race
  - smoking
  - alcohol ingestion
- CT contrasts may interfere with blood and urine tests.It is recommended that routine blood and urine biochemical testing be performed 24 hr after CT scan. If testing is perfomed prior to the 24 hours ordering provider must be cautious when interpreting results.

NOTE: There is no evidence that performing venipuncture through a tattoo will affect specimen quality. If an appropriate site is available that is not covered in a tattoo, allow the patient to decide which site to use.

Cause of Error	Affect on Test Results
• Failure to perform positive patient identification • Mislabelling • Failure to label at the bedside (Could lead to a labelling error) • Inadequate/prolonged fast • Not coordinated with other treatments /medication • Improper time of collection • Failure to provide collection information	May provide misleading information. Could lead to misdiagnosis and/or improper treatment.
• Filling tubes in the incorrect order of draw	Carryover of additives that may affect test results
• Drawing blood from a peripheral line	May result in hemolysis of sample which may falsely increase or decrease test results and result in a redraw and delay in results
• Disinfecting collection site with alcohol swab prior to collection for alcohol testing	Falsely increases alcohol result

Cause of Error	Affect on Test Results
• Leaving the tourniquet on for longer than one minute	Causes hemoconcentration where proteins, coagulation factors and cells accumulate disproportionately and doesn't reflect patient's actual status. **Example:** Elevated protein
• Mixing tubes/microtainers too vigorously or rough handling during transport • Drawing blood from a vein that has a hematoma • Using a needle smaller than 23 gauge(exception 25G ultra-thin wall which is comparable to regular 23G needle) • Frothing of the blood caused by improper fit of the needle on a syringe • Forcing the blood from a syringe into an evacuated tube • Excessive fist clenching • Not allowing sufficient dry time of disinfectant	Result in hemolysis of sample which may falsely increase or decrease test results **Example:** Elevated potassium
• Overfilling or underfilling of tubes or blood culture bottles	Inappropriate blood to additive ratio and may lead to incorrect results. **Example: Blood cultures** positivity rate can drop by 28% for every mL a bottle is under-filled! **Coagulation**: Sodium citrate- blue top tubes must be filled. Underfilled tubes could lead to results being falsely high. **NOTE**: Under and/or overfilled coagulation tubes will not be processed.
• Inadequate mixing of tubes. • Pouring of blood from one collection tube to another.	May result in platelet clumping, clotting and/or incorrect test results.
• Failure to separate serum/ plasma from red cells within two (2) hours • Collection of blood in inappropriate tube	Inaccurate results - test dependent **Example:** Glucose, LDH and potassium tests (but not limited to); unable to perform test; recollection required
• Air bubble in blood sample for blood gas testing (capillary, venous or arterial) •	Falsely increases pO2 results
• Insufficient cleansing of the venipuncture site	May lead to microbiological contamination of patient/client and/or specimen

Cause of Error	Affect on Test Results
• Collection of blood below (distal) an intravenous (IV) site that has not been turned off for a minimum of two minutes	• Results in a diluted blood specimen that contains medications, electrolytes, donor blood, glucose and/or other fluids yielding laboratory results completely inconsistent with the patient's/client's actual physiology.
• Collection of blood above (proximal) an intravenous (IV) site	• Infused analytes can exist in higher concentrations above the IV for up to 24 hours after the IV has been shut off. • Results in a diluted blood specimen that contains medications, electrolytes, donor blood, glucose and/or other fluids yielding laboratory results completely inconsistent with the patient's/client's actual physiology.
• Using a large tube while using a small gauge needle	Can cause collapsed vein and/or hemolysis
• Inappropriate storage (temperature and/or humidity), and transportation of samples • Transportation delay • Improper placement of labels	May cause delay in testing and/or specimen rejection. May affect test results. **Example:** Blood gas, ammonia
• Not allowing serum samples to clot (minimum 30 minutes) prior to centrifugation.	May produce fibrin clots which can affect results and laboratory instrumentation.
• Tube orientation. Samples be kept upright as much as possible.	May affect test results.
• Excessive crying may adversely affect the concentration of some constituents (e.g., leukocyte count). Consult with caregiver before proceeding with collection.	May affect test results.

BACK TO TABLE OF CONTENTS

LAB ONLY- Completing Phlebotomy Deviation Form

NOTE: This section of the Regional Phlebotomy Manual relates to Laboratory staff ONLY. It is outside laboratory professional's scope of practice to access these sites (first 4 sites) unless ordering provider has given approval.

Principle/Purpose:

A completed **Phlebotomy Deviation Form (LAB-1237-SC-18-F00003)** is required by laboratory staff prior to drawing blood from:

- arm of an inactive AV fistula
- same side as a mastectomy
- foot by venipuncture
- patients/clients where the blood volume will exceed the allowable limit
- proximal or distal to an active intravenous (IV) site

Materials:

- Phlebotomy Deviation form - **LAB-1237-SC-18-F00003**
- Materials required to do phlebotomy

Procedure:

1. When situations arise as outlined above - Initiate a Phlebotomy Deviation form.
   NOTE: DO NOT COLLECT THE SPECIMEN UNTIL THE FORM IS COMPLETED.
2. Determine if this is a one-time exception or a standing order – tick off the appropriate box. If this is a standing order give form an expiry date of 1 year.
   NOTE: Standing orders cannot exceed 1 year in length
3. Complete the following information:
   a. Date/ Time of Deviation
   b. Deviation location
   c. Phlebotomist Name or ID
   d. Patient/client name (First and Last)
   e. Patient/client Identification #
4. Select the appropriate deviation type
   NOTE: Situation #5, proximal to (above) an active IV sites, does not require ordering provider approval. Laboratory staff cannot turn off the IV.
5. Add any additional comments as required
6. Have ordering provider sign the deviation form
7. Collect samples as required
8. Photocopy Phlebotomy Deviation form
9. Send photocopy to the laboratory with the specimen(s)
10. Send the original to the appropriate department for storage
    NOTE: The form is considered a worksheet and will be retained for 2 years.

BACK TO TABLE OF CONTENTS

Venipuncture

REAGENTS/SUPPLIES/INSTRUMENTATION*:*

- Blood tube
- Blood tube holder
- Multisample needles:
  - 20G, 21G, 22G or,
  - Winged infusion blood collection sets: 21G; 23G; if available, 25G ultra-thin wall (which is comparable to regular 23G needle)
- Alcohol preps (70% isopropanol)
- Gauze
- Tourniquet
- Appropriate tape or bandage
- Gloves
- Approved sharps container
- Syringe as required (also including transfer device)

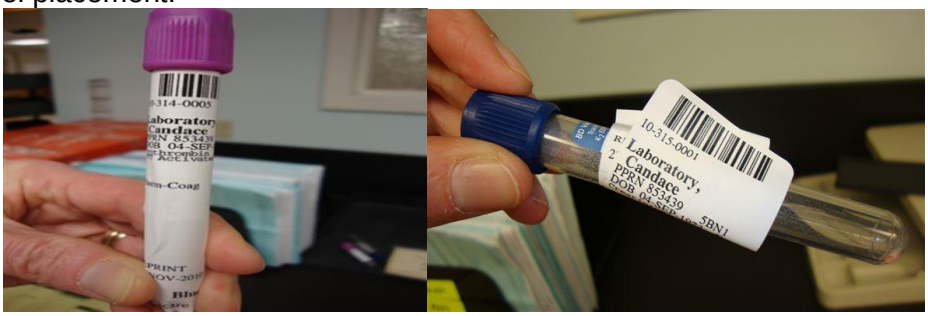
PROCEDURE:

