nursing professional development

Phlebotomy Guidelines for the Adult Patient

Resource Manual

strengthening today…sustaining tomorrow

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Introduction

Quinte Heath Care gratefully acknowledges the contribution of Grace Zwart and members of the Canadian Intravenous Nurses Association (CINA) Committee for the preparation of this resource manual.

Phlebotomy Guidelines for the Adult Patient is a valuable teaching resource based on current best practice for blood collection. Please feel free to contact a CINA nurse for further information or resources.

OBJECTIVES

- To provide succinct skill-based guidelines for nursing staff in the collection and processing of laboratory specimens for blood analysis.
- To maintain quality standards in the collection of blood specimens for laboratory analysis.
- To provide testing and certification for nursing staff.

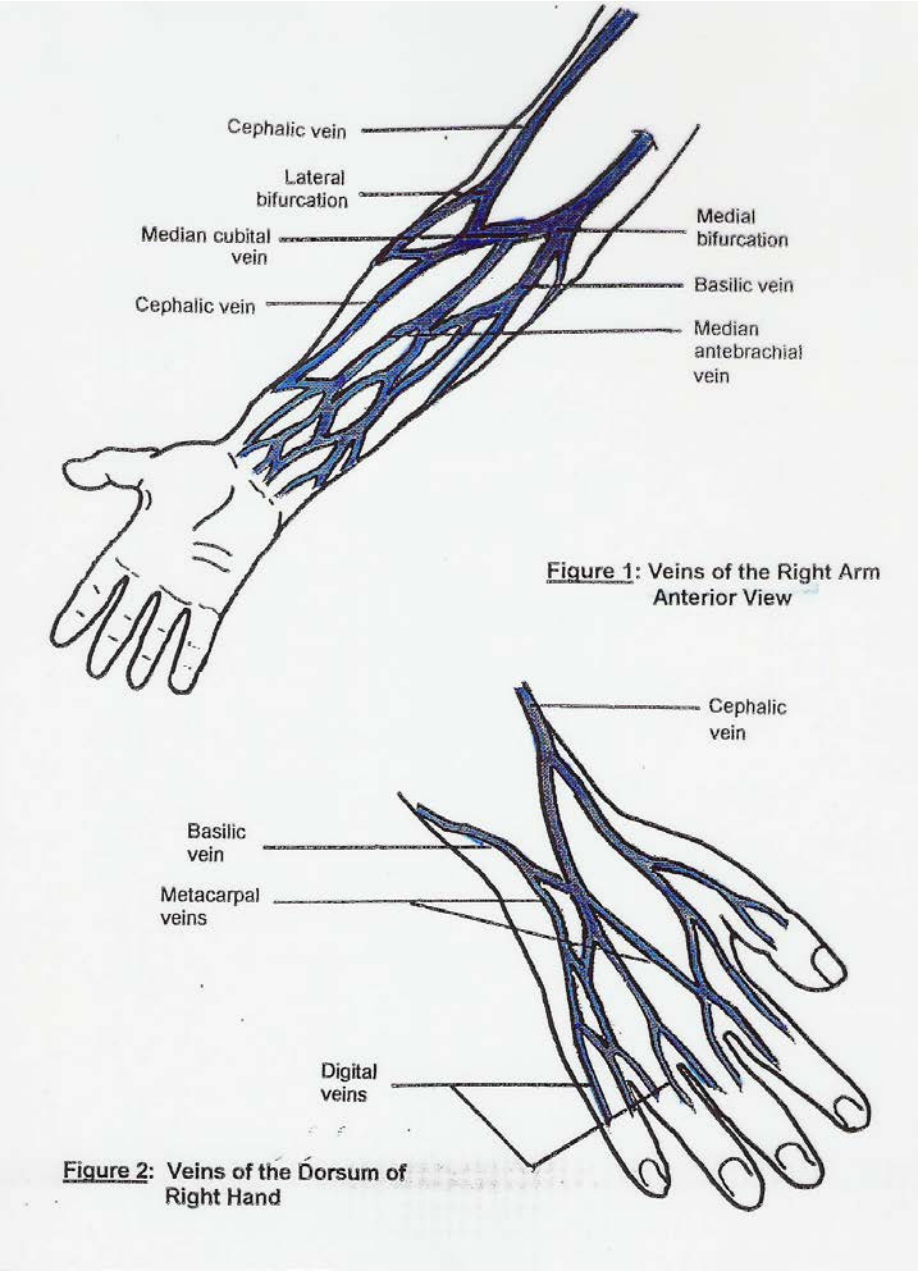
CERTIFICATION REQUIREMENTS

Nurses will attend in-service training as provided by QHC and successfully complete the Phlebotomy Certification process. This includes:

