



Providence Care Hospital

VENIPUNCTURE LEARNING GUIDE

This manual has been reviewed and approved for use by Dr Y. Michael Chan, Laboratory Director, Providence Care Hospital.

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Approved by:	Dr. Y. M Chan, Laboratory Director	Revised:	June 1, 2018
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Foreword

This document establishes criteria for the accurate specimen collection by venipuncture. Proper specimen collection and handling are of the utmost importance because significant errors occur in the pre-analytical phase of laboratory testing.

The errors that can occur during the collection and handling of blood specimens are potentially numerous (e.g. inaccurate identification of client, incorrect order of draw, incorrect use of additives tube, specimen hemolysis, labeling errors, hemoconcentration). Standard procedures and protocols are intended to prevent these problems and protect result quality.

At Providence Care Hospital only trained Laboratory staff and certified nurses may perform phlebotomy.

Routine Practices

Since it is impossible to know what might be infectious, all specimens are to be treated as infectious and handled according to 'routine practices'.

INTRODUCTION

1.0 Purpose of the Venipuncture Learning Guide

This learning guide provides theoretical information related to the skill of venipuncture (also known as phlebotomy). It explains the certification process and the venipuncture procedure and is used in conjunction with an instructional class to train nurses and laboratory staff.

1.1 Certification Process

Nurses and laboratory staff certified in this procedure may perform venipuncture.

The certification process includes:

- Review the Venipuncture Learning Guide
- Attendance in an instructional class on venipuncture policy and procedure
- Observe venipuncture demonstration by laboratory staff on a client.
- Return demonstration to the laboratory staff or delegate of three successful venipunctures.
- Successful completion of the venipuncture certification test (achieving a minimum a mark of 80%)

If the nurse/laboratory staff can prove they have been certified previously elsewhere and has practiced venipuncture within the last three (3) years the laboratory staff may waive the requirement for a total of three return demonstrations. However, the nurse/laboratory staff will be expected to attend an instructional class, successfully complete the venipuncture test, and demonstrate a successful venipuncture.

Annual recertification is not required unless the nurse/laboratory staff or their Manager identifies a need for review.

Note: Baccalaureate nursing students may perform venipuncture when all the following conditions are met:

- The student attends an instructional class on venipuncture policy and procedure.
- The added nursing skill is commonly practiced by the RNs in the assigned clinical unit.
- The student is in their consolidation experience at the end of their educational program and is under **direct** supervision of the certified Registered Nurse (RN) preceptor/delegate while performing venipuncture.
- The student completes a written test with a score of 80% or greater.

Note: This process will not certify the student for these interventions. While consolidating students may perform the interventions under certain conditions, only nurses employed by PCH are eligible for certification.

1.2 Expected Competencies for the Learner

- Complete the certification test scoring 80% or greater.
- Demonstrate location of the PCH policy and procedure regarding blood specimen collection and venipuncture.
- Demonstrate principals of routine practices.
- Perform positive client identification.
- Demonstrate the correct procedure for:
 - equipment selection
 - Distension/vasodilation of the vein
 - Preparation of venipuncture site
- Perform venipuncture.
- Understanding the correct procedure for collection and accessioning specimens in the electronic patient record (ePR).
- Demonstrate the procedure for packaging and transporting specimens to the laboratory.

2.0 Venipuncture Procedure

2.1 Preferred Veins

The upper extremities are the preferred sites for venipuncture. The ideal veins for venipuncture are located in the antecubital fossa, i.e. the inner aspect of the elbow joint. In the antecubital fossa, the median cubital and cephalic veins are usually easily accessible. Due to the proximity of the basilic vein to the brachial artery and the median nerve, this vein should only be considered if no other vein is more prominent. Another suitable site for venipuncture is the dorsum (back) of the hand, where the metacarpal veins and the dorsal venous arch are located. Venipuncture in this area is more painful as it contains smaller and more fragile veins. Therefore, use a smaller gauge needle, i.e. the push button 23G blood collection set (butterfly). Veins on the underside of the wrist should not be used. (See Figure 1)