1. Patient/client must have approved order for tests to be drawn.
2. Review labels/order for any special consideration (e.g. priority, age, oncology patient/client, etc). For inpatients, look for signs that indicate precautions at entry of room (such as infection control procedures), and at head of patient's/client's bed (such as a warning not to perform venipuncture on a particular arm). Confirm that dietary needs for testing were followed according to requirements.
3. Perform hand hygiene
4. Greet patient/client using the active offer and determine their experience with blood work. Decide whether patient/client is to be drawn lying down or seated in a chair appropriate for phlebotomy (back is supported, side arms present) and position accordingly. Reassure and explain the procedure, especially for a first time patient/client or a child. Note any signs that patient/client is anxious or may be withdrawing consent to procedure.
5. Identify patient/client and confirm accuracy of labels/order as per Patient/Client Identification Process.
6. Verify patient's/client's dietary restrictions or other restrictions (such as in drug monitoring) as appropriate.
7. Ask patient/client to remove anything that he/she may have in mouth that can present a potential hazard to patient/client during venipuncture, such as gum or candy.
8. Assemble appropriate supplies. Inspect sterile packaging/covers/seals of needles and other sterile supplies, and discard if not intact. Check expiration dates on tubes and bottles as appropriate.
9. If using a winged infusion device, attach winged infusion needle to appropriate device (holder or syringe).
   To attach a syringe:
   i. Ensure sterility of the syringe.
   ii. Pump plunger to ensure it moves freely and push all air out of syringe before beginning venipuncture.
   iii. Remove luer adapter end of winged infusion needle and discard in sharps container. Attach syringe to luer end of winged infusion needle.
   To attach a tube holder:
   i. Thread luer adapter of the winged infusion needle to tube holder
10. Inquire and/or determine which site is appropriate. Clean hands and apply gloves.

11. Position selected arm, apply tourniquet and encourage patient/client to close his/her hand if possible, reinforce NO hand pumping.
12. Inspect and palpate arm for suitable vein. If veins are not easily palpated, remove tourniquet and apply warm moist compress over extremity for 10 minutes. If able to find a vein but tourniquet has been left on for longer than one minute, the tourniquet should be released for two minutes before reapplying it. Failing to adhere to this requirement can lead to test results that do not accurately reflect the patient's physiology.
13. Cleanse venipuncture site with 70% isopropyl alcohol prep with a **back and forth friction motion** and allow to air dry fully.
    - **ALCOHOL ALLERGY**: Chlorhexidine (alcohol free) or povodine iodine prep can be used if patient/client has a sensitivity or allergy to alcohol prep.
    - **BLOOD ALCOHOL:** When collecting blood alcohol do not use an alcohol based cleansing agents. Use Chlorhexidine (alcohol free) or povodine iodine prep
    - **BLOOD CULTURE –** See section on Blood Culture
14. Inspect needle for defects and turn bevel side up
15. Anchor vein, warn patient/client that they will feel a pinch, and insert needle at an angle of 30^{o} or less.
16. Once blood has begun to flow into first tube, or as soon as possible, release tourniquet (not to exceed 1 minute) unless doing so threatens success of the venipuncture, and ask patient/client to open their hand.
    NOTE: If tourniquet has been on less than one minute it can be re-applied if required (may require assistance)
17. Fill the tubes in correct order of draw. Allow each one to fill until its normal vacuum is exhausted. Mix each tube gently by inversion 3 to 10 times (depending on tube and additive) immediately after removal from needle holder.
    NOTE: When using winged infusion set (butterfly) and the first sample is a sodium citrate (blue tube/ESR tube), a sodium citrate discard tube must be drawn to remove air from tubing. The discard tube does not have to be full.
18. Place clean gauze over puncture site.
    NOTE: Do not use cotton balls
19. Remove needle (activating needle/winged infusion set safety device if applicable) and immediately apply pressure to puncture site.
20. Dispose of needle as soon as possible (ASAP) in a properly labeled and approved sharps container. **DO NOT RECAP NEEDLE**.
21. Patient/client can be asked to apply direct pressure to puncture site if he/she is able. If not (e.g. in elderly or young children), a relative, friend or caregiver may be willing to apply pressure for 2-3 minutes or until the bleeding stops. If no one is available, the certified healthcare professional will apply pressure. Bending the elbow is not recommended.
22. While at patient's/client's side, label tubes/containers with patient/client information/label, ensure date and time of collection and phlebotomist's initials/ identification number, (written or electronic), is documented.If samples are being sent via pneumatic system, tubes should be placed in clean sealable bag at bedside.
    NOTES:
    - Transfusion Medicine specimens (any sample that may result in a potential transfusion), requires phlebotomist's signature in full (written or electronic).
    - Handmade labels can be used but must contain date and time of collection, patient/client name and one other approved identifier.
23. Inspect puncture site to ensure it has stopped bleeding:
    a. Patients/clients on Aspirin™ therapy may have to hold longer than 3 minutes.
    b. Patients/clients on anticoagulants such as Coumadin™, Plavix™, heparin therapy, etc. must hold a minimum of 5 minutes.

24. For adults, bandage puncture site and advise patient/client to leave bandage for a minimum of 15 minutes. It is not advisable to apply adhesive bandages over skin puncture sites on children less than 2 years old. Have caregiver apply pressure and monitor site.
    NOTE: If povodine iodine was used in step 13, wipe clean prior to applying bandage
25. Ensure that any special handling instructions for specimens are performed as required (e.g. chilling, keeping warm, protecting from light, sending STAT to Lab, etc)
26. Dispose of contaminated supplies
    NOTE: If using reusable equipment (ex. tourniquet, holder, etc) clean and disinfect between each patient/client, according to the manufacturer's recommendations.
27. Remove gloves and perform hand hygiene.
28. Send properly labeled tubes to appropriate laboratory section as per local area policy.

Incorrect label placement:



Pictures by Horizon Health Network 2016

Correct label placement:

Pictures by Horizon Health Network 2016

Contraindications/Limitations/Sources of Variability:

- It is not advisable to attempt a venipuncture more than two (2) times by the same phlebotomist. When possible have another person attempt to draw specimen: Total maximum number of attempts will not exceed four (4).
  NOTE FOR LAB: If consent by the patient is given to exceed the maximum attempts, the Phlebotomy Deviation Form must be completed.
- The phlebotomist should NEVER attempt venipuncture if a vein cannot be located. If Phlebotomist cannot locate a vein, another Phlebotomist should be consulted.
  NOTE: If unable to obtain sample(s) notify the authorized provider.

BACK TO TABLE OF CONTENTS

Winged Collection Set

A winged collection set or butterfly needle may be used for difficult venipunctures. They are easy to manipulate, their wings allow for a lower angle of insertion and greater control than what a straight collection needle can offer. Winged collection sets must always be used in conjunction with a tube holder or syringe (for example: newborn). This method is useful for patients with small veins, drawing from the hand or wrist, paediatric patients, geriatric patients, patients who are severely burned or patients with fragile skin and veins. Due to risk of hemolysis a 21 or 23 gauge needle is recommended. Do not use any needle smaller that 23 gauge.

