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 5

Laboratory Medicine Program

November 14, 2025

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 integrity of the patient's veins 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 methods:

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

BACK TO TABLE OF CONTENTS

Glossary of Terms

Aliquot - a portion of a specimen taken from the original sample for diagnostic testing
Anticoagulant - an agent that is used to prevent the formation of blood clots. Anticoagulant may be present in blood collection tubes
Antecubital fossa – The area of transition between the anatomical arm and the forearm. It is located in a depression on the anterior surface of the elbow joint.
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 Prescriber - Physicians, Nurse Practitioners, and Hospital Pharmacists 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, e.g. Vacutainer®
CVAD – Central Venous Access Device
Consent – refer to HHN-SA-014. Consent to Treatment
Dead Space – as applied to needleless connectors, indicates space inside the housing where fluid can leak or be flushed into
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
HIS – Hospital information system
IGRA - Interferon-Gamma Release Assays (IGRAs) – Blood Tests for latent TB Infection; also called QuantiFERON©
IV - Intravenous
LPN – Licensed Practical Nurse
LUM – Laboratory User Manual: Region specfic
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 and collection from lines.
Phlebotomist – any healthcare professional trained to draw blood competently by venipuncture, capillary method or line collection
PICC – Peripherally Inserted Central Catheter
PPE - Personal Protective Equipment
RN – Registered Nurse
RRT - Registered Respiratory Therapist
TB – Tuberculosis
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

Whenever possible, blood must be collected from the opposite arm when an IV fluid (including transfused blood products) is being administered into a patient's arm.
When not possible, collections from the following sites is acceptable:

- Below the active IV site (distal), once IV is turned off for 2 minutes
- Above the active IV site (proximal), once IV is turned off for 5 minutes with a 5 mL discard tube collected first. This selection would be the last resort
- the foot
- same side as mastectomy

When one of the above sites are chosen lab staff must complete a LAB-1237-SC-18-F00003 Phlebotomy Deviation Form

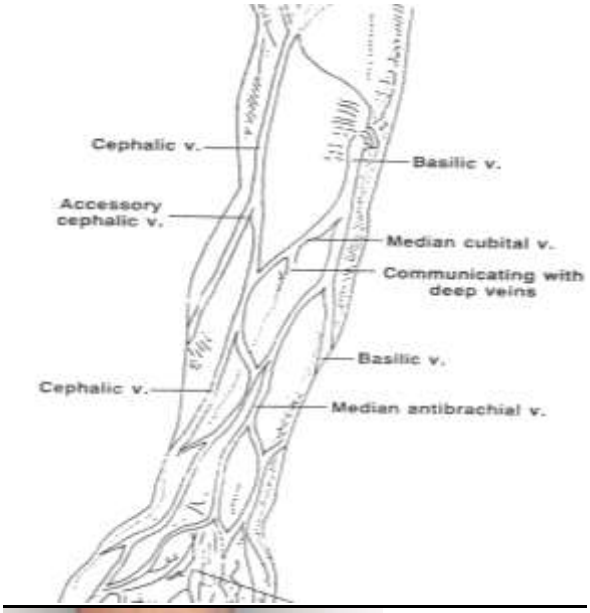
Venipuncture is **not** to be performed**:**

- 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 qualified personel e.g. RRT, nursing staff, physicians)

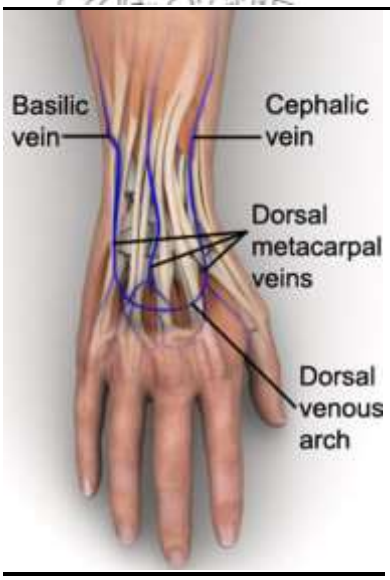
For Nursing ONLY: If collected proximal to an active IV site it must be documented on the tube label or the manual requisition and if possible, notify lab directly. Include the type of fluid running in the IV and the length of time the IV was stopped.