2.2 Factors in Site Selection

Specimens collected through an area with hematoma may cause erroneous test results. Phlebotomy must not be performed on any size hematoma. If another venous site is not available, the specimen is collected distal to the hematoma. After numerous venipunctures and intravenous (IV) administration, these areas may become thrombosed and scarred. As a result, the veins in this area may feel ‘cord-like’ or may lack dimension when palpated. In this case, select an alternate site.

Never use an arm that has a fistula or arteriovenous shunt for dialysis. Drawing blood from the side on which a mastectomy was performed should be avoided because of the potential for complications due to lymphostasis.

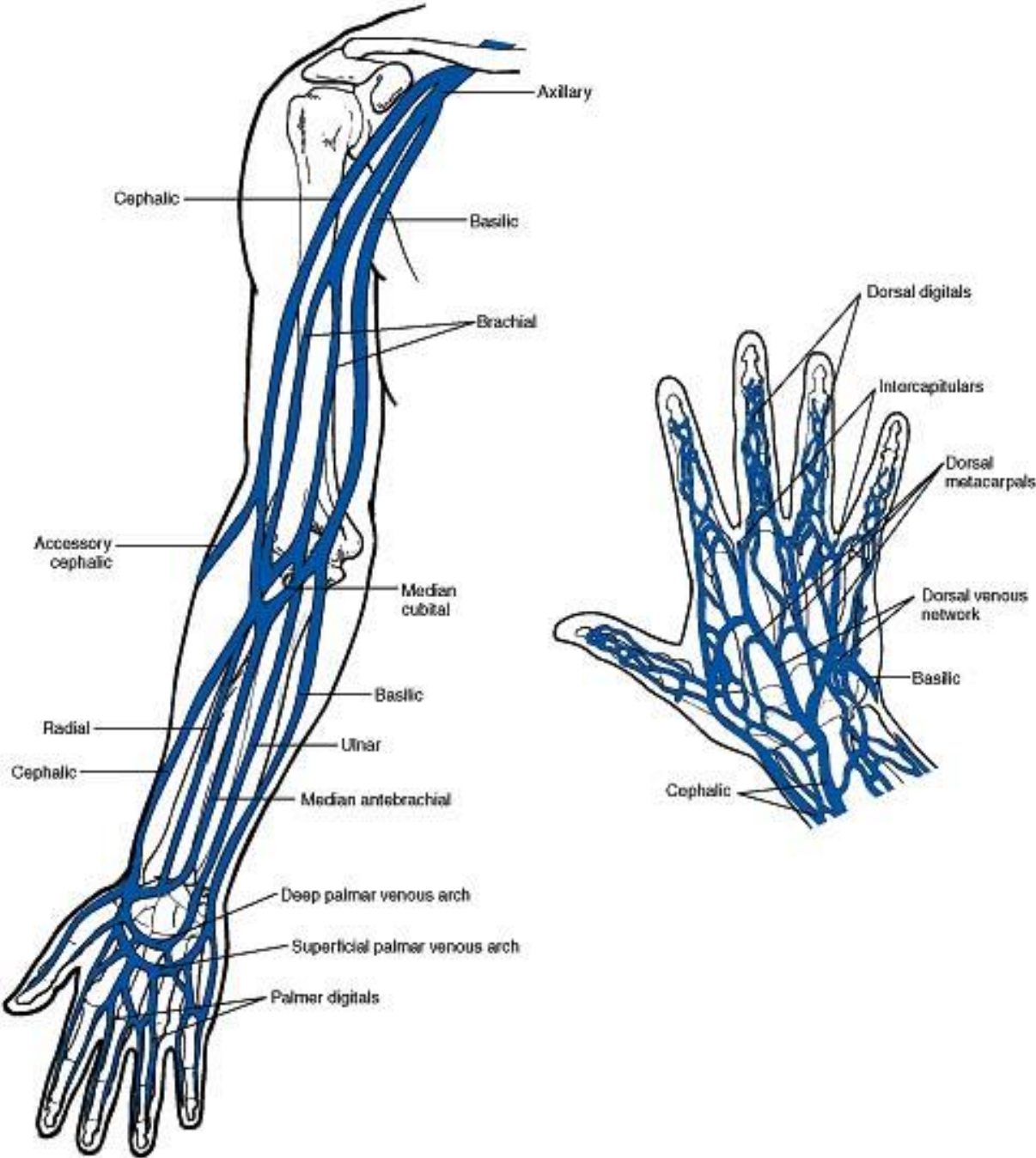
The vein you select for venipuncture ideally should have several qualities:

- dimension or bounce when palpated, not flat
- softness, avoid veins that feel ‘cord-like’
- located in limb opposite to existing IV site (if there is no appropriate vein in the opposite limb, then the venipuncture site may be the same limb but below the IV site)
- free of hematoma, swelling, redness and/or warmth

If possible, limbs being used for IV therapy should not be used for venipuncture. If there are no other veins, except those being used for IV therapy, venipuncture may be performed:

- distal (preferred) or proximal to the IV site, when the venipuncture is distal to the IV site apply the tourniquet between the IV and the venipuncture site the IV infusion must be turned off completely for a least two (2) minutes before the venipuncture, and until the venipuncture is complete.

Figure 1



2.3 Equipment

The choice of equipment used for venipuncture is based upon the vein selected and the blood tests ordered.

Equipment list:

- Vacutainer blood collection system (See Figure 2 and Figure 3)
- Blood collection tube/blood culture bottles
- Gloves
- Alcohol swabs and 2% Chlorhexidine swab if collecting blood cultures
- Gauze pads
- Non-latex single use tourniquet
- Sharps biohazard container
- Client specimen collection labels (ePR labels)
- Biohazard specimen bag
- Ice slurry or cold pack, if indicated
- Foil to protect from light, if indicated

The Vacutainer Blood Collection System

The vacutainer blood collection system consists of a needle holder, a needle that has an attached safety shield, or a push button collection set (butterfly).

The vacutainer blood collection system consists of a needle holder, a needle, which has an attached safety shield or a push button collection set (butterfly). The 23G blood collection set (butterfly) is often used for smaller veins and veins located in the hand and lower limbs. User preference may also dictate the use of this set, since it shows visible blood return, which allows the nurse to confirm placement in the vein.

Blood cultures must be collected with either the 21G for good-sized veins or the 23G set for small veins.

Note: A discard tube must be drawn prior to a coagulation tube (blue) or any test that is sensitive to gas exchange/air exposure (e.g. ionized calcium, venous gas) if using a butterfly blood collection set. The discard tube is used to fill the blood collection tubing dead space, and thus ensure the tube fills to the proper level. The discard tube does not need to be completely filled and can be a non-additive tube (red top) or a blue coagulation tube.

Figure 2

BD Eclipse™ Blood Collection System with BD Vacutainer™ One Use Holder

Needle-Based Safety

Needle is always bevel up toward the pink safety shield

Same BD PrecisionGlide™ needle quality and sharpness

Safety shield is an “integral” part of the needle

Thumb pad for easy, one-handed activation

Pre-load line

Engraved text to help drive compliance

Instructions for Use

Holding both pink shield and green cap, twist and remove white cap.

While holding the needle firmly, screw holder onto needle until it fits securely.

(a) Rotate pink safety shield back toward the holder.
(b) Twist and pull green needle cap straight off.

Perform venipuncture according to your facility's established procedures.

Immediately after removing needle from vein, cover needle by pushing pink safety shield forward with thumb. An audible click may be heard. Lock into place and inspect. **DO NOT** attempt to engage shield by pressing against hard surface.