Exception: BD 25 gauge Ultra Touch Push Button Blood collection set has a ultra-thin wall five bevel cannula and are comparable regular 23 gauge needle.

Equipment/Materials/Reagent Preparation:

- Labels
- Tourniquet
- Alcohol swab and/or Chlorihexidine swab (blood cultures)
- Winged collection set 21g or 23g (see exception above)
- Gauze
- Tape
- Biohazard sharps container
- Antibacterial wash
- Gloves
- Tubes
- Tube holder

Note:
The butterfly needles are more expensive to use and are too short to reach deep veins therefore should only to be used when necessary.

Procedure:

1. Patient/client must have approved order for tests to be drawn.
2. Review labels/order for any special consideration (e.g. priority, age, oncology patient/client, etc). For inpatients, look for signs that indicate precautions at entry of room (such as infection control procedures), and at head of patient's/client's bed (such as a warning not to perform venipuncture on a particular arm). Confirm that dietary needs for testing were followed according to requirements.
3. Perform hand hygiene
4. Greet patient/client using the active offer and determine their experience with blood work. Decide whether patient/client is to be drawn lying down or seated in a chair appropriate for phlebotomy (back is supported, side arms present) and position accordingly. Reassure and explain the procedure, especially for a first time patient/client or a child. Note any signs that patient/client is anxious or may be withdrawing consent to procedure.
5. Identify patient/client and confirm accuracy of labels/order as per Patient/Client Identification Section
6. Assemble equipment and supplies.

7. Attach butterfly needle to the appropriate device.
   To attach a tube holder:
   i)Thread the Luer adapter of butterfly needle to tube holder. If no luer, retrieve and attach one to butterfly.
   To attach a syringe:
   i)Ensure sterility of the syringe.
   ii) Pump plunger to ensure it moves freely and push all air out of syringe before beginning venipuncture.
   iii) Remove Luer adapter end of the butterfly needle and discard in sharps container.
   iv) Attach syringe to Luer end of butterfly needle.
   NOTE: If blood gases need to be collected along with other tubes, the tubes must be collected first.
8. Clean hands and apply gloves.
9. Apply tourniquet.
10. Locate a vein.
11. Cleanse site using alcohol swab in a **back and forth friction motion**. Note: If collecting Blood Cultures please refer to Blood Culture Collection procedure for proper cleansing technique.
12. Allow cleansing solution to air dry.
13. Remove cover of needle and perform a visual inspection ensuring the absence of any burrs.
14. Insert into vein, bevel up with one smooth motion. Once blood is observed flowing into tube, loosen tourniquet (within 1 minute).
15. **If using an evacuated tube system:**
    a. Continue to fill all tubes following order of draw and mixing guidelines as recommended by manufacturer. **Remember** that you **must** first draw a blue sodium citrate tube as a discard if a blue is the first tube that you need to collect to ensure proper filling of the tube. The discard tube does not need to be completely filled.
16. **If using a syringe:**
    a. Once needle is in the vein, draw back slowly on the syringe plunger until required amount of blood is drawn. **Note:** care must be taken not to pull back hard on plunger as this may cause haemolysis or collapse vein.
17. Place gauze over puncture site and activate the safety mechanism if applicable.
18. Hold pressure on venipuncture site, or instruct patient to do so.
19. If using a syringe, carefully remove butterfly luer from syringe and attach a transfer device to syringe. Make sure to transfer blood immediately from the syringe to vacutainer tubes.
20. Dispose of butterfly and syringe in sharps container.
21. Ensure bleeding has stopped.
22. For adults, bandage puncture site and advise patient/client to leave bandage for a minimum of 15 minutes. It is not advisable to apply adhesive bandages over skin puncture sites on children less than 2 years old, have caregiver apply pressure and monitor site.
23. Label tubes immediately in presence of patient.
24. Remove all equipment that was brought to patient's bedside.
25. Remove gloves and perform hand hygiene.
26. Send properly labeled tubes to appropriate laboratory section as per local area policy.

Contraindications/Limitations/Sources of Variability:

- The tubing of butterfly needle contains air therefore it will underfill the first tube by 0.5mL therefore draw a blue sodium citrate discard tube if collecting a blue coagulation tube as first specimen.
- The tip of a winged/butterfly needle is much more blunt resulting in a more painful puncture for patient.
- The butterfly needles are more expensive to use (therefore only to be used when necessary) and are too short to reach deep veins.
- Winged collection sets are associated with a high risk of accidental needle stick injuries. The extension tubing attached to the needle causes it to become more cumbersome to control and place safely into a sharps disposal container, making activation of safety mechanisms crucial prior to sharps disposal.

BACK TO TABLE OF CONTENTS

Capillary Collection/Filter Paper Collection

Capillary blood collection is the preferred method of blood specimen collection for newborn, infants and young children:

- Less than 1 year of age – heelstick (maximum depth 2.0 mm)
- Greater than or equal 1 year of age – fingerstick
  NOTE: Not all circumstances will allow a capillary collection (example: blood cultures, high volumes of sample, etc.)

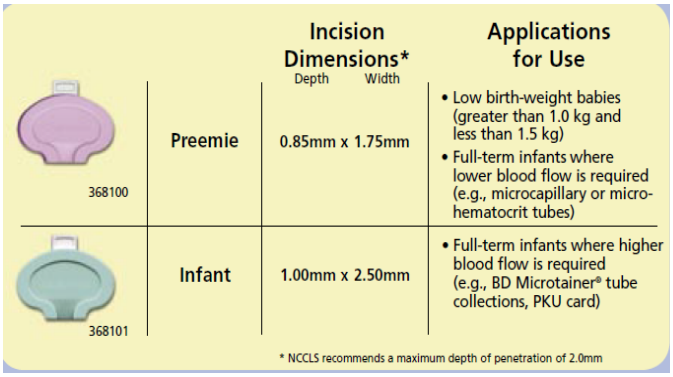
Obtaining blood specimens by skin puncture or incision can be an alternative to venipuncture on patients/clients for whom venous access is difficult or unavailable(ex. IV in both arms), if small quantities of blood are sufficient for testing.

MATERIALS AND EQUIPMENT:

- Lancet device (**Heels only, DO NOT use for finger punctures**):
  - Micro-preemie lancet (depth 0.65 mm) only used for heel punctures- on babies weighing less than 1000g.
  - Preemie incision lancet (depth 0.85 mm) only used for heel punctures- on babies weighing 1000g – 2500g.
  - Incision lancet (depth 1.0 mm) only used for heel punctures - on babies weighing greater than 2500g.

Description	Product Code	Depth	Length	Case Color	Indications*
Tenderfoot™ Micro-Preemie	TFM 50I	0.65 mm	1.40 mm	Blue	Less than 1000 g
Tenderfoot™ Preemie	TFP 50I TFP 200I TFP 1000I	0.85 mm	1.75 mm	White	1000 g – 2500 g
Tenderfoot™ Newborn	TF 50I TF 200I TF 1000I	1.00 mm	2.50 mm	Pink/Blue	Greater than 2500 g

BD Microtainer™ Quikheel Lancet:



Courtesy and © Becton, Dickinson and Company.Reprinted with permission.