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.

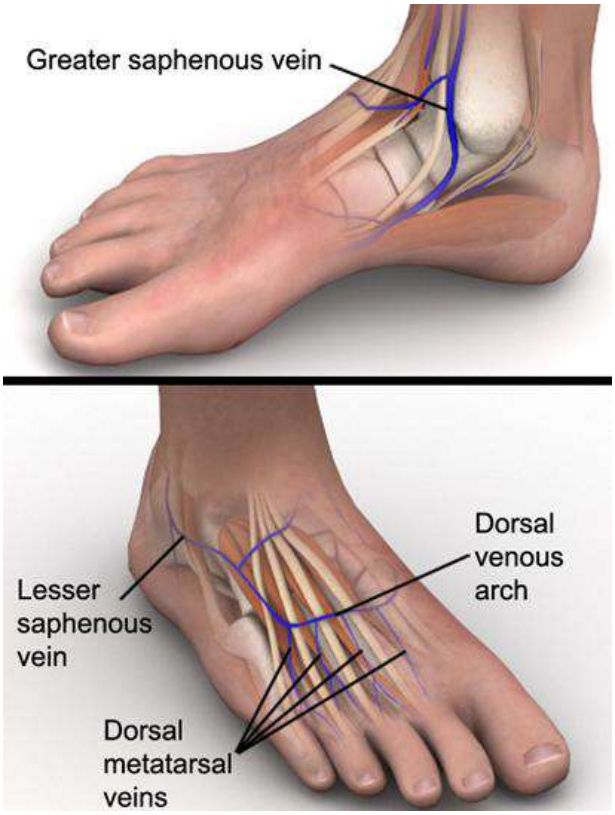


The most common sites for venipuncture are in the antecubital area of the arm, where the median cubital, cephalic and basilic veins lie close to the surface of the skin and are the most prominent.



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

Source – Todd W. Thomsen Copyright ©



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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 (Patient /client 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.

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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.

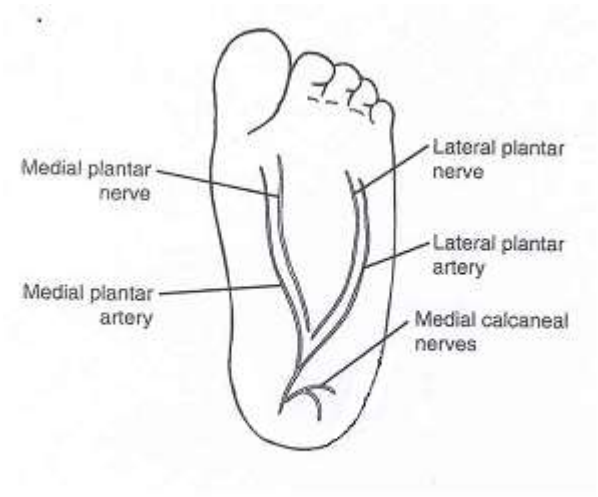


Diagram by Horizon Health Network 2016

Alternate view of heel – showing arteries and nerves

Finger Puncture (adult and children greater than or equal to 1 year):

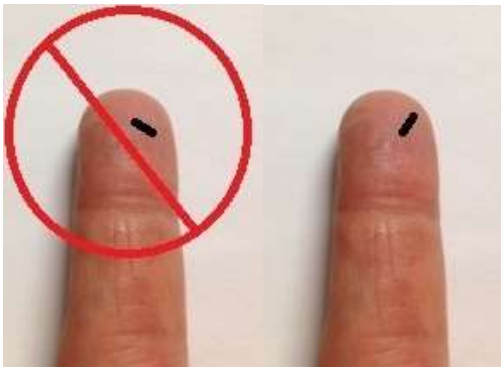
After 1 year of age a child's finger is the preferred site for puncture for capillary blood collection. Do not puncture the fingers of a newborn or infant less than one year old. The distance from the skin surface to the bone in the thickest portion of the last segment of each finger of newborns varies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