DO NOT remove needle from holder. Dispose of the needle and holder as one unit into nearest sharps container. **DO NOT REUSE.**

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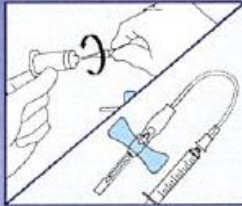



Figure 3

BD Vacutainer® Push Button Blood Collection Set

BD Vacutainer® Push Button Blood Collection Set

In-Vein Needle Activation at the Push of a Button

General Use and Disposal (See package insert for detailed directions for use.)

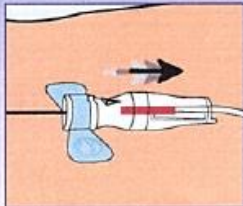
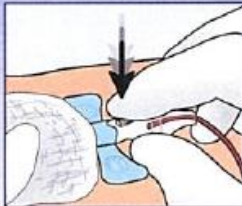
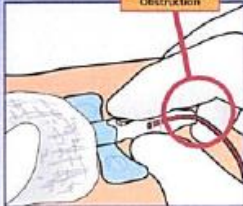

1a. Peel back packaging at arrow so that the back end of the wing set is exposed.

1b. With thumb and middle finger, grasp the rear barrel of the wing set and remove from package. Be careful to avoid activating the button.

2. CAUTION - Never use a blood collection set without a holder or syringe attached.
 Assemble to BD Vacutainer® One Use Holder or BD Syringe.

3a. With thumb and index finger, grasp the wings together and access vein using standard needle insertion technique.

3b. If preferred by your institution, the body of the device can be held, instead of the wings, during insertion.

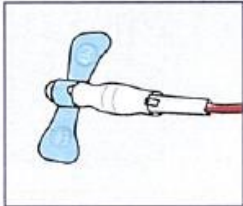
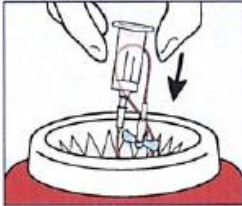





4. Proper access to the vein will be indicated by the presence of "flash" directly behind and below the button.

5a. The device is designed to be activated while the needle is still in the patient's vein. Place your gauze pad or cotton ball on the venipuncture site. Allow gauze pad or cotton ball to cover nose of front barrel. Following the collection procedure, and while the needle is still in the vein, grasp the body with the thumb and middle finger. Activate the button with the tip of the index finger.

5b. To ensure complete and immediate retraction of device, make sure to keep fingers and hands away from the end of the blood collection set during retraction. Do not impede retraction.

6. Apply pressure to the venipuncture site in accordance with your facility's protocol.

7. Confirm that the needle is in the shielded position prior to disposal.

8. Discard the entire shielded blood collection set and holder into an approved sharps disposal container.

Ordering Information

BD Vacutainer® Push Button Blood Collection Sets						
Facility Reference Number	BD Reference Number	Needle Gauge	Wing Color	Subing Length	Configuration	Packaging
	367336	21	Green	7"	with luer	50/Box, 200/Case
	367344	21	Green	12"	with luer	50/Box, 200/Case
	367326	21	Green	12"	without luer	50/Box, 200/Case
	367336	23	Blue	7"	with luer	50/Box, 200/Case
	367342	23	Blue	12"	with luer	50/Box, 200/Case
	367324	23	Blue	12"	without luer	50/Box, 200/Case
	367381	25	Blue	12"	with luer	50/Box, 200/Case
	367323	25	Blue	12"	without luer	50/Box, 200/Case
	367335	25	Blue	7"	with luer	50/Box, 200/Case

BD Vacutainer® One Use Holder			
Facility Reference Number	BD Reference Number	Description	Packaging
	364815	One Use Holder	250/Bag, 1,000/Case

2.4 Application of Tourniquet and Vein Selection

It is usually necessary to apply a latex-free tourniquet to find a suitable vein. The application of the tourniquet 3 to 4 inches above the chosen site allows adequate distension of the vein.