- **Skin Puncture Device**
  - Roche AccuChek™ Safe-T-Pro Plus – used for glucometer testing or when only a small amount of blood is required (depth 1.3 mm, 1.8 mm or 2.3 mm adjustable by turning the purple ring to desired depth)
    NOTE: 2.3 mm setting is **not to be** used as a heel pick

Courtesy of Roche

  - BD Microtainer™ Contact Activated Lancet

BD Microtainer® Contact-Activated Lancet Ordering Information

Facility Ref. #	BD Ref. #	Color	Dimensions	Blood Volume	Packaging
	366592		Needle: 30 G x 1.5 mm depth	Low Blood Flow Single Drop	200/Box, 2,000/Case
	366593		Needle: 21 G x 1.8 mm depth	Medium Blood Flow	200/Box, 2,000/Case
	366594		Blade: 1.5 mm width x 2.0 mm depth	High Blood Flow	200/Box, 2,000/Case

Courtesy and © Becton, Dickinson and Company.Reprinted with permission.

- Microtainers™ – appropriate for testing
- Capillary tube**,** rubber stoppers and metal flea (if capillary blood gases are required)
- 70% Alcohol prep (povodine iodine must not be used)
- Gauze pads
- Biohazard sharps container
- Gloves
- Warming device, as required

SKIN PUNCTURE PROCEDURE:

1. Patient/client must have approved order for tests to be drawn.

   NOTE: Handmade labels can be used but must contain date and time of collection, patient/client name and one other approved identifier.
2. Review labels/order for any special consideration (e.g. priority, age, oncology patient/client, Stat, ice requirements,etc). For inpatients, look for signs that indicate precautions at entry of room (such as infection control procedures), and at head of patient's/client's bed (such as a warning not to perform blood collection on a particular hand or foot, or not to move patient/client). Confirm that dietary needs for testing were followed according to requirements.
3. Perform hand hygiene.
4. Greet patient/client using the active offer and determine their experience with blood work. Decide whether patient/client is to be drawn lying down or seated in a chair appropriate for phlebotomy (back is supported, side arms present) and position accordingly. Reassure and explain the procedure, especially for a first time patient/client or a child. Note any signs that patient/client is anxious or may be withdrawing consent to procedure.

5. Identify patient/client and confirm accuracy of labels/order as per Patient/Client Identification Section.
6. Assemble supplies. See Appendix D for appropriate comfort measures.
7. Follow "Site Selection" for proper skin puncture site and Order of Draw for Microtainer required for testing.
8. Prepare site: It is recommended to use a warming device on baby's foot for 3 to 5 minutes in order to increase blood circulation, thus improving blood flow.
   NOTE: warming device cannot exceed 42 °C. An alternative would be to **gently** massage the site.
9. Clean hands and apply gloves.
10. Thoroughly cleanse the plantar surface of foot or finger with 70% alcohol, allow to air dry fully.
11. Ensure entire lancet device has contact with the skin and activate device.
12. Wipe away first drop of blood with a gauze pad.
13. Holding limb downward, gently squeeze finger/lower heel area applying intermittent pressure. **NOTE:** Avoid excessive dorsiflexion of the infant's foot.


Pictures by Horizon Health Network 2016

14. Allow blood to bead up. If performing capillary blood gas, touch blood gas capillary tube to blood drop, fill completely avoiding air bubbles. Place capillary stopper on one end, put flea in tube and place the other stopper on tube. Holding both ends of capillary tube, mix blood.
15. Continue to collect microtainer(s) as required, (ensuring adherence to order of draw and avoidance of vigorous mixing), by touching the tip of microtainer to underside of drop (if blood drop becomes lodged inside the collector top, a gentle tap of microtainer on a hard surface is sufficient to move it to bottom of tube).
    NOTE: Do not use a scraping motion or strong repetitive pressure, (milking), to collect blood. This could cause blood to "run", wear away delicate skin of a newborn, and/ or cause haemolysis of sample.
16. Collect specimens as quickly as possible to minimize the effects of the coagulation process including platelet clumping and microclot formation.
    NOTE: Each microtainer has a predefined minimum and maximum: ensure samples are not underfilled or overfilled.
17. Ensure microtainers are mixed by inversion (0 X for red cap; 5 X for yellow caps 10 X for all others) once filled and capped.
18. When all samples are collected, place gauze over the puncture site until puncture wound seals. It is not advisable to apply adhesive bandages over skin puncture sites on children less than 2 years old.
    NOTE: Baby's foot should be held above the level of their heart in order to aid cessation of bleeding.
19. Each microtainer must be individually labelled at bedside prior to leaving area.
20. Remove all articles related to blood collection from collecting area and dispose according to hospital policy.
    NOTE FOR LAB: Infants are to be left how they were found.

21. Remove gloves and perform hand hygiene.
22. Send properly labeled tubes to appropriate laboratory section as per local area policy.

BLOOD COLLECTION ON FILTER PAPER PROCEDURE:

1. Avoid touching area within the circles on filter paper before, during and after collection.
2. Follow steps 1-10 as per above.
3. Holding limb downward, gently squeeze lower heel/ finger area applying intermittent pressure.
   NOTE: Avoid excessive dorsiflexion of infant's foot.
4. Allow a large drop of blood to form. Wipe away first drop with a sterile gauze pad.
5. Touch filter paper gently against the large drop of blood and in one step, allow a sufficient quantity of blood to soak through and completely fill the preprinted circle on filter paper.
   Note: Do not press filter paper against the puncture site. Blood should be applied only to one side of the filter paper. Do not apply layers of successive blood drops to the same printed circle as this may cause nonuniform analyte concentrations.
6. Repeat steps 3-5 for each circle.
7. When all samples are collected place gauze over the puncture site until puncture wound seals. It is not advisable to apply adhesive bandages over skin puncture sites on infant less than 2 years old.
   NOTE: Baby's foot should be held above the level of their heart in order to aid cessation of bleeding.
8. Remove all articles related to blood collection from collecting area and dispose according to hospital policy.
   NOTE FOR LAB: Infants are to be left how they were found.
9. Remove gloves and perform hand hygiene.
10. Fill in all the required information fields in all the areas of filter card.
11. Allow to dry 3 hours and submit to lab for processing.
    NOTE: If this is the card for Maritime Newborn Screening program, give the top information sheet from the card to the parent or guardian. For more details refer to Maritime Newborn Screening program (www.maritimenewbornscreening.ca).

Considerations for Skin Puncture:

- Do not puncture heel/finger if bruises, abrasions, edema, injury, infection or sloughing of skin is present.
- Never puncture old puncture wounds.
- Do not use a heel of a foot with an intravenous (IV). A foot with an oximeter may be used.
- Do not use milking to obtain an adequate specimen as this will cause contamination with tissue fluid.
- Avoid using fingers that are swollen or below an IV as both can cause samples to provide inaccurate results.
- Prewarming a site is helpful.