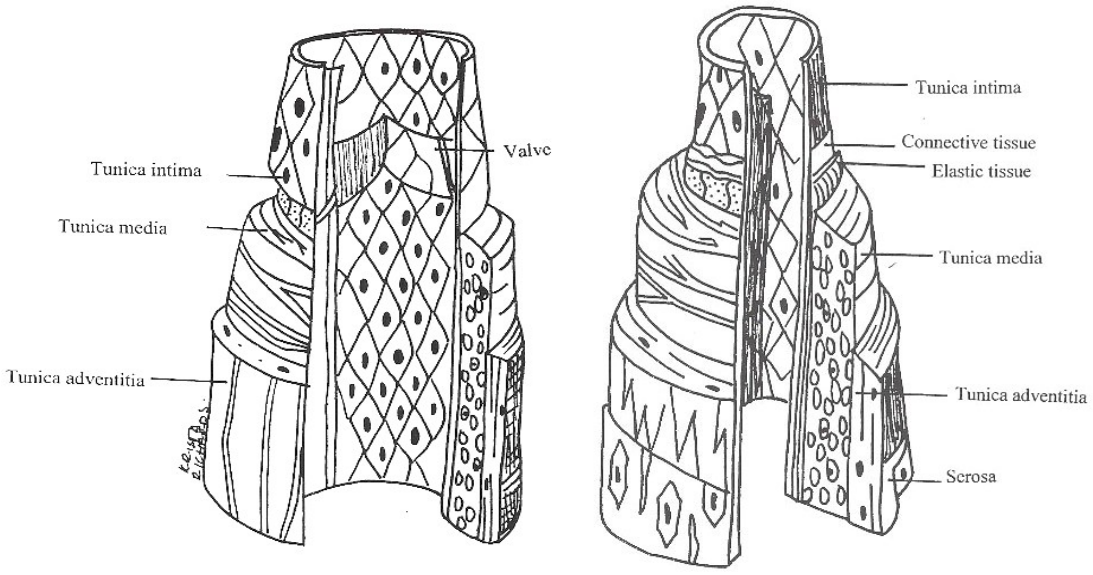
1. Pretest.
2. Classroom theory taught by a CINA certified nurse.
3. Attend demonstration lab.
4. Complete written exam.
5. Three supervised blood specimen collections by an RN with a minimum of two years of experience in all aspects of phlebotomy.
6. The supervising nurse must review appropriate Skills Checklist, sign and date it. (Appendix A).
7. The completed checklist should be photocopied with a copy to manager and original retained by staff member.

CLINICAL APPLICATION

ANATOMY OF VEINS



Vein **Artery**



Veins	Arteries
• No pulsation	• Pulsates
• Sluggish flow	• Blood is under pressure and flows rapidly
• Dark red colour	• Bright pink-red colour
• Shorter duration of pressure needed to stop blood flow from the venipuncture site	• Prolonged direct pressure needed to stop blood flow from a venipuncture site
• Valves prevent backflow	• No valves, blood moves under pressure of the heart beat
• Thin muscular wall	• Thick muscular wall
• Veins are unlikely to spasm and are more likely to collapse; may spasm with irritating solution or trauma	• If fluid is infused into a superficial artery the artery will spasm resulting in blanching and ischemic injury

BLOOD COLLECTION GUIDELINES

Steps		**Rationale**
Preparation		
1. Verify the doctor's order and compare with Meditech label.		Ensure correct test for correct patient.
2. Ensure appropriate patient preparation for test.		May need to fast or follow a specific diet for a specified time.
1. Consent if necessary.		e.g. HIV testing.
2. Gather equipment. • Alcohol wipes • Multi-sample needle • Evacuated tubes – check for expiry dates • Holder • Gauze and tape • Tourniquet • Gloves • Labels • Biohazard bag		Be prepared. Additional bar codes are provided when there is more than one tube to be drawn.
3. Ensure proper identification of the patient. a. Check patient name band with Meditech label. b. Compare first and last name and hospital number. c. If the patient is not wearing an ID band ask the patient their name and birth date. If the patient is confused or disoriented, staff member or family member familiar to patient will need to identify patient		To ensure proper patient identification. No two patients will have the same hospital number Do not ask, "Are you Mrs. Smith?" as the confused patient may answer "yes" Steps should be taken to have proper identification for patient, e.g. ID band on arm or ankle
4. Explain procedure to patient.		Reduce anxiety.
5. Wash hands and apply gloves		Standard precautions
Site selection and vein criteria		
1. Selecting a vein: a. Antecubital fossa b. Veins of wrist, hand and arm c. Lower limb		a. Most accessible and is the site of choice b. Only used if the antecubital fossa is inaccessible and the vein is large enough to support a 21 gauge needle. c. Use only as a last resort with extreme caution. Requires physician's orders
2. Palpate the vein in the direction of blood flow.		Vein should be soft and bouncy, elastic to the touch – pulseless.

VENIPUNCTURE

Purpose: To procure blood for laboratory analysis**.**

Steps		**Rationale**
1. Apply tourniquet OR BP cuff to assess limb for venous distention. ***Note***: Techniques to reduce patient's anxiety will promote venous distention. A warm environment e.g. the arm that's under the blanket, promotes vasodilatation and improved circulation.		Primary technique. BP cuff reduces the risk of skin tears in fragile skin. *Radial pulse must remain palpable.
2. If venous distention is not obtained: a. Gently tap vein b. Release tourniquet gently rub arm from wrist to elbow c. Place a warm cloth in patient's hand d. Ask patient to make a fist and hold. DO NOT PUMP the hand		To obtain distention of vein relieving vasoconstriction A warm environment promotes venous distention Causes hemolysis
3. Reapply tourniquet and palpate.		Do not leave tourniquet on for more than one minute - this will cause hemoconcentration.
4. Cleanse site with alcohol starting at the centre and working outward. Allow to dry.		Wet alcohol may cause pain and hemolyse the specimen.
5. Immobilize the vein. If re-palpation is necessary, cleanse fingertip with alcohol and let dry.		To prevent rolling. To maintain taut skin for easier penetration.
6. Insert needle with safety shield pulled back, bevel up at 15-degree angle in the direction of venous blood flow.		Reduces trauma to vein and prevents hematoma from forming. If veins of the hand or arm are used refer to <u>Venipuncture with Safety-Lok (butterfly) set.</u>
7. Insert needle ¼" into the vein.		To ensure complete entry into the vein
8. Tap evacuated tubes to ensure that additives are in the bottom of tube.		Additives may transfer to next tube altering lab results.
9. While holding the multisample holder securely, push evacuated tube into the holder piercing the rubber stopper fully		To prevent movement of the needle in the vein. To ensure full vacuum. * The vacuum in