Refer to HHN-SA-027 Patient / Client Identification

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 the 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
      Refer to: Your New Brunswick Medicare Card (gnb.ca)
   B. Medical record/ Permanent Patient/Client Record Number (PPRN) / Chart number
   C. RCMP / Military
   D. Correctional Institute
   E. IFHP – Interim Federal Health Program
   F. 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 (patient with extensive burns, 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): [8]

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.

Patients/Clients with hearing or language support needs:

NOTE 1: 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.

NOTE 2: Languages

- Horizon corporate policy HHN-BD-003 Official Languages, provides services in both official languages in New Brunswick by active offer. This is made when patients and members of the public are greeted in both official languages at the first point of contact: Example: "Hello. Bonjour."
- ***Language Line Service*** is an over-the-phone interpretation service being used in Horizon facilities for multiple languages.

Instructions for using the Language Line Service

1. When receiving a call from a non-English caller, place the call on Conference Hold. When initiating the call, or for in-person communication, start at step 2.
2. Dial 1-866-874-3972
3. ENTER the client ID number: 258002
4. Press 1 for Arabic, or 2 for other languages. An interpreter will then be connected to the call.

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 evacuated tubes with rubber stoppers of various colours to indicate the type of additive present.

General supplies include the following:

- 10% povidone iodine [for ethanol (alcohol) or volatile screen/ethylene glycol collection]
- 70% isopropanol swabs
- 2% Chlorohexidine with 70% isopropanol 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)
- Safety needle as determined by venipuncture site:
    - straight needles 21g, 22g
    - butterfly, winged needle 21g, 23g, 25g (ultra thin wall)
- Biohazard sharps container
- Specimen bags (plastic)
- Specimen labels
- Tourniquet (latex free) (single use, or if multiple use must be cleaned between patients)
- 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 putting on gloves 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 should have a safety mechanism that must be 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 recommended sizes for adults are 21g-23g. The BD 25 gauge Ultra Touch Push Button Blood collection set has a ultra-thin wall five bevel cannula and are comparable to regular 23 gauge needles for hemolysis. This needle is used for pediatric patients or extremely difficult draws. 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. In extremely rare cases a 25g ultra thin needle can be used.

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 by reducing the risk of hemolysis.

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

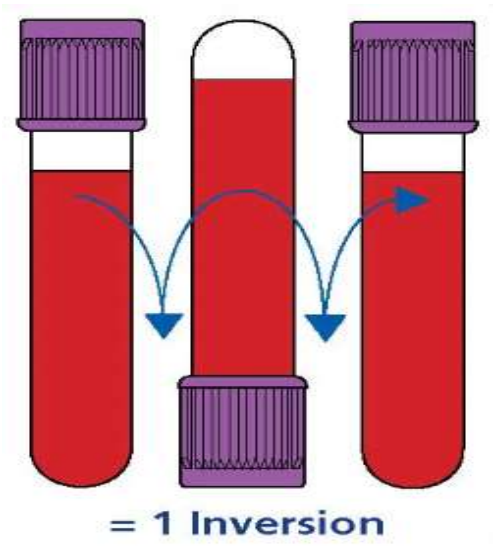
Venous blood collection tubes are sterile and may be plastic or glass and have an expiry date. Each comes with a colour- coded rubber stopper to identify the additive compound inside, which

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 veins, 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 automatically fill 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.