To help increase venous blood flow, the following methods are sometimes useful prior to applying a tourniquet:

- Massage arm from wrist to elbow
- Lower the appropriate limb
- Apply heat (i.e. warm cloth or blanket)
- Instruct the client to close their hand firmly

Apply the tourniquet lightly to constrict venous return while still maintaining the arterial flow to the area. Leave one finger under the tourniquet as you tighten to support judgement whether the tourniquet has been applied too tightly or too loosely. Instruct the client to close their hand; the veins become more prominent and easier to enter when the patient forms a fist. To locate veins, palpate and trace the path of veins several times with the index finger.

Select the vein carefully for blood collection because the veins also provide an avenue of entry for transfusion, infusion and therapeutic medications. Since the brachial artery passes through the antecubital area, caution must be exercised to avoid the artery. If, during the procedure, arterial puncture is suspected, direct forceful pressure must be applied to the puncture site until active bleeding has ceased. The physician should be notified immediately and a SafetE-Net report completed.

2.5 Performing Venipuncture Procedure

1. Prepare equipment, blood tubes, and specimen collection labels.
 - Check to ensure that all labels are legible and complete.
 - Determine time if timed blood work is ordered.
 - Select appropriate tubes according to test requests and have them easily available in the correct order of draw. (Refer to Specimen Collection for Nursing Policy and Procedure Manual.)
2. Verify correct client using two client identifiers. (Refer to Policy CLIN-PD-18 ‘Client Identification’)
3. Explain the procedure to the client and reassure them. Position the client comfortably, providing support for the arm. Place client’s arm in a downward position to prevent possibility of a backflow.
4. Perform hand hygiene and apply gloves.
5. Select vein site, asking the client to close their hand if required. Apply the tourniquet 3 to 4 inches above the site selected.

Note: Do not have them open and close their hand repeatedly. Vigorous pumping during venipuncture can cause changes in the concentration of certain analytes in the blood and therefore should be avoided. If the client has a skin problem, the tourniquet should be applied over the client’s gown or other material so that the skin is not pinched or torn.

6. Cleanse the venipuncture site with 70% alcohol with a circular motion from the center to the periphery. Allow enough time for the site to air dry.

Note: This prevents a burning sensation when the venipuncture is performed and prevents hemolysis of the specimen. If the vein must be touched again, the site should be cleansed again.

7. Hold skin taut below the venipuncture site to anchor the vein.
8. Grasp the needle holder close to the needle end and, with the safety shield pointed up. Puncture the vein with the needle at an angle of insertion of 30 degrees or less. (See Figure 4). Keeping the needle as stable as possible in the vein; push the first tube onto the needle. If the needle is in the vein, blood will flow immediately into the tube. Once blood flow begins request the client open their hand.
9. Allow the tube to fill until the vacuum is exhausted and flow ceases.
10. Release the tourniquet as soon as possible after blood flow is established.

Note: Never apply the tourniquet for longer than one minute as localized stasis with hemoconcentration and infiltration of blood into tissue can occur. This will result in erroneously high values for all protein based analytes, packed cell volume and other cellular elements.

Holding the needle/holder securely remove the tube from the needle/holder. The sleeve recovers the needlepoint that pierces the tube closure, stopping blood flow until the next tube is inserted. Immediately after removing tube, gently mix the blood by gently inverting the tube 5 to 10 times. If additional specimens are required insert the next tube and repeat the collection procedure. (Refer to the Specimen Collection Manual for Nursing for Order of Draw).