		the large evacuated tube may collapse the vein therefore small evacuated tubes may be necessary.
10. Additional bar codes are supplied when additional tubes are required		Each lab department requires a separate tube.
11. Follow correct order of draw. • Blood cultures • Coagulation study (contains citrate) **Note:** All coagulation studies require a discard. • Gold (Chemistry) –Serum tube with or without additives. • Red (Chemistry) • Green • Lavender (Hematology) • Grey (glucose) • Black (ESR) • Navy Blue (Aluminum, copper or zinc)		Order of Draw (Appendix 2) and the QHC Specimen Procurement Manual See Collection of Blood Cultures procedure in this manual. Penetration through the skin may collect a tissue plug in the first tube. This will affect the results of coagulation studies. May contain gel and a clot activator Contains clot enhancer Na or Lithium Heparin, with or without gel plasma separator. Contains EDTA Glycolytic inhibitor Sodium citrate Metal free tube
12. Change tubes when filled to appropriate level.		To ensure correct ratio of additive to blood volume.
13. Mix blood with additives by rotating gently as soon as tube is removed from holder 5-10 times. DO NOT SHAKE.		Vigorous mixing may cause hemolysis. Additives need to be mixed immediately.
14. Remove tourniquet when last tube is half full.		To maintain vein distention. To prevent hematoma.
15. Remove tube from holder prior to removing needle.		To prevent hematoma and venous spasm.
16. Apply direct pressure with dry sterile gauze as soon as needle is *completely* removed.		To prevent hematoma. To prevent tissue trauma.
17. Upon removing the needle push the safety shield forward over the needle		To reduce exposure to needle

18. Maintain direct pressure with arm straight for 3 – 5 minutes or until bleeding stops.		Patient on anticoagulants will bleed longer. Flexing elbow forms a clot that will dislodge when the arm is straightened.
19. Apply pressure dressing made by folding sterile gauze twice.		Band-Aids do not apply sufficient pressure. Pressure dressing should be removed in approx. 20 minutes.
20. Apply barcode labels to midsection of evacuated tube while still at bedside.		Unlabelled tubes are discarded. Ensures correct labeling.
21. Recheck label data with patient's armband – complete header label with your **printed** first initial, last name, date and time of collection. **If collected by means other than direct venipunture also note how sample was collected**, e.g. saline lock, PICC, Arterial line etc.		Identification errors can be deadly!!
22. Discard sharps in sharps container.		Standard precautions. Safety shielded needle and holder are discarded as one. Do not disassemble.
23. Recheck venipuncture site for bleeding.		
24. Place specimen in biohazard collection bag. Place labels in the pouch provided – separate from specimen.		Standard precautions.
25. Document on nurses' notes and Kardex. If electronic documentation available use appropriate screens.		

VENIPUNCTURE WITH SAFETY LOK

Purpose: When veins of the antecubital fossa are inaccessible, e.g. burn patient, hematoma or scar tissue. It can also be used when blood cultures are needed.

Steps		**Rationale**
1. Equipment: • Safety-Lok collection set • Multisample holder • Evacuated tubes • Meditech labels • Alcohol swabs • Sterile Gauze • Tape • Biohazard bag		Be prepared. Additional bar codes are provided when there is more than one tube to be drawn.
2. Follow procedure as per venipuncture guidelines for preparation and vein selection.		
3. Luer holder onto Safety Lok set.		
4. Grasp wings of Safety Lok – insert needle into vein at 15° angle with bevel up until back flash. Wings may be taped.		Do not hold by grasping yellow safety shield. Veins are closer to the surface distal to the antecubital fossa.
5. Follow venipunture guidelines. **Note** needle removal technique below.		Because the displacement of air in the tubing may alter blood additive ratios a discard may need to be drawn. Always draw a discard before a blue tube draw. This avoids insufficient quantity draws.
6. Activate safety shield when collection complete by grasping one of the wings with one hand and grip the yellow safety shield base with the other hand. Slide wings back into the rear of the safety shield until a snap is felt. Discard entire unit in sharps container.		To prevent needle stick

BLOOD COLLECTION FROM SAME ARM AS IV

Purpose: To collect blood specimen when only one limb is accessible.

Steps		**Rationale**
Below IV		
1. Turn off IV x 2minutes.		To maintain patency, be sure to restart IV when specimen is drawn.
2. See preparation and vein selection in venipuncture guidelines.		
3. Wash hands and apply gloves.		Standard precautions.
4. Apply tourniquet below IV site.		
5. Select vein other than IV vein.		
6. Perform venipuncture; use Safety Lok collection set if blood draw is not from the antecubital fossa.		
7. Discard minimum 5mL using large tube then follow the order of the draw.		Discard tube should be same colour as first tube to be collected to maintain order of draw.
8. Document on Meditech label that blood was collected below the IV site and the type of IV solution infusing.		
Above IV		
1. Turn off IV x 2 minutes. Slow to minimum rate if unable to turn off		To maintain patency, be sure to restart IV when specimen is drawn.
2. Select vein other than IV vein. Use vein selection guidelines.		
3. Apply tourniquet.		
4. Perform venipuncture.		
5. Discard minimum 5 mL and follow the order of the draw.		Using large tube same colour as first tube to be drawn.
6. Document on Meditech label if IV shut off or slowed and type of IV solution infusing.		

BLOOD COLLECTIONS FROM PERIPHERAL SALINE LOCK

Purpose: Patient on anti-coagulant therapy, e.g. TnK or TPA Patient who requires multiple blood draws daily or patient who refuses venipuncture. Blood collection from a saline lock is not recommended for any test ordered and is always the last choice.

Note: Flushing the lock first may enhance blood collection from a saline lock. When this is done the lock should be left for two minutes prior to taking the blood sample. Follow the steps as listed including taking a discard.

There is a higher incidence of hemolysis using this method.
DO NOT use for blood cultures.

Steps		**Rationale**
1. See venipuncture guidelines for preparation		
2. Gather equipment • Alcohol • Tourniquet • Holder • Multisample slip connector or 10 ml syringe and needle. • Evacuated tubes • 5 ml saline flush • Extra tube or syringe for discard		
3. Cleanse clave adaptor with alcohol with 30-second friction rub and let dry.		Standard precautions and adequate antisepsis.
4. Apply tourniquet or cuff		
5. Attach slip connector by pressing tip into clave connector and twist ¼ turn or luer on syringe and withdraw. Discard 3 – 5 ml or one large tube.		To prevent contamination of specimen by saline.
6. Push evacuated tube into the holder piercing the rubber stopper fully. Collect appropriate tubes for specimens required following the correct order of draw.		To ensure full vacuum.
7. Change tubes when filled to appropriate level.		To ensure correct ratio of additive to blood volume..