BACK TO TABLE OF CONTENTS

Collection From a Peripheral Intravenous Catheter (Nursing Only)

Sampling of blood from indwelling short peripheral catheters is reliable for many routine blood tests, including coagulation studies. Obtaining blood cultures from peripheral catheters at insertion or during the dwell is not recommended.
There is an increased risk of hemolysis when obtaining specimens from a short peripheral catheter saline lock. Hemolysis has the potential to impact accuracy of results delaying treatment. **To prevent hemolysis, perform venipuncture whenever possible.**

Laboratory employees will **not** collect samples from a peripheral intravenous catheter/saline lock.

Note: If drawing blood from a central venous access device (CVAD), instructions are in section E of HHN-CL-NU031 Central Venous Access Device Intravenous Therapy

REAGENT/SUPPLIES/INSTRUMENTATION:

- Intravenous catheter, Short peripheral/Midline peripheral(16g or 18g cannula)
- Needleless connector
- Transparent dressing
- Blood tubes
- 10 mL Syringe
- Safety transfer device
- Gauze
- Tourniquet
- Gloves
- Prefilled 0.9% NaCl (saline) syringe
- Approved sharps container
- 2% chlorihexidine gluconate with 70% isopropyl alcohol

PROCEDURE:

Note: If accessing an existing intravenous line, ensure infusing solution(s) are stopped for at least 2 minutes prior to obtaining the sample.

- **For non-coagulation tests - discard two times the dead-space volume of the particular line (1-2 mls)**
- **For coagulation tests- discard the greater of these two volumes, 5 mls or six times the dead-space volume of the particular line**
- **Deadspace volume is equivalent to the priming volume of the internal volume of the entire system (catheter, needleless connector, non-coring needle,etc.)**
- **Details on priming volume of a product can be found on packaging or from the vendor.**

1. Access peripheral intravenous catheter by attaching a needleless connector and secure device with a transparent dressing, according to HHN-CL-NU029 Peripheral Intravenous Therapy (PIV). **NOTE:** Larger vein sites such as the antecubital fossa are recommended to reduce possibility of vein collapse. Avoid using hand veins. **This is to be used as a last resort.**
2. Obtain appropriate blood collection equipment, requisition, and labels.

3. Perform hand hygiene
4. Position patient/client and assess saline lock site for any signs or symptoms of potential complications such as site reddened, swollen, phlebitis, pain.
5. Assess site prior to each specimen collection via saline lock and/or when patient/client reports discomfort.
6. Perform hand hygiene.
7. Apply clean non-sterile disposable gloves.
8. Cleanse top of saline lock using 2% chlorihexidine gluconate with 70% isopropyl alcohol. Allow cleaning agent to dry completely (minimum 2 minutes).
9. Apply tourniquet 10-15 cms above antecubital fossa.
10. Break seal on plunger of syringe before use.
11. Attach syringe to needleless connector (saline lock). Ensure a tight Luer-Lok connection with syringe.
12. Slowly pull back on plunger until 1- 2ml of blood has been drawn into the syringe. Remove syringe from saline lock and discard.
13. Attach a new syringe; obtain required volume using multiple syringes if needed.
    NOTE: Once blood has begun to flow, or as soon as possible, release tourniquet (not to exceed 1 minute).
14. Once sufficient blood is obtained, flush saline lock with 3-5 mL of preservative free 0.9% sodium chloride (normal saline) using turbulent flush technique.
    NOTE: The device should flush easily without resistance and without discomfort to patient/client.
15. Fill tubes immediately using a safety transfer device and in correct order of draw.
    - Angle tube so blood impacts against side of tube, not bottom;
    - Allow the tube's vacuum to pull blood into tube;
    - If multiple syringes are filled, evacuate into tubes in same order in which they were drawn.
16. Mix tubes by gentle inversion as soon as they are filled. Avoid vigorous mixing.
    NOTE: One inversion is up-ending the tube 180 degrees, then returning it upright. Allow air bubble to rise to top before up-ending again.
17. Label tubes in presence of patient/client.
18. Dispose of sharps in appropriate sharps container.
19. Send labelled tubes to laboratory in a timely manner, observing special handling requirements as applicable.
20. Remove gloves.
21. Perform hand hygiene.

LIMITATIONS:

To prevent hemolysis, perform venipuncture whenever possible.

Obtaining blood cultures from a short peripheral catheter at insertion or during the dwell is not recommended.

Pediatric Consideration: Hemolysis is multifactorial and although research shows drawing bloods through an IV is a risk factor for hemolysis, sometimes it may be necessary to use smaller bores for children.

When venipuncture is not possible:

- Recommend drawing from large-bore cannulas (e.g. 16 or 18 gauge).
- Do not submit samples obtained by sluggish draws.
- Permit antiseptic to dry completely.

- Use collection tubes with reduced vacuum. Keep smaller volume tubes within arm's reach for difficult draws and only when necessary. Follow same order of draw as for regular tubes.
- Avoid excessive aspiration force.
- Avoid underfilling, fill all tubes +/- 10% of their stated volume.
- Reject all underfilled tubes at bedside and recollect sample.
- Mix tubes by gentle mixing instead of shaking.
- When blood culture sample volume is inadequate to fill both bottles in one set, submit at least one properly filled aerobic or pediatric bottle (depending on sample volume) for testing rather than dividing the sample equally between two bottles.

NEVER pour blood from one tube into another.

NEVER fill tubes by removing stopper and squirting blood from syringe. Use a safety transfer device.

ALWAYS label tubes in presence of patient/client.

BACK TO TABLE OF CONTENTS

Blood Culture Collection

Venous blood collected by sterile technique using a winged infusion collection set or a syringe. Blood cultures collected from an indwelling line should be paired with another culture obtained by venipuncture to assist in interpretation in the event of a positive result.
NOTE: Bottles are to be kept upright during collection to avoid backflow of the solution into the vein.

Equipment/Materials/Reagent Preparation:

- Tourniquet
- Disinfectant:
  - Chlorhexidine swabs (for patient/clients greater than or equal to 2 months old)
  - 70% Alcohol (less than 2 months old)
  - Iodine swab
- Winged collection set or syringe/transfer device
- Gauze
- Tape
- Biohazard sharps container
- Antibacterial wash
- Gloves
- Blood culture tube holder
- Blood culture bottles as required for the order:
  - Aerobic Bottle
  - Anaerobic Bottle
  - Pediatric Aerobic Bottle
  - Mycobacterium (TB) Bottle

Quality Control:
Ensure that area of collection is properly disinfected. Proper venipuncture technique must be adhered to in order to produce a quality specimen. Microbiology monitors contamination rates as a quality indicator.