11. Remove the last tube from the holder before removing the needle from the client's arm.
12. Apply gauze to the insertion site before removing/retracting needle from vein. Cover the needle by pushing pink safety shield forward with thumb until an audible click is heard. If using the Push Button Blood Collection set, push the button to retract the needle into the body of the device.
13. Immediately apply continuous pressure to the site until active bleeding has ceased; then apply paper tape to hold the gauze in place.
14. Dispose of needle and holder directly into sharps container.
15. Label all blood tubes with specimen collection (ePR) labels. Document specimen electronically in ePR by going into the specimen collection tab/shortcut. Verify that the client name on the collection label matches the name in ePR. If the blood collection takes place outside of PCH laboratory hours of operation, the specimen must be 'after hours' accessioned in ePR and the accession (Kingston Health Sciences Centre (KHSC)/ Sunquest) label applied to the blood tubes. Refer to Specimen Collection for Nursing Policy and Procedure Manual for after-hours accessioning instructions.
16. Place blood tubes in biohazard bag and arrange for transport to the laboratory. If after hours, send specimen directly to KHSC Core Lab. Refer to Specimen Collection for Nursing Policy and Procedure Manual for afterhours transportation instructions

Note: A maximum of two (2) attempts by one nurse/laboratory staff to successfully perform venipuncture may be attempted on a client. If not successful after two attempts, defer obtaining the blood sample to another authorized staff member. Subsequently, there must be consideration as to whether appropriate venipuncture sites have been exhausted, and whether the physician should be notified before subjecting the client to further attempts.

Figure 4

Correct angle of Needle Insertion

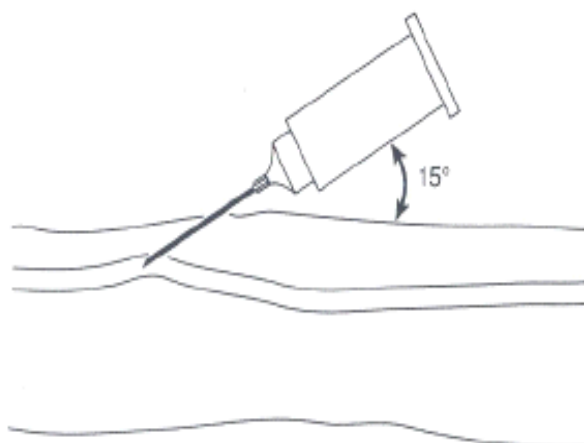


Figure 4.8 *Proper position of needle entering vein.*

(Pfeiler, 2010)

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3.0 Blood Culture Collection Procedure

It is important to follow strict aseptic technique when collecting blood cultures so that normal skin organisms are not introduced in the culture bottles. Many organisms grow on the skin and therefore can be introduced through venipuncture into the blood culture bottles. The introduction of only one organism into a bottle will result in the blood culture being regarded as positive.

Blood cultures should be drawn prior to the initiation of antimicrobial therapy. If the client is on antimicrobials, the blood sample should be drawn just before the next dose is due. Collect two blood culture sets (two bottles per set) for a total of four bottles. This includes one aerobic and one anaerobic from one site and one aerobic and anaerobic from a different site.

Ten (10) mL should be drawn into each bottle. Before collection, mark on each bottle where the 10 mL fill line will be and fill **only** to this level.

Note: Overfilling the bottles may cause false positive readings. If additional blood is required for other tests, it must be collected after the blood cultures.

For clients with a Central Venous Access Device (CVAD) the nurse will require three (3) sets of blood cultures. Collect one set by peripheral venipuncture, one set from the CVAD, and a **third** set from a **different peripheral venipuncture site**. When collecting specimen in ePR record that the specimen was drawn from a CVAD. Refer to Specimen Collection Manual for Nursing for detailed instructions for collection for blood cultures.

Note: If the client has a hemodialysis line, notify the dialysis unit as they will need to obtain the blood culture from that line.