8. If using a syringe, collect appropriate volume to fill required tubes, draw back slowly. First syringe with minimum 5mL discard, then attach next syringe to procure specimen.		To prevent dilution of specimen with saline
9. Mix blood with additives by rotating gently as soon as tube is removed from holder 5-10 times. DO NOT SHAKE.		Vigorous mixing may cause hemolysis. Additives need to be mixed immediately.
10. Remove tourniquet when last tube is half full.		To maintain vein distention.
11. Remove tube from holder prior to disconnecting from clave adaptor.		To prevent venous spasm.
12. Disconnect slip connector by turning ¼ turn in the same direction.		
13. Flush saline lock with 5 ml of normal saline.		To remove blood from tubing and to maintain a patent line.
14. If syringe method used, attach large bore needle to syringe and transfer blood to evacuated tubes.		Allow vacuum in tubes to draw blood in. Do not force the blood into the evacuated tubes. This may cause hemolysis or inappropriate ratio of additive to blood.
15. Apply barcode labels to evacuated tube while still at bedside.		Unlabelled tubes are discarded. Ensures correct labeling.
16. Recheck label data with patient's armband. Complete label with your **printed** first initial, last name, date and time of collection.		Identification errors can have grave consequences if lab values are attributed to the wrong patient.
17. Transport specimen to lab by biohazard collection bags. Place specimen in the collection bag and labels in the pouch provided		Standard precautions.
18. Document in patient notes and Kardex. If electronic documentation available, chart on appropriate screens.		

TRANSFUSION IDENTIFICATION SYSTEM

Steps		Rationale
1. Equipment • Transfusion identification blood tab sheet (R#) • Red plastic band • Large lavender top tube • Venipuncture equipment		
2. Initial sample must be accompanied by numbered blood tab sheet.		
3. Using a waterproof pen – print patient's last name, first name and date on "R" number tab. Insert tab into red plastic band and place on patient's arm, same side as ID band.		It becomes permanent patient identifier for blood transfusions during this admission. More obvious when all ID's are together.
4. Collect 1 large lavender top tube. If other blood is collected follow correct order of draw.		May be collected during routine venipuncture – 1 tube for ABO-RH antibody screen, cross match, G & R and Coombs test.
5. Label with barcode label. Around top of tube affix "R" number label from Left hand side of blood tab sheet.		This tube will be identified by R number as well as meditech barcode.
6. Recheck patient ID and compare "R" number on the band with tab sheet. Write "R" number on comment section of collection label. A label from the left hand side of blood tab sheet may be used.		Accurate patient ID is essential. Use of preprinted label prevents transcription errors.

Note: A sample for type and screen that is missing any part of the identification system will not be processed and a new sample will be requested.

RECOLLECTION FOR TRANSFUSION

Purpose: Performed 72 hours after last type and screen if the patient has been transfused. Performed 14 days after the last type and screen if the patient has not been transfused.

Steps		**Rationale**
1. Follow procedure under venipuncture guidelines preparation and vein selection. **Use blank blood tab sheet.**		An "R" number has already been assigned to this patient.
2. Transfer original "R" number on two blank tabs of a blank blood tab sheet.		"R" number from patient blood band to maintain current transfusion data. Patient maintains same "R" number throughout hospital stay.
3. Collect 1 large hematology (lavender top) tube.		If other blood samples are to be collected follow the standard order of draw.
4. Apply handwritten "R" number tab around top of tube and bar code.		
5. Ensure all information is accurate.		Inaccurate transcription may lead to mismatching and negative patient outcome.
6. Complete Meditech label and send labeled specimen to lab.		

COLLECTION OF BLOOD CULTURES

Purpose: Aid in detection of bacteria in the blood.

***Special Note*:** An order for blood cultures includes 2 sets of one aerobic and one anaerobic from two separate venipuncture sites.

Steps		**Rationale**
1. Follow procedure under preparation and vein selection.		Do not access a saline lock for blood cultures.
2. Equipment • Blood culture specimen bottles (Check for expiration date) • Safety Loc Blood Collection Set (butterfly set) • Large multi sample holder • Safety Lok Venipuncture equipment		
3. Prepare and organize equipment. a. Observe integrity and expiration date of culture bottles b. Mark bottle label at desired fill level using label scale as a guide c. 10 ml aerobic BacT/Alert d. 10 ml anaerobic BacT/Alert e. 4 ml (pediatric) BacT/Alert –if needed f. Prepare Safety-Lok Blood collection set. Thread the luer end of tubing into large multi sample holder		Discard vial if contents are cloudy, septum bulging, or evidence of contamination or deterioration DO NOT EXCEED THE MAXIMUM AMOUNT OF BLOOD!
4. Apply tourniquet.		The antecubital fossa is the site of choice for blood cultures.
5. Perform venipuncture by holding the wings of Safety-Lok collection set together. Tape collection set across wings if required.		Do not hold by grasping the yellow, safety shield. Secures venous access.
6. Remove flip-off caps from BacT/Alert culture bottles.		
7. Press large multi sample holder over top of BacT/Alert bottle to puncture septum. Hold in place. Select aerobic bottle first. Do not touch top of prepped culture bottles with fingers Ensure bottles are in a secure level		.