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

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 bottle 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 10 mL total), place the full specimen amount 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 designed for single use.
When reused, a tourniquet:

- must be cleaned and disinfected with a hospital approved disinfectant between all patients
- discarded 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, every zone must follow their IPC guidelines:

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 including arms 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
2. Green
3. Yellow
4. Purple

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 LAB-1237-SC-18-F00003 Phlebotomy Deviation Form. Nursing will document in 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. lidocaine) should only be used as a last resort. Examples of comfort measures can be found in Appendix E.

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, or if they indicate that they feel faint the phlebotomist will be proactive by taking any of the following actions:

- move the patient from a sitting position to a lying/reclined position
- ask patient/client to breathe deeply
- request the assistance of a co-worker to move patient/client to a secure position
- apply a cold wet towel to patient's/client's forehead and neck area
- ask patient/client if he/she would like juice or water
- remain with patient/client for up to 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:

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

For Lab ONLY:

1. If patient/client remains unresponsive, call: Stat medical assist.
2. If the patient/client regains consciousness but does not fully recover, call a STAT medical assistance code. Clinics outside of a hospital setting will call 911.
3. If patient/client is an inpatient activate the advanced care team (ACT)

4. Notify Phlebotomy Manager or delegate
5. 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:

- Ensure proper positioning of the needle in the vein.
- Remove/loosen tourniquet before removing needle and within one minute of application.
- Use major superficial veins.

Course of Action: If a hematoma begins to form:

1. immediately remove the tourniquet and needle
2. apply direct pressure to the puncture site for a minimum 2 minutes and reassess.
3. if bleeding continues past 5 minutes:
   a) recommend the out-patient/client go to the Emergency/Urgent Care Department, for inpatients notify patients nurse.
   b) 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:

1. if patient/client is sitting, have him/her lean forward and use a basin or trash can
2. if patient/client is lying down, turn his/her head to the side and provide a basin or trash can
3. provide patient/client with tissues or towels
4. apply cold compresses to patient's/client's forehead and neck area
5. be patient and compassionate, do not make patient/client feel that he/she is imposing on you, or taking too much of your time
6. **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:

1. remove needle
2. do not place anything in patient/clients mouth
3. protect patient/client from hitting their head or hurting themselves without restraining movements of patient/client extremities completely

for Lab ONLY:

call a STAT medical assistance code or Code Blue, depending on Area. For inpatients activate the ACT. Clinics outside of a hospital setting will call 911

4. 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:

- be knowledgeable about location of nerves in the anticubital area
- not enter the vein at an excessive angle of insertion
- 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:

1. immediately remove needle and perform venipuncture on a different site, preferably opposite arm
2. ask patient/client to wiggle fingers and move arm
3. apply ice if necessary
4. inform out-patient/client if pain persists seek medical assistance
5. If patient/client is an inpatient activate the advanced care team (ACT)
6. 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:

1. remove needle immediately
2. apply pressure for at least 10 minutes or longer until bleeding has stopped
3. apply ice if necessary
4. **for Lab ONLY**
   Call stat medical assist if bleeding persists for more than 10 minutes. Clinics outside of a hospital setting will call 911
5. inform patient/client that a bruise may occur
6. generate an incident report

7. 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:

1. inquire medication history/ bleeding disorder
2. continue to apply pressure until the bleeding stops
3. if bleeding continues for more than five (5) minutes recommend the out-patient/client go to the Emergency /Urgent Care Department
4. Notify patients nurse or charge nurse
5. Complete an incident report

9. Suspected Cardiac Arrest

1. Call Code Blue immediately. Clinics outside of a hospital setting will call 911.
2. 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.

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:

- 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
- not probe a collapsed vein
- immediately remove needle if a collapsed vein is suspected
- 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. Blood collection for patients with IV- Above/below IV – Whenever possible, blood must be collected from the opposite arm when an IV fluid (including transfused blood products) is being administered into a patient's arm. When not possible, collections from an arm in which fluids are being infused should be below (distal to) the infusion site. 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 and below an active IV site, (IV that is infusing), as specimen contamination is highly possible.**

Below (Distal)-

1. Turn off IV for at least 2 minutes and ensure that the flow has completely stopped before venipuncture. **Lab Personnel** will ask authorized person to turn off the IV infusion.
2. Place the Tourniquet between the IV site and the site of collection.
3. A discard tube is not required.
4. Document as follows:
   For Lab: 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.