Take the following items to the client’s bedside:

- Tourniquet
- Chlorhexidine Gluconate swab (Solu-I.V.)
- Alcohol 70% swab
- Vacutainer Push Button Blood collection set & Blood Collection Adapter Cap holder 2 or 3 Blood Culture Bottle sets (1 aerobic (green), 1 anaerobic(orange))
- Gloves
- Gauze and tape
- Specimen collection labels

1. Inspect the bottle surface, the broth media and the sensor (grey or opaque layer) at the bottom of the bottle. Ensure the sensor is intact and is grey in colour. Do not use the bottle if the sensor is yellow.
2. Verify correct client using two client identifiers. (Refer to policy CLIN-PP-18 ‘Client Identification’)

3. Explain the procedure to the client
4. Perform hand hygiene and apply gloves. (Refer to Policy ADM-1C-1 'Hand Hygiene')
5. Prepare each culture bottle by removing cap. Disinfect septum on bottle with alcohol, allow to dry. Do not touch septum after disinfection.
6. Position the client's arm and culture bottles. Apply tourniquet.
7. Select venipuncture site and wash with soap if skin is dirty. Remove tourniquet.
8. Moving from the vein outwards, wipe skin with 2 % Chlorhexidine swab for fifteen (15) seconds in concentric circles away from the puncture site covering a circular area 1 to 2 inches in diameter. Allow to air dry.
9. Wipe skin with 70% alcohol in the same manner and allow to air dry. Do not palpate site after disinfection.
10. Reapply tourniquet. **Note:** For clients sensitive to Chlorhexidine use a providone-iodine swab.
11. Perform venipuncture with a Vacutainer Blood Collection Set (Butterfly needle.) Draw one aerobic (green) bottle and then one anaerobic (orange) bottle from one site. Repeat procedure drawing one aerobic bottle and one anaerobic from another site. Ensure 10 ml draw to each bottle.

Note: For clients with a CVAD refer to V-C-10 'Central Venous Access Device (Non-Valved)' or V-C-35 'Central Venous Access Device (Valved)'

12. Mix blood and culture medium thoroughly by inverting culture bottles gently 5-10 times.
13. Label specimens (do **NOT** cover the bar code or the sensor at the bottom of the bottle with the client label) and collect each electronically in ePR noting site in the comment section, time and date of collection and send to lab. If after hours, accession each specimen in ePR and send directly to KHSC, KGH site Core lab. **Do not refrigerate specimens.**

4.0 Transfusion Request Collection Procedure

1. Collect samples as indicated above.
2. Refer to policy CLIN-PP-14 'Blood Transfusions'

5.0 Complications

Complications of venipuncture may include the following:

COMPLICATION	POSSIBLE CAUSE	NURSING ACTION
Pain	<ul style="list-style-type: none"> – improper technique – puncturing an artery – nerve irritation 	<ul style="list-style-type: none"> – ensure proper technique – palpate first to confirm vein – reassure client
Hematoma	<ul style="list-style-type: none"> – puncturing through vein wall – inadequate pressure after needle removal 	<ul style="list-style-type: none"> – insert needle with short thrust and ensure bevel is up – ensure direct pressure is applied to site until bleeding stops
Bleeding	<ul style="list-style-type: none"> – insufficient hemostasis, maybe be caused by anticoagulant therapy 	<ul style="list-style-type: none"> – direct pressure to venipuncture site until bleeding stops
Infection	<ul style="list-style-type: none"> – contaminated equipment/fingers – insufficient cleaning 	<ul style="list-style-type: none"> – ensure sterile equipment and proper aseptic technique
Phlebitis	<ul style="list-style-type: none"> – see causes of infection – frequent sampling from same site 	<ul style="list-style-type: none"> – see actions for infections – rotate venipuncture site – avoid warm and reddened sites
Thrombosis	<ul style="list-style-type: none"> – frequent sampling from same site – probing site 	<ul style="list-style-type: none"> – rotate venipuncture sites – avoid bruised areas – use proper technique
Nerve Damage	<ul style="list-style-type: none"> – hitting the nerve 	<ul style="list-style-type: none"> – palpate first and choose appropriate veins

References

Kingston General Hospital Nursing Policy and Procedure Manual, Venipuncture for Obtaining a Blood Sample (Adult): Advanced Competency (AC) for Nurses (Registered Nurses and Registered Practical Nurses), B-4580, September 2012

IQMH Accreditation Requirements, Version 7.1, April 2017.