position at patient's bedside.		
8. Collect blood to desired level on bottle. Monitor to ensure proper blood flow and fill level.		Accurate fill volumes are critical to quality results. Maximum amount of blood is best.
9. Alternate vial position during collection. • The vial may also be held sideways but seeing the level of blood will not be possible. • Remove the vial from the holder and check level. If insufficient, reapply to holder and continue filling. Monitor this process closely to detect any back flow of the bottle contents into tubing. If back flow is noted, immediately remove the vial from the large multi sample holder.		Culture bottle may be repunctured if sterility is maintained.
10. When the bottle is filled to the appropriate level, remove the Adapter Cap from bottle and immediately push and hold holder onto anaerobic bottle.		
11. Collect blood to desired fill level. Remove large multi sample holder from vial.		Each set of one aerobic and one anaerobic bottle must be collected in entirety from one site – if the blood draw is interrupted (e.g. the vein collapses), the collection must be repeated from a new site and a new set of bottles.
12. If required, additional samples can be drawn at this time using the same holder. Tube holder insert may be placed into large multi sample holder.		
13. Remove the tourniquet when the final bottle or tube is half filled. Activate safety shield when collection complete by grasping one of the wings with one hand and grip the yellow safety shield base with the other hand. Slide wings back into the rear of the safety shield until a snap is felt. Discard entire unit in		To prevent needle stick

sharps container.		
14. Apply pressure to the venipuncture site as per the routine venipuncture.		
15. Apply barcodes to each bottle collected in numerical order leaving a strip of the bottles' barcode uncovered. Measurement lines should also be left exposed for quality assurance checks.		
Syringe method (not a common practice)		
1. Prepare BacT alert bottles as above.		
2. Perform venipuncture according to established procedure. Collect appropriate amount of blood by luering syringes onto Safety-Lok blood collection set.		
If blood for other tests is required, collect the maximum amount in the syringes.		.
3. Complete venipuncture according to established procedure.		Care of venipuncture site and disposal of equipment.
4. Transfer of blood • Apply large bore needle onto syringe using aseptic technique. • Inoculate culture bottles by piercing the rubber septum with the needle and gently expel the required amount. • Watch the levels on the syringe barrel. • Fill additional tubes, as needed maintaining the routine order of the draw.		Allow the vacuum in evacuated tubes to draw the required amount from the syringe. Do not use force
5. Place barcode label on bottles and tubes. Complete the label with your printed initials, time and date of collection.		
6. Do not refrigerate bottles. Transport bottles to lab according to site/ unit protocol.		When using pneumatic tube system, ensure bottles are well padded.
7. Document on Kardex, Doctor's order		

sheet or flow sheet as appropriate. If electronic documentation is available use appropriate screens.		

SPECIAL NOTE PERTAINING TO BLOOD CULTURE COLLECTION

1. In addition to routine Laboratory requirements, documentation in Meditech must include:
   a. Why blood culture is ordered (clinical indications).
   b. If patient is to be started on antibiotics.
   c. If patient is on antibiotics and next dose of antibiotics if applicable.
   d. Urgency of request.
2. No more than two sets of blood cultures **are necessary** from a patient in a 24-hour period. **An order for blood cultures means two (2) sets.**
3. Each blood culture set should be collected from a different venipuncture site. Saline Locks are not suitable for blood culture collections.
4. Blood culture sets **may be collected simultaneously from separate sites.**
5. Blood culture sets collected up to 1 hour apart are acceptable.
6. Pediatric patients will have ten times the number of organisms than an adult, therefore, the **(pediatric) BacT/Alert (4 ml)** is aerobic only; can be used for patients up to 10 years and 51 pounds.
7. Adult blood cultures require blood collection in both the **aerobic BacT/Alert and anaerobic BacT/Alert** bottles.
8. If a central line sample is collected for a blood culture, please refer to Central Line guidelines.
9. Blood Culture bottles must be stored in an upright position. Sensor material is located in bottom of bottles.
10. Do not draw sample directly from vein into bottle (use Safety-Lok Blood Collection Set).
11. Amount of blood required is **ten (10) ml for the aerobic and anaerobic bottles, four (4) ml for pediatric BacT/Alert** bottle. Accurate amounts of blood are critical to quality results.

SPECIMEN FOR BLOOD ALCHOHOL

Purpose: Ordered by physician for diagnostic or medical treatment or by warrant for legal purposes.

- A physician, if for legal purposes must draw specimen.
- If specimen is for legal purposes, skin will be prepped with saline **not** alcohol
- Specimen will be hand-delivered to the lab with police accompaniment throughout delivery and testing.
- Specimen will **not** be drawn in conjunction with other tests.

Note: Blood sample results, taken for diagnostic purposes, will **never** be given to the police without a warrant and may be part of a routine blood work-up.
Please be aware of current policies in your specific area.

SPECIMEN PROCUREMENT QUALITY OUTCOMES

1. Do not attempt more than twice – contact team leader or In Charge for direction in obtaining assistance.
2. Avoid drawing blood from:
   a. Edematous areas. Tissue fluid accumulation alters test results.
   b. Areas where hematoma or bruise has formed. In addition to it being painful, it may yield erroneous results. If no other site is available, collect specimen distal to hematoma.
   c. From arm on the side where mastectomy has been performed. Test results may be affected because of lymph stasis.
   d. Excessive scars from burns and surgery. It is difficult to puncture the scar tissue and obtain a specimen.
   e. Areas of infection.
   f. Cannula, fistula, vascular graft – Use only after consulting with physician.
   g. Never pour blood from one tube to another. This may cause contamination of specimen and adversely affect test results (e.g. additives).
   h. Make sure diet restrictions have been followed.
   i. Never do a puncture on a patient who is standing. Make sure patient is sitting or reclining.
   j. Do not probe. It is painful and may cause a hematoma.
   k. Collected specimens should be transported to the lab as soon as possible to ensure accuracy of blood results.
   l. Collect timed specimens promptly. This is critical for therapeutic drug monitoring, glucose testing and many other procedures.
   m. Do not take a blood draw from a PVAD until the saline lock is established and flushed.