1. Turn off IV for at least 5 minutes and ensure that the flow has completely stopped before venipuncture. **Lab Personnel** will ask authorized unit staff to turn off the IV infusion.
2. Place the Tourniquet between the IV site and the site of collection.
3. A 5ml discard tube is required prior to sample collection.

   For Nursing: If collected proximal to an active IV site it must be documented on the tube label or the manual requisition and if possible, notify lab directly. Include the type of fluid running in the IV and the length of time the IV was stopped.

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. Patient/Client with Diabetes:

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 tended 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 authorizer perscribers 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*:*

- 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.
- Never use a tourniquet on the arm of the side that has had a mastectomy.

Course of Action- Double Mastectomy*:*

- 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.
- The phlebotomist must have written permission from the Authorized Provider and patient/client will be informed of this process.
- Never use a tourniquet.

18. Obesity:

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

Course of Action:

- The phlebotomist will attempt venipuncture a maximum of two (2) times before asking for assistance, up to a maximum of four (4) total attempts per clinic visit.
- The phlebotomist will not probe excessively with the needle.
- 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 the phlebotomist will:

- recommend that they see their family physician or after hours clinic
- 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 wait to 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.

Common causes of error and their affects	
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	Tourniquet time >1 min leads to significant increase in hemolysis [35] 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 an area 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 • Leaving the tourniquet on for longer than one minute	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 **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. **Blood Cultures:** For adult patients, the blood volume collected is related to the pathogen yield [11] Positivity rate can drop by 28% for every mL a bottle is under-filled
• 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 **Examples:** Glucose, LDH, Troponin, Potassium, etc 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 may contain medications, electrolytes, donor blood, glucose and/or other fluids grossly affecting laboratory results
• Collection of blood above (proximal) an intravenous (IV) site • intravenous (IV) site that has not been turned off for a minimum of five minutes • No collection of 5 ml discard tube	• 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 may contain medications, electrolytes, donor blood, glucose and/or other fluids grossly affecting laboratory results
• 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 • 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 in children or infants. Consult with caregiver before proceeding with collection.	May adversely affect the concentration of some constituents (e.g., leukocyte count).

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 LAB-1237-SC-18-00003 Phlebotomy Deviation Policy:

- 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 (Does not require Ordering Provider approval)

Materials:

- Phlebotomy Deviation form LAB-1237-SC-18-F00003 Phlebotomy Deviation Form.
- 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:
   - Date/ Time of Deviation
   - Deviation location
   - Phlebotomist Name or ID
   - Patient/client name (First and Last)
   - Patient/client Identification #
4. Select the appropriate deviation type
5. Add any additional comments as required
6. Have ordering provider sign the deviation form. Authorization can be given verbally and documented as such.
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 and Winged Butterfly Set

REAGENTS/SUPPLIES/INSTRUMENTATION*:*

- Blood tube
- Blood tube holder
- Multisample needles:
    - 20G, 21G, 22G or,
    - Winged infusion blood collection sets, 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 with a regular 23 gauge needle.

- Alcohol preps (70% isopropanol) or approve disinfectent
- Gauze
- Tourniquet
- Appropriate tape or bandage
- Gloves
- Biohazard sharps container
- Syringe as required (also including transfer device)

PROCEDURE:

1. Patient/client must have approved order for tests to be drawn. Authorized prescriber full name must be on requisition either signature or stamp are acceptable.
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).
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 compliance with any required pre-test preparation (example: fasting, dietary restrictions or other specific instructions related to 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. Inquire and/or determine which site is appropriate. Clean hands and apply gloves.
9. 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.
10. Position selected arm, apply tourniquet and encourage patient/client to close his/her hand if

possible. Reinforce NO hand pumping.