Cross-References:

Providence Care Clinical Practice Manual Policy and Procedure #CLIN-PP-14 ‘Blood Transfusions’.

Providence Care Clinical Practice Manual Policy and Procedure #CLIN-PP-18 ‘Client Identification’

Providence Care Administrative Manual Policy and Procedure #ADM-IC-1 ‘Hand Hygiene’

Providence Care Hospital, Specimen Collection for Nursing Policy & Procedure Manual for Nursing, Version 7, May 2018

Appendix 1

PROVIDENCE CARE HOSPITAL

VENIPUNCTURE PERFORMANCE CHECKLIST FOR CERTIFICATION

Name: _____ **Date:** _____

The RN has demonstrated knowledge and competence of the following criteria.

		S	U	Remarks
1.	Knows which blood vessels suitable for venous samples.			
2.	Knows alternatives to main vessels and can select appropriate site.			
3.	Checks Physician's orders and selects appropriate tubes for tests required.			
4.	Knows to perform positive client identification.			
5.	Utilizes routine practices.			
6.	Explains procedure, reassures and prepares client.			
7.	Cleanses site with 70% isopropyl alcohol and allow to air dry.			
8.	Anchors vein without contaminating prep site.			
9.	Inserts needle into proposed vein site at an angle sufficient to enter vein.			
10.	Demonstrates ability to withdraw samples, change tubes and collect tubes in correct order.			
11.	Immediately applies direct pressure to site after removing needle until tape applied.			
12.	Disposes of used supplies correctly according to hospital waste disposal guidelines.			
13.	Records date and time of collection in ePR and labels all blood tubes.			
14.	Places blood tubes in biohazard specimen bag.			

Signatures: Trainer: _____ **Trainee:** _____

MLT or designate:

1. * _____	Date: _____
2. _____	Date: _____
3. _____	Date: _____

Version 7: April 2017

**PROVIDENCE CARE HOSPITAL
VENIPUNCTURE CERTIFICATION TEST**

Name: _____ Date: _____

1. Match the correct color of tube.

CBC	Red
PTT	Lavender
Crossmatch	Pink
Lithium	Light Blue
Vitamin B12	Green (Lithium Heparin)
Creatinine	Yellow
Lactate	Light Green

2. What is the correct order of draw?
 - a. Red, Yellow, Green, Blue
 - b. Lavender, Pink, Red, Blue
 - c. Yellow Green, Lavender, Pink
 - d. Light Blue, Yellow, Green, Red

3. Veins differ from arteries in having lower pressure, thinner walls, valves and no pulse.

T or F

4. What would the best vein to select for venipuncture be?
 - a. Hard, "cord-like" vein
 - b. dimension or bouncy vein above IV site
 - c. dimension or bouncy vein below IV site
 - d. warm, swollen vein

5. When selecting venipuncture sites on a limb with an IV, veins above the IV site is appropriate.

T or F

6. A discard tube ideally is required before a blue (coagulation) tube is drawn when using a butterfly collection set.

T or F

7. When collecting blood cultures, cleansing the site with 70% alcohol only, is optimal.

T or F

8. Client Safety includes all except:

- a. washing hands
- b. applying gloves
- c. cleansing site with 70% alcohol
- d. release of tourniquet after removal of needle
- e. application of pressure and dressing to venipuncture site

9. Infections, hematomas, phlebitis, nerve damage are all examples of complications of venipuncture that can be prevented with proper technique.

T or F

Version 4: April 2017