TROUBLESHOOTING

1. If there is an incomplete collection, or no blood flow, into the tube:
   a. You may not have completely entered the vein.
      - Check length of needle insertion into skin.
      - Try pushing forward slightly.
      - Palpate for direction and depth of vein above the puncture site.
   b. You may have gone right through the vein
      - Pull back a little.
   c. Adjust the angle of needle – the bevel may be against vein wall.
   d. The vacuum may be gone from the tube. Try another tube.

e. The vacuum in the tube may be too strong, collapsing the vein. Try removing the tourniquet to increase blood flow. Try using small evacuated tubes.

2. A hematoma may develop while you are drawing blood. If the blood continues to flow into the tube, continue collecting the specimen. If the blood flow stops, remove tourniquet, remove the needle slowly and apply direct pressure over the area. Ice may be applied if necessary. A new site must then be found to collect the remaining tubes of blood.

3. All veins are not large, prominent and easy to stick. From time to time, even those best at performing venipuncture have difficulty in obtaining blood. If, after palpating, you decide to attempt a venipuncture and you miss or, for some other reason, cannot get any blood, try **only once more**. If, after the second attempt, you still have not obtained a specimen, do not attempt a third time.

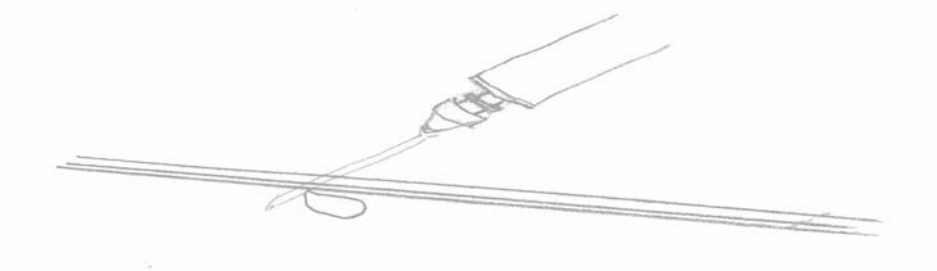
4. If blood stops flowing in the tube:

a. The vein may have collapsed, release the tourniquet to increase venous filling. If not successful, remove the needle and discard in sharps container.

b. The needle holder/tube assembly may not have been held steady enough to prevent pulling the needle out of the vein when switching tubes. Hold equipment firmly and place fingers against patient's arm, using the flange for leverage when withdrawing and inserting tubes.

5. Preventing hematomas. A hematoma is a localized collection of blood that has escaped from a vessel causing swelling and pain. The blood clots in a space, tissue or organ. It is possible to cause a hematoma while doing a venipuncture

a. Do not enter the vein at an angle greater than 15°. This may cause the needle to puncture not only the top wall of the vein but also the far wall. This will allow blood to flow from the far wall when the needle is pulled slightly back to obtain blood.



Prevention: Always use the proper angle when entering the vein.

b. Do not remove the needle before releasing the tourniquet. The increased blood pressure in the vein will cause blood to rush from the puncture site.

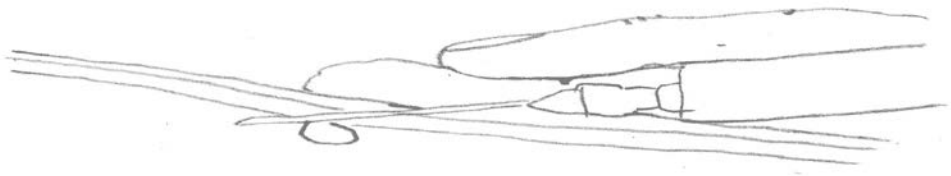
Prevention: Always release the tourniquet before removing the needle.

c. Fragile or thin-walled veins found especially in the elderly, are weak and may tear when the needle is inserted or removed.
Prevention: use strong veins whenever possible; be extremely careful when performing venipuncture on the elderly.

d. Partial penetration may allow blood to leak into soft tissue that surrounds the vein when the needle does not fully penetrate the vein.

Prevention: Always insert the needle so that the entire bevel is completely in the vein.

e. Do not apply direct pressure while the needle is still in the vein. This is extremely painful for the patient and the pressure may cause the needle to puncture the back of the vein causing a deep hematoma.



Prevention: Remove the needle completely before applying direct pressure.

f. When sufficient time or pressure is not used on the site after the venipuncture, blood may not have had time to clot; therefore, bleeding will occur causing a hematoma.

Prevention: Apply direct pressure to the venipuncture site until all bleeding stops (usually 3 to 5 minutes). Apply pressure dressing. **Keep arm straight. If patient bends arm a clotted puncture site may reopen when arm is straightened.**

6) To prevent unsuccessful venipuncture due to veins rolling:

a. Anchor vein well by placing thumb of free hand 1 to 1 ½ inches below puncture site. Pull skin taut over vein and circle fingers around back of arm and brace elbow for support. Keep elbow hyper extended.

b. Whenever a hematoma starts to form and blood flow stops, stop the procedure by releasing the tourniquet, remove the needle and apply direct pressure. Always warn the patient that a bruise will

probably form in that area. Ice packs can be placed on the site to make the patient feel less pain and discomfort.

ERRORS THAT CAN EFFECT RESULTS

1. Leaving the tourniquet on too long, the blood flow is reduced and some plasma is forced into the interstitial fluid through capillaries. This causes the concentration of cells to be falsely elevated resulting in falsely high RBC, WBC, and platelet counts (hemoconcentration).

2. If the tube is not properly mixed, clots can form causing erratic cell counts.

3. If the tube is not accurately filled, the volume of anticoagulant dilutes the specimen causing falsely low cell counts.

4. Drawing a specimen **above** an IV, rather than **below** the site, may dilute the specimen causing false results. Avoid using the same vein as the IV.