11. 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.
12. 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 Pico syringe:
    i. Ensure sterility of the syringe
    ii. Pump plunger to ensure it moves freely and push all air out of syringe before beginning venipunture
    iii. Remove the plastic cap if not already removed by manufacture
    iv. Place end of the syringe directly in the tube holder, the tip of the syringe will fit nicely on the end of the needle.

    To attach a tube holder:
    i. Thread luer adapter of the winged infusion needle to tube holder

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) Meditech# 6169311 Swabstick clear 2%CHG No alcohol. Primary Vendor A007995 Cardinal Health Canada . 3M Canada INC. 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 tube 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 collection.
    NOTE: When using winged infusion set (butterfly) and the first sample is a sodium citrate (blue tube/ESR tube), a sodium citrate discard tube or a discard tube (non additive) 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 tube system, tubes should be placed in clean sealable bag at bedside. Follow local area policies for operation of the PTS and appropriate packing instructions.
    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 bleeding has stopped completely prior to patients leaving.
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

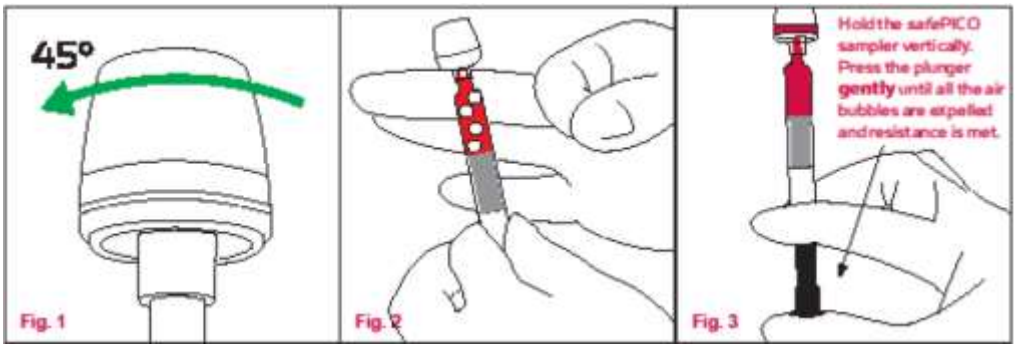
Contraindications/Limitations/Sources of Variability:

- 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

Venous Blood Gas Collection by safePICO 50 syringe after vacutainer collection:
After the final tube is drawn, prior to removing needle:

1. Remove the safePICO syringe TIPCAP and place on the end of the needle.
2. Gently withdraw sample (Minimum sample volume is 1 mL).
3. Remove safePICO syringe.
4. Remove needle from patient and apply pressure with gauze, following remainder of steps below.
5. To cap the safePICO syringe, push downward on the TIPCAP and twist 45 degrees.
6. Hold sample vertically and tap to remove air bubbles.
7. While holding vertically, press the plunger gently until all air bubbles are expelled and resistance has been met. Make sure the chamber at the bottom of the TIPCAP is completely filled with blood.
8. Mix the sample by inverting the PICO syringe several times, you may also roll in your hand gently.



Venous blood gas collection using a syringe:

1. 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.
2. Place gauze over puncture site and activate the safety mechanism if applicable
3. Hold pressure on venipuncture site, or instruct patient to do so.
4. 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.
5. Dispose of butterfly and syringe in sharps container.
6. Ensure bleeding has stopped.
7. 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.
8. Label tubes immediately in presence of patient.
9. Remove all equipment that was brought to patient's bedside.
10. Remove gloves and perform hand hygiene.
11. Send properly labeled tubes to appropriate laboratory section as per local area policy.

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 to 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.
- **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
  - BD Microtainer™ Contact Activated Lancet comes in different sizes depending on the depth required.
- Microtainers™ – appropriate for testing
- Capillary tube(s)**,** 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 E 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 peripheral intravenous catheters (PIVs) is not recommended. This method of blood collection should be used only when no other venous access is available. PIVs should not be initiated for the purpose of blood sampling. Obtaining blood cultures from PIVs at insertion or during 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

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
- Biohazard 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 5 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.