Procedure:

Note: If drawing blood for blood cultures from a central venous access device(CVAD), instructions are in section E of HHN-CL-NU031 Central Venous Access Device Intravenous Therapy

1. Review labels/order for any special consideration (e.g. priority, age, oncology patient/client, Stat, ice requirements,etc). For inpatients, look for signs that indicate precautions at entry of room (such as infection control procedures), and at head of patient's/client's bed (such as a warning not to perform blood collection on a particular hand or foot, or not to move patient/client). Confirm that dietary needs for testing were followed according to requirements.
2. Greet patient/client using the active offer and determine their experience with blood work. Decide whether patient/client is to be drawn lying down or seated in a chair appropriate for phlebotomy (back is supported, side arms present) and position accordingly. Reassure and explain the procedure, especially for a first time patient/client or a child. Note any signs that patient/client is anxious or may be withdrawing consent to procedure.
3. Identify patient/client and confirm accuracy of labels/order as per Patient/Client Identification Section

4. Perform hand hygiene.
5. Assemble equipment and supplies. Check following:
    - Expiry date
    - Examine for cracks and chips
    - Examine for discolouration or turbidity.
    - Ensure indicator on the bottom is not yellow.
    - Ensure the flip cap has not been removed.
    - If any of these conditions exist do not use the bottle.
6. Remove flip cap and cleanse the top of the rubber stopper with either 70% alcohol, chlorhexidine in 70% alcohol, or iodine in swab or applicator form. Use a fresh swab/applicator for each bottle. Allow to air dry 1 minute before inoculation.
7. Clean hands and don gloves.
8. Apply tourniquet. Palpate area to select venipuncture site. Once vein has been located release the tourniquet to avoid hemodilution.
9. Cleanse the venipuncture site with 70% alcohol followed by:
    - **Greater than 2 months of age** - Chlorhexidine swab or povodine using a **back and forth friction motion** for 30-60 seconds. Use more than one swab if required.
    - **Less than or equal to 2 months of age –** a second cleanse with 70% alcohol (allow a 30 second dry in between)
10. Allow cleansing solution to air dry for a minimum of 30 seconds.
11. Blood culture bottles have graduations on the sides. It is recommended to identify the Fill-to Mark or mark the target fill level on the blood culture bottle label about 10 mL above the media level.
    - 10 mLs for aerobic and anaerobic bottles
    - 4 mLs for pediatric aerobic bottle

    NOTE: If drawing both aerobic and anaerobic cultures and specimen obtained is less than the recommended volume for each bottle (ie. 10 mL), place specimen into the aerobic bottle to the 10 mL mark and whatever is left over place into the anaerobic bottle, rather than dividing inadequate amounts between two bottles.
12. If 10 mL cannot be obtained, use the paediatric aerobic bottle and fill to the optimal volume of 4 mLs.
13. Reapply tourniquet. Do not repalpate venipuncture site. If it is necessary to repalpate site, site MUST be cleansed again using a new Chlorhexidine swab.
14. Perform venipuncture, using correct order of draw i.e. blood cultures before other collection tubes.

    NOTE: If using a winged collection set inoculate aerobic bottle first. This prevents air from tubing from getting into anaerobic bottle. Bottles are to be kept upright during collection to ensure proper volume is collected. The broth inside the bottle should never touch the back end of needle as there is a risk of backflow of solution into the vein.
15. Once blood flow is established release tourniquet (less than 1 minute) unless doing so threatens the success of venipuncture.
16. Once all containers are filled, or desired volume is withdrawn place a clean gauze pad over site and remove needle, activating safety device if equipped.
17. Apply pressure to site (this can be performed by patient/client if possible).
18. If using a syringe, a transfer device should be used to inoculate the blood culture bottles. Inoculate anaerobic bottle first and then aerobic bottle as air bubbles in syringe are closest to plunger.
19. Mix by gentle inversion 4 to 5 times.
20. Label blood culture bottles according to local area policy.

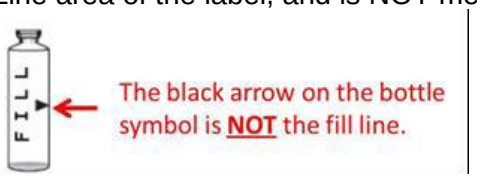
NOTE: Place label near bottom taking care not to cover window, the lot# and expiry date or the barcode. Do not place any labels over indicator on the bottom of the bottle.

21. Ensure bleeding has stopped.
22. For adults, bandage puncture site and advise patient/client to leave bandage for a minimum of 15 minutes. Bandage not recommended for children less than two years old, have caregiver apply pressure and monitor site.
23. Remove gloves and perform hand hygiene.
24. Repeat this process immediately using new collection supplies from a separate anatomical site if possible.
25. While at the patient/client's side, label blood culture containers with patient/client information/label, ensure time of collection and phlebotomist's initials/identification number, (written or electronic), is documented.
26. Send appropriately labeled specimens to lab.

BacT/ALERT blood culture bottle label clarification:
"Fill-to Mark" Feature will be added to all adult blood culture bottle labels (FA Plus).
This feature for BacT/ALERT users provides a **visual target** to aid the collector in drawing the optimal 10ml specimen volume in accordance with the product IFU.

The Fill-to-Line is a black stripe running the length of the bottle label. A white zone etched into the Fill-to-Line shows the **Fill-To Mark** which indicates the optimal volume of blood to be collected (10 ml) in adult bottles.

The bottle icon depicting a bottle with the word **FILL** and an arrow is a symbol indicating the Fill Line area of the label, and is NOT meant to correspond to the **actual Fill-To-Mark (see below).**



Pediatric bottles (BacT/ALERT PF Plus) will **not** have a Fill Line added to its label, as the volume of blood drawn from pediatric patients may vary according to the weight of the patient and may be too low to be accurately measured.

Contraindications/ Limitations/ Sources of Variability:

- Blood culture set includes one (1) aerobic and one (1) anaerobic bottle collected with same venipuncture or, one (1) pediatric bottle. Every order for blood cultures should include two (2) sets unless otherwise specified by physician.
- Source of specimen is indicated where possible. [eg. PICC line, peripheral right arm (peripheral specimens require venipuncture), etc.]
- Blood culture bottles may contain resin beads which neutralize antibiotics, however, it is always advisable to collect blood cultures prior to administration of antibiotics to avoid false negative cultures.
- Contamination with skin flora leads to inappropriate use of antibiotics which is costly and may be detrimental to patient/client. Take time to decontaminate venipuncture site and the top of the bottle prior to inoculation.
- The volume of blood obtained is the most important factor in detecting bacteremia. Take care to get as close to the maximum volume as possible without overfilling. Overfilling or underfilling the blood culture bottles can lead to false negative results. For neonates and small children from whom 4 mLs is impossible, smaller amounts can be collected. The laboratory will not reject specimens with low volumes. However the yield of such cultures may be reduced.
- Do not collect blood cultures from peripheral IV lines, unless there is no other available site. Blood cultures obtained from indwelling intravascular access devices, such as intravenous catheters and ports, are associated with greater contamination rates than blood cultures obtained by venipuncture. Although blood occasionally may need to be obtained from intravenous lines and similar access devices, a culture of blood from such a device should be paired with another culture of blood obtained by venipuncture to assist in interpretation in the event of a positive result.
- If blood cultures for bacteria or fungi are collected through an intervenous line, it is not necessary to discard the initial volume of blood or flush the line with saline to eliminate residual heparin or other anticoagulants. Moreover, the antimicrobial activity of heparin is effectively eliminated in protein-rich culture media.

BACK TO TABLE OF CONTENTS

Blood Collection for Law Enforcement

The following process based on Bill C-46 of the Criminal Code of Canada must be adhered to while performing a venipuncture when requested by a law enforcement agent. It is no longer necessary for an ordering provider to submit the order for testing.

PROCEDURE:

When a law enforcement agent requests blood to be obtained from an individual suspected of being impaired by alcohol and/or drugs for testing in the crime laboratory, the patient/client must be assessed by an ordering provider to ensure there is no risk to patient's/client's safety to draw blood. The first priority is to provide life-saving health care to the patient and the collection of the forensic blood is secondary.

When consent cannot be obtained, it is possible for the law enforcement agent to ask a judge or a justice of the peace for a warrant, (court order), to authorize taking of blood samples. If a peace officer requests that staff collect blood from an individual which does not follow the process (consent or warrant), escalate to health facility administration in an expeditious manner.

The NB Attorney General has designated the following health professionals as qualified to collect blood samples:

- Physicians;
- Medical Residents;
- Physician Assistants;
- Nurse Practitioners;
- Registered Nurses;
- Licensed Practical Nurses;
- Medical LaboratoryTechnologists; and
- Medical Laboratory Assistants

The following process must be followed:

1. A valid consent must be obtained from patient. If the patient is unconscious, mentally unfit, unable to consent to the blood draw or refuses to consent, blood should not be drawn.
2. Blood may be taken from an unconscious patient if a warrant issued by a judge is provided.
3. If a warrant is being issued, it must be presented to attending physician/nurse practitioner, and a copy will be placed on patient's/client's health record.
4. While collecting, ensure that the law enforcement agent is present for venipuncture.
5. A **Forensic Blood Collection Kit** will be provided by the law enforcement agent.
6. Follow instructions provided within the **Forensic Blood Collection Kit.**
7. When venipuncture is complete, ensure that all labels for blood samples are completed and accurately labelled.
8. Hand specimen(s) to the law enforcement agent and observe while they place security seals over stoppers and place vial(s) in appropriate bag.
9. Complete the "Certificate of Qualified Technician" form provided by law enforcement agent, make a copy and place in patient's/client's chart.
   NOTE: This certificate acts as a legal document that will significantly reduce the likelihood of the person collecting the blood from being subpoenaed to attend court.
10. Document all actions in the progress notes of patient's/client's health record.

Isolation Procedure

When a patient/client requires a phlebotomy and is on Isolation Precautions, phlebotomist must adhere to all isolation procedures.

Isolation procedures are accessible on skyline: Infection Prevention Control Skyline Page

How to Remove (Doff) Personal Protective Equipment

Questions regarding isolation procedures can be directed to the following contacts associated with each area – Click Here

BACK TO TABLE OF CONTENTS

Related Documents

Area Horizon Health Network Infection Control policies and procedures

Criminal code of Canada

Emergency Procedures

Fredericton Lab User Manual

HHN-SA-014 Consent to Treatment

HHN-IC-005 Hand Hygiene

HHN-CL-NU029 Peripheral Intravenous Therapy (PIV)

HHN-CL-NU031 Central Venous Access Device Intravenous Therapy

HHN-SA-009 Right to Refuse

HHN-SA-027 Patient / Client Identification

Infection Prevention Control Skyline Page

Miramichi Lab User Manual

Moncton Lab User Manual

Saint John Lab User Manual

www.maritimenewbornscreening.ca

HHN-PC-004 Deaf and Hard of Hearing Patients

HHN-IC-006 Disinfection of Non-Critical Patient Care Equipment Cleaning and Electronic Devices

https://www.childlife.org/files/ComfortMeasuresandTips.pdf

http://www.albertahealthservices.ca/assets/wf/lab/wf-lab-top-10-to-do-during-pediatirc-venipuncture.pdf

HHN-PC-022 Disclosure of Personal Health Informationf to Law Enforcement Officers

BACK TO TABLE OF CONTENTS

References

1. Accreditation Canada CSA Group. *Primary Sample Collection, Facilities and Medical Laboratories – Patient Safety and Quality of Care – Requirements for Collecting, Transporting and Storing Samples.* Z316.7-12, 2012.
2. BD Canada Product website: www.bd.com/ca/products/products.asp
3. Biomerieux (Adapted from Kellogg et al. Frequency of low-level bacteremia in children from birth to fifteen years of age.
4. Blood Collection Adverse Reactions and Patient Blood Volumes, Freemont Rideout Health Group(FRHG), Laboratory Services, CA, Version 4 :April 2011.
5. Capital Health. *Learning Module: Venipuncture for Blood Specimen Collection CC 85-079. Post Entry Level Competency for Healthcare Professionals Performing Venipunture.* July 2013.
6. Center for Phlebotomy Education:2008 *Blood Specimen Collection FAQ's.*
7. Center for Phlebotomy Education:2011 *Guide to Collecting Blood Samples During IV Starts.*
8. CLSI GP41, Collection of Diagnostic Venous Blood Specimens, Seventh Edition April 2017.
9. CLSI H04-A6:2008 *Procedures and Devices for the Collection of Diagnostic Capillary Blood Specimens; Approved Standard – Sixth Edition.*
10. CLSI H3-A6:2007 *Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard – Sixth Edition.*
11. CLSI M47-A:2007 *Principles and Procedures for Blood Cultures; Approved Guideline.*
12. CLSI NBS01-A6:2013 *Blood Collection on Filter Paper for Newborn Screening Programs; Approved Standard – Sixth Edition.*
13. Colorado Association for Continuing Medical Laboratory Education:1983 *Introduction to Phlebotomy.*
14. Criminal Code of Canada, Section 320
15. ERNST, Dennis J. *Applied Phlebotomy.* Lippincott Williams & Wilkins, 2005
16. ERNST, Dennis J. *Protect Yourself from Phlebotomy Related Lawsuits.* Conference, 2001
17. GARZA, Diana and BECAN-MCBRIDE, Kathleen. *Phlebotomy Handbook, 5th ed*, Appleton & Lange, 1999.
18. HALM, Margo A. and GLEAVES, Melissa. *Obtaining Blood Samples From Peripheral Intravenous Catheters: Best Practice?* Am J Crit Care 2009;18:474-478 doi10.4037/ajcc2009686
19. HHN-PC-022 Disclosure of Personal Health Information to Law Enforcement
20. Horizon Health Network Emergency Procedures, Staff Action Sheets Code Blue.
21. HOWIE, Stephen RC. *Blood sample volumes in child health research: review of safe limits* [online]. Available from: Bull World Health Organ 2011;89:46–53, www.who.int/bulletin/volumes/89/1/10-080010.pdf
22. Infusion Nursing Standards of Practice, Journal of Infusion Nursing, Supplement to January/February 2011, Volume 34, Number 1S; pages S77- S80.
23. Infusion Therapy Standards of Practice, Journal of Infusion Nursing, Supplement to January/February 2016, Volume 39, Number 1S; pages S85-S91.
24. Institute for Quality Management in Healthcare (IQMH) Requirements Version 6.0, 2013
25. J Clin Microbiol.2000; 38:2181-2185.
26. MCCALL, Ruth and TANKERSLEY, Cathee. *Phlebotomy Essentials 4th edition.* Lippincott Williams & Wilkins, 2008.
27. NB Extra Mural Program, Care Manual, Volume 2 Nursing II-L-057, Dec 2014.