5. Not following correct order of draw when specimens collected.

PREVENTING HEMOLOYSIS

Hemolysis is the rupture of erythrocytes with release of hemoglobin into the plasma. When this occurs in a blood sample, it is useless for most laboratory studies. Some common causes of hemolysis when obtaining a blood sample are:

1. Using a needle that is too small (21 gauge is standard for adults and children).

2. When using a syringe, pulling back on plunger too quickly or forcefully.

3. Expelling blood into evacuated tube too quickly. It is best to insert the needle through the stopper and let the vacuum draw the blood out of the syringe, instead of removing the stopper. This way, you are not only preventing hemolysis, but are assured of adding the correct volume of blood to the tube.

4. Shaking or mixing anticoagulated tubes too vigorously instead of gentle inversion.

5. Blood flowing into evacuated tube very slowly or intermittently. This occurs with patients who have very small veins.

6. Probing excessively with the needle when there is difficulty finding a vein.

CAPILLARY COLLECTON

CAPILLARY FINGER PUNCTURE

Purpose: To obtain blood sample for point-of-care testing (glucose monitoring) and when venipuncture cannot be performed (e.g. severely burned, extremely obese, or pediatric patients).

Note regarding specimen: Mixture of arterial and venous blood equivalent to venipuncture sample. Microtainer collection tubes are available for hematology and chemistry. Coagulation studies cannot be done on these specimens.

Steps		**Rationale**
1. Standard prep for venipuncture.		
2. Equipment • Alcohol wipe • Sterile gauze • Gloves • Tape • Lancet • Microtainers (check expiry date) • Labels		
3. Site selection – distal lateral palmer surface of second and third finger of non-dominant hand. Do not use the thumb.		Avoid nerves in the ball of the finger. Avoid using hands that are edematous or have poor circulation.
4. Wash hands and put on gloves.		
5. Warm the hand but do not overheat. May milk the fingers.		Stimulates circulation – prevents hemostasis.

6. Cleanse site with alcohol and allow to dry completely. 7. Wipe with sterile gauze.		Alcohol even when dry may cause hemolysis.
8. Support the site. Puncture perpendicular to lines lateral to ball of the finger.		
9. Squeeze gently and wipe first drop of blood away. 10. Follow the order of draw for microtainers: lavender then gold		May include interstitial fluid or tissue debris.
11. Squeeze release action allow blood to flow through collector top. NO SCRAPING.		Causes hemolysis.
12. Tap tube after each drop.		Mix with additives that are sprayed on inner side of microtainer.
13. Fill tube to fill line.		For adequate blood additive ratio.
14. Dry gauze pressure to site.		
15. Cap microtainer and invert gently 10 times.		To mix additives.
16. Clean outside of tube.		Standard precautions.
17. Label – double check identification.		
18. Dispose of sharps.		Standard precautions
19. Transport to lab in biohazard collection bag, with the labels placed in the pouch.		
20. Document appropriately. If electronic documentation available use appropriate screens.		

CAPILLARY PUNCTURE FOR GLUCOMETER

Purpose: To obtain blood sample for point-of-care testing e.g. glucometers.

Steps		**Rationale**
1. Refer to venipuncture guidelines for preparation.		
2. Equipment • Gloves • Alcohol wipe • Lancet • Glucometer • Glucometer strip • Label • Sterile gauze		
3. Site selection – distal lateral palmer surface of fingers – rotate sites. Do not use the thumb.		Avoid nerves in the ball of the finger. Avoid using edematous hands or those with poor circulation.
4. Wash hands and put on gloves.		Standard precautions.
5. Cleanse site with alcohol and allow to dry completely. Wipe with sterile gauze.		Alcohol even when dry may cause hemolysis.
6. Support the site – place lancet against the finger and pierce the skin.		Hold lancet in place to ensure adequate blood flow.
7. Lightly squeeze puncture site (without touching).Wipe away first drop. Squeeze until large droplet of blood has formed.		To ensure proper coverage of test strip.
8. Hold test strip close to drop of blood and lightly transfer droplet to test strip.		Droplet must be absorbed by test strip to ensure proper chemical reactions.
9. Apply pressure to puncture site.		
10. Wait for glucometer reading.		Reading <3 or >20 requires a split specimen. Therefore venipuncture required. ***Note***: Meditech label used for glucometer is also used for split specimen.
11. Remove test strip.		

12. Dispose of sharps.		Standard precautions.
13. Document appropriately. If electronic documentation available use appropriate screens.		

NURSING PROCEDURE FOR AUTOLOGOUS BLOOD

The day before the clinic takes place each first time donor scheduled is telephoned and the pre blood donation terms are reviewed (Appendix C).

CRITERIA

1st Unit Hemoglobin must be: Males 115
Females 110
2nd and subsequent units Hemoglobin must be: Male 110
Females 110

- Surgeon's Request of Consideration for Autologous Transfusion form is completed in the surgeon's office.
- Autologous Transfusion Donor consent Form is signed and witnessed in surgeon's office
- If there is a history of cardiovascular disease or convulsions, then at the discretion of the surgeon, further assessment may be necessary.
- Patient should be on Iron supplement, if not then contact surgeon or family doctor
- Blood pressure: maximum 180/100 - minimum 90/50

PROCEDURE

1. **Pre Procedure**
- Autologous Blood List comes from O.R. Bookings the day before
- Patient first registers at Patient Registration and obtains a blue hospital card if necessary (no outpatient chart is needed).
- Patient is directed to come to SDS Waiting Room and ring the bell.
- If patient does not show up, check with the Laboratory, the patient may be having blood drawn

2. Patient Arrives in SDS
- Identify patient and check demographic information
- If any information is incorrect, call Patient Registration and make corrections before blood is drawn. A new blue card may be necessary.
- Ask patient if they have any other blood work booked to be drawn (yellow slip)
- If patient had blood work drawn in the Laboratory, collect two (2) Disease Marker tubes and an additional small lavender top tube.