Access peripheral intravenous catheter according to HHN-CL-NU029 Peripheral Intravenous (PIV) / Midline Catheters and Infusion Therapy.

NOTE: Larger veins are recommended to reduce the possibility of vein collapse. The antecubital fossa is not recommended as an insertion site except in emergency situations due to increased risk of catheter failure and phlebitis from catheter in vessel movement.

1. Obtain appropriate blood collection equipment, requisition, and labels.
2. Perform hand hygiene
3. Position patient/client and assess saline lock site for any signs or symptoms of potential complications such as site reddened, swollen, phlebitis, pain.
4. Assess site prior to each specimen collection via saline lock and/or when patient/client reports discomfort.
5. Perform hand hygiene.
6. Apply clean non-sterile disposable gloves.
7. Cleanse top of saline lock using 2% chlorihexidine gluconate with 70% isopropyl alcohol. Allow cleaning agent to dry completely (minimum 2 minutes).
8. Apply tourniquet 10-15 cms above antecubital fossa.
9. Break seal on plunger of syringe before use.
10. Attach syringe to needleless connector (saline lock). Ensure a tight Luer-Lok connection with syringe.
11. Slowly pull back on plunger until 1- 2ml of blood has been drawn into the syringe. Remove syringe from saline lock and discard.
12. 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).
13. 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.
14. 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.
15. 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.
16. Label tubes in presence of patient/client.
17. Dispose of sharps in appropriate sharps container.
18. Send labelled tubes to laboratory in a timely manner, observing special handling requirements as applicable.
19. Remove gloves.
20. 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. Coagulation studies must be completely filled.
- 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 Collection in Patients on Total Parenteral Nutrition (TPN)

Total parenteral nutrition is a method of feeding that bypasses the gastrointestinal tract. Fluids are given into a vein to provide most of the nutrients the body needs. The solution can contain a mixture of protein, carbohydrates, glucose, fat vitamins and minerals using vascular access devices.

NOTE: Blood specimen collection from a PN line occurs only as a last resort with AP order when no other access is available and/or can be attained."

Collection of Blood for Adults on PN

General Procedure Comments:

- Avoid drawing blood from catheter lumen used for parenteral nutrition (PN).
- Drawing from lumen requires flush and discard twice the dead-space volume of the vascular-access device(VAD)
- If not possible to use a different lumen (e.g. single lumen).Venipuncture is best collection

Venipuncture Collection:

- Draw after discontinuing TPN for 2-3 min (see exceptions below). Select extremity opposite to infusion. If not possible choose vein below VAD.
- Refer to the Regional Phlebotomy Manual, section Site Selection and Complications/ Special Considerations for details.

Catheter Collection

- Draw after discontinuance of PN for 2- 3 min (see exceptions below)
- When drawing samples from a CVAD follow instructions as outlined in HHN CL NU031 Central Venous Access Device Intravenous Therapy

Exceptions for specific laboratory tests:

- Triglyceride, cholesterol: draw 4 hours after discontinuance of PN (to approach a fasting state)
- Calcium, magnesium, phosphorus: draw 1-4 hours after TPN is discontinued.
- Tests for Therapeutic drug monitoring (TDM): use lumen not being used for specific drug administration.
- Venipuncture is best collection

Reference:

Karon B.S., Answering your questions MLO October 1st, 2011
National Guidelines - 2019 (cvaa.info)

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
- Gloves
- Blood culture tube holder
- Blood culture bottles as required for the order:
  - Aerobic Bottle
  - Anaerobic Bottle
  - Pediatric Aerobic Bottle
  - Mycobacterium/Fungus (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:

For Nursing: 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). 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 70% alcohol. Use a fresh alcohol prep 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 hemoconcentration.
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 (i.e. 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 the tubing 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. Mix by gentle inversion 4 to 5 times.
17. Draw the second blood culture set from the same site unless endocarditis is suspected. If endocarditis is suspected, draw the second blood culture set from a different site.
18. 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.
19. Apply pressure to site (this can be performed by patient/client if possible).
20. 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.