28. PENDERGRAPH, Garland E. *Handbook of Phlebotomy, 2nd ed*. Lea & Febizer, Philadelphia, 1988.
29. PERRY, Anne Griffin and POTTER, Patricia A. *Clinical Nursing Skills & Techniques*, 7th ed. Mosby Eslevier, 2010.
30. Provincial Infectious Diseases Advisory Coommittee: Best Practices for Enviromental Cleaning for Prevention and Control of Infections in all Health Care Settings, 3rd Edition; April 2018, Appendix 8, pages 140-145.
31. Saint John Area Nursing Policy and Procedure Manual: I-B-20 Basic Life Support Training Policy
32. SLOCKBOWER, Jean M. and BLUMENFELD, Thomas A. *Collection and Handling of Laboratory Specimens - A Practical Guide.* JB Lippencott Company, 1983.
33. STIENE-MARTIN, E. Anne, LOTSPEICH-STEININGER, Cheryl A. & KOEPKE, John A. *Clinical Hematology Principles, Procedures, Correlations, Second Edition*. Lippincott, 1998
34. Stuart, J Ian MD FCCM, Validation of cleaning of single use tourniquets for reuse in an outpatient phlebotomy department. May 2017

BACK TO TABLE OF CONTENTS

Appendix A: Maximum Volume of Blood for Pediatric Patients

Patient's Weight		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)
Pounds	Kg		
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

References:

- Phlebotomy for Nurses and Nursing Personnel; Dennis J. Ernest MT (ASCP) and Catherine Ernest, RN;2001
- Phlebotomy Handbook, Blood Collection Essentials; Diana Graza & Kathleen Becan-McBride; 1999

BACK TO TABLE OF CONTENTS

Appendix B: Order of Draw Table for Collection of Blood Samples

Order	Description	Mixing	Picture
1	Blood Cultures 1. Aerobic 2. Anaerobic 3. Pediatric	**8-10x**	 Photo bioMérieux
2	Citrate tube - (**Blue**) ***Must be completely filled – use discard tube when using a winged collection set**	**3-4x**	
3	Citrate tube – ESR (Black)	**3-4x**	
4	Plain Serum Tubes (**Red**)	**5x**	
5	Serum tube with/without clot activator/gel (**Gold**)	**5x**	
6	Lithium Heparin with Gel, PST (**Green**) Heparin tube (**Green**)	**8-10x**	 
7	EDTA tube **Lavender** **Pink** **Royal Blue**	**8-10x**	  
8	Oxalate/Fluoride tube (Gray)	**8-10x**	
9	ACD (light **yellow**)	**3-4x**	
10	Blood Gas/Ionized Calcium 'Safe PICO' syringe	**8-10x**	

Vacutainer tubes are Courtesy and © Becton, Dickinson and Company.Reprinted with permission. HHN-0955

Appendix C. Order of Draw for Capillary Collection of Blood Samples

Order	Description	Mixing	Picture
1	Capillary Tube Blood Gas (Heparinized)	**2-3x using mixing flea and magnet**	
2	EDTA (**Lavender**)	**10x**	
3	Lithium Heparin - (**Green**)	**10x**	
4	Lithium Heparin and Gel for plasma separation	**10x**	
5	$NaFl/Na_2EDTA$ (**grey**)	**10x**	
6	Clot activator/gel for serum separation (**Gold**)	**5x**	
7	No additive (**Red**)	**0x**	
8	Filter paper	**0X**	

Microtainer tubes are Courtesy of © Becton, Dickinson and Company. Reprinted with permission. HHN-1011

BACK TO TABLE OF CONTENTS

Appendix D. Post Venipuncture Care

Soins à la suite d'une ponction veineuse

Suivez les étapes ci-dessous pour veiller à ce que votre site de ponction guérisse sans complications :

1. Laissez votre pansement sur le site de ponction pendant deux heures.
2. Utilisez temporairement le bras opposé pour transporter des objets.
3. Évitez de soulever ou de transporter des objets lourds pendant plusieurs heures.
4. Évitez toutes activités pouvant exercer une tension sur le site de ponction.

De légères contusions au site de ponction sont communes. Si vous remarquez un saignement ou une enflure appliquez une pression pendant au moins 15 minutes.

Les problèmes ci-dessous sont rares, mais ils peuvent survenir :

- Contusions importantes au site de ponction*
- Saignement au site de ponction*
- Enflure douloureuse*
- Inconfort
- Picotements ou engourdissement au niveau du bras

*En particulier si vous prenez un anticoagulant (médicament pour éclaircir le sang) ou si vous avez des troubles de saignement.

Si vous avez l'un ou l'autre de ces problèmes ou d'autres problèmes découlant du prélèvement, veuillez communiquer avec votre médecin de famille.

Post-Venipuncture Care

Follow these steps to ensure your puncture site heals without complications:

1. Leave the bandage on the site for 2 hours
2. Temporarily carry items with the opposite arm
3. Avoid lifting or carrying heavy objects for several hours
4. Avoid activities that may put stress on the puncture site

Minor bruising at the puncture site is not uncommon. If you notice bleeding of swelling at the site, apply pressure for at least 15 minutes.

These conditions are rare, but may occur:

- Significant bruising at the puncture site *
- Bleeding from the puncture site *
- Painful swelling *
- Discomfort
- Tingling or numbness in the limb

*especially if you are on blood thinner medication or have a bleeding disorder.

If you experience these or any other symptoms from the collection, please contact your family physician.

BACK TO TABLE OF CONTENTS

Appendix E Comfort Measures Techniques For Pediatric Patients

Create a connection first: Build trust – Get down to the child's eye level, ask something about the child. Using friendly positive approach, explain what is going to happen using age level appropriate language for the child, involve the parent as much as possible. In keeping a good environment and reducing anxiety, block noise from other patients or siblings.

Positioning the child: Create a sense of control and comfort. When a child lies on his back, he feels vulnerable. When the child sits in his parent's lap, he feels comforted and relaxed. Involve parents with specific instructions.

Babies	Toddlers	School-Age Children	Teenagers
Skin to skin contact*	Parent lap*	Sitting on chair or parent lap*	Offer choice of Positions*
Soothers, sucrose solution Breastfeeding*	Hugging/hand-holding*	Hand-holding with parent	Hand-holding with parent if requested

**Always keeping in mind patient safety & preventing phlebotomist injury.*

Distraction: What you don't notice may not hurt. Give children something to focus on and stay engaged. Introduce a distraction item. The most important factor is to provide non-procedural talk and redirect child to coping technique.

Toddlers	School-age Children	Teenagers
Interactive Toys	Deep Breathing	Deep Breathing
Blowing Bubbles	Blowing Bubbles	TV/Video Games
Light Wands	TV/Video Games	Music
Singing	Books	Books
	Counting	
	Singing	

Communication: Use simple language and positive language rather than negative. i.e. "Now is the time I need you to hold your hand very still" rather than "Don't move". Find better ways to phrase what you want to tell them. Listen carefully to the child, and be sensitive to their response to your language. Allow choice when appropriate: "Which arm should I look at first?" Reward and encourage positive behavior. i.e. "Those are great deep breaths that you are taking. Keep it up!" Phlebotomist should take cues: some children need minimal talking, others need more explanation. Phlebotomist assessment should always be respected.

Instead of saying:	Say:
It feels like a bee sting.	Tell me how it feels.
Be a big girl/boy.	When I count to three, blow the feeling away from your body.
Don't cry.	That was hard.

Praise and reward: If a reward or sticker was promised before the intervention, praise positive behavior and reward as promised.

BACK TO TABLE OF CONTENTS

End of Manual