3. **Forms**

First Donation
- Stamp Autologous Blood Service Progress Notes
- Have Blood Bank Numbers tab sheet
- Red blood arm band and insert
- Enter orders in Meditech

Second and Subsequent Donation
- Enter orders in Meditech. If Meditech is down, stamp and fill in the green transfusion requisition QHB 171 and stamp and use Laboratory Requisition #BG 139

4. First Donation

- Enter blood work into Meditech and receive appropriate labels. The order set is /AB and consist of:
  Lab- Hem/CBC
  BBK- TS
  # units required
  Doctor's order ___ of ___, today's date, surgeon and OR date

- Required Blood Work
  Hgb- 3mL lavender tube X2
  T&C- 6 ml lavender tube
  Disease Marker- 6 mL red tube- X2
  If required- pre-op blood work from yellow request for surgery slip. Example
  ELE/BUN – 4 mL gold
  PT/PTT – 5 mL blue

Subsequent Donation

- Enter blood work into Meditech and receive appropriate labels.
  Lab- Hem/CBC
  BBK- ABH
  # units required
  Doctor's order ___of ___, today's date, surgeon and OR date
- Red Blood Arm Band- using water proof pen write
  R number
  Last name
  First name
  Today's date

The bracelet must be on the patient's wrist and patient is to leave it on until after their surgery. If patient refuses to wear bracelet note it on labels and on nursing progress notes. Give the patient the sheet regarding bracelet identification (Appendix D).

5. Review patients chart

- Consent
- Verify medications that patient is currently taking
- After reviewing chart, take BP, P & R ad record on Flow Sheet

6. With patient sitting or lying

- Draw blood with either a 21 G Safety-Lok or 21 G butterfly- this is generally done using the veins on top of the hand
- Draw the appropriate blood work required – see step 4.
- Apply pressure dressing to hand

7. Labels

- Place the correct labels on the appropriate tubes. Complete the header label with your first initial, last name, and date of draw.
- The R number band is placed around the neck of the Disease Marker and T&C tubes.
- Label Hgb tube STAT

8. Laboratory

- Place the Hgb blood tube into biohazard bag with requisition label placed in the outside pocket of the bag and take directly into Hematology
- Other blood work, except T& C and Disease Marker can go to the Lab at this time
- The Lab will phone extension 2562 with the Hgb report

9. Offer juice and cookies.

10. Prepare single bag on shaker. If opening new aluminum foil bag please put the day the bag was opened on the outside of the package. They are good for 3 months.
- Remove plastic wrap being careful not to let any tubing touch the floor
- Fasten the bag over the 2 metal adapters at the end of the shaker
- Lie the bag flat on the shaker and thread the tubing into the appropriate slot
- Leave approximately 2 – inches for movement (up and down) when the shaker is moving. Make sure there are no kinks in the tubing
- Fold the tubing over the back of the shaker
- Attach a forcep to the tubing close to the shaker
- Press 1 and the machine should read READY

11. Wait for Hbg report to be called back and assure that it meets the criteria then prepare the patient for the procedure.

12. Have patient lying down and check both arms for the best venipuncture site.

13. Attach BP cuff to upper arm with the gauge and bulb at the top, away from the antecubital fossa.
- Inflate BP cuff to 80 mm Hg.
- Identify vein of choice and cleanse site with alcohol starting at the center and working outward. Allow to dry.
- Immobilize the vein and insert needle (16 gauge) into the vein.
- Remove forcep.
- Observe blood flow (blood flow may not appear in tubing until the forcep is released. Press –(x2) then * and shaker will begin. Reduce the inflated BP cuff to 40mm Hg.
- Tape the tubing, below the hub, to the patients arm.

14. The Green indicator light means the blood is flowing quickly. A Red indicator lights mean the blood is flowing slowly.

15. The shaker will beep when the bag is full (586 gms.).
- If procedure is terminated before the bag is full, complete on the green bag label the number of grams obtained
- Anything over 330 gms. can be used
- Upon completion of collection, reapply forcep close to the bag and release the pressure from the BP cuff.
- Press * and the shaker will stop
- Remove tape from the tubing and remove the needle. Apply direct pressure with dry sterile gauze as soon as the needle is *completely* removed.
- Maintain direct pressure with the patient's arm straight for 5 minutes (this may be done by the patient).

16. Blood bag, tubing and needle are removed from the shaker and taken to the sealer.
    - Insert needle into the red stopper blood tube, release forcep and fill the red tubes.
    - Reapply forcep.
    - Approximately 20 cm from needle, heat seal between forcep and needle.
    - Detach needle segment and cover with blue safety guard. Discard needle and tube in sharps container
    - Remove forcep and prepare segments along tubing as indicated by X's (at 2nd X) and seal 6-7 times.
    - Do not stretch tubing
    - Break off and neatly fold tubing along side of bag.

17. Check venipuncture site for bleeding. If there is none, apply pressure dressing by folding sterile gauge twice. Patient may now sit up on the side of the bed.

18. Patient signs the green Whole Blood Autologous Donor Label. This label includes the following information:

- Patients H#
- Patient's name
- Patient's date of birth
- Collected by and date
- R number- A, B or C indication which donation (1,2, or 3)
- # of grams obtains and which donation, 1 of 1, 1 of 2 etc.
- Affix the label to the donor bag
- Take the patient's blood donation, the Meditech labels, Disease Marker and T&C tubes to the Blood Bank. If this is the first unit, cut off some R numbers and send to Blood Bank with the donor bag
- Remaining R numbers are staple to the Autologous Blood Service nursing Progress note
- On the last donation, send all remaining numbers to the Blood Bank.

19. Recheck the patient's venipuncture site for bleeding. Patient may have drinks and cookies. Review post donation teaching with the patient. The patient signs and dates the form and takes a copy of the pre/post donation teaching sheet with them.

20. Make sure all records and forms are completed i.e. nursing progress note and teaching/emotional support (Appendix C).

21. If this is the first donation, the forms are kept in the Autologous Blood Collection binder. If it is the last donation the following papers are sent to O.R. Bookings:

- Consent- record the number of units available on this sheet.
- Request form
- Nursing progress notes.

22. The remaining papers

- Health