21. 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.
22. Ensure bleeding has stopped.
23. 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.
24. Remove gloves and perform hand hygiene.
25. Status the samples as collected in the HIS system.
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. Collection from one site is acceptable unless endocarditis is suspected then two separate collections is recommended.
- 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; if patients condition allows, 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 intravenous 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

Refer to HHN-PC-024 Assistance to Peace Officers in Collecting Blood Samples for complete details. An authorized prescriber's order to collect the blood samples is not required and the person does not need to be registered as a patient except in circumstances listed in the policy.

Law enforcement is responsible to provide the Blood Sample Collection Kit and the Certificate of a Qualified Medical Practitioners or Qualified Technician Province of New Brunswick form. In situations where this is not provided, a blood sample is **NOT** to be collected and the Area Duty Officer is to be contacted to consult with the law enforcement agency.
NOTE: 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 the Area Duty Officer in an expeditious manner.

The priority is to provide life-saving health care to the patient and the collection of the forensic blood is secondary.

The following health professionals are designated as qualified to collect blood samples for legal purposes:

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

NOTE: Phlebotomists who do not have any of the above credentials are not to proceed with the collection.

The following process must be followed:

1. Express verbal 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. Patient identification must be obtained by following the patient/client identification process.
3. Blood may be taken from an unconscious patient if a warrant issued by a judge is provided.
4. 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.
5. A **Blood Sample Collection Kit** will be provided by the law enforcement agent
6. Inspect all equipment to be used for acceptability. If kit is out of date inform the law enforcement officer, they will indicate if they wish to proceed with the collection, document on the patients chart "tubes expired, proceeded with law enforcement approval"
7. While collecting, ensure that the law enforcement agent is present for venipuncture.
8. Follow instructions provided within the **Blood Sample Collection Kit.**
9. When venipuncture is complete, ensure that all labels for blood samples are completed and accurately labelled.

10. Hand specimen(s) to the law enforcement agent and observe while they place security seals over stoppers and place vial(s) in appropriate bag.
11. Samples are not entered into the HIS system as they are not processed on site.
12. Complete the “Certificate of Qualified Technician” form provided by law enforcement agent, make a copy and place in patient’s/client’s chart.
13. Document all actions in the progress notes of patient’s/client’s health record.(Nursing Only)

    Note: If patient was not seeking medical treatment they will not have an arm band, proceed as you would in an outpatient setting. If patient does not have identification have the law enforcement officer confirm the patients identity prior to collection.

BACK TO TABLE OF CONTENTS

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

Personal Protective Equip Donning and Doffing

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

LAB-1237-SC-18-F00003 Phlebotomy Deviation Form.docx

HHN-CL-NU029.Peripheral Intravenous Therapy (PIV)/Midline Catheters and Infusion Therapy

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

HHN-PC-024 Assistance to Peace Officers in Collecting Blood Samples

BACK TO TABLE OF CONTENTS

References

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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

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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 4. Mycolytic (obtain from microbiology)	**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 (not used in Zone 2) (**Green**) Heparin tube (**Green**) Barricor tube (**Green**)	**8-10x**	
7	EDTA tube **Lavender** **Pink** **Royal Blue**	**8-10x**	
8	Oxalate/Fluoride tube (Grey)	**8-10x**	
9	ACD (light **yellow**)	**3-4x**	
10	Blood Gas/Ionized Calcium 'Safe PICO' syringe	**8-10x**	

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	Post-Venipuncture Care
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 15minutes. 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.	Follow these steps to ensure your puncture site heals without complications: 1. Leave the bandage on the site for 15 minutes 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
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.	**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.**
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.**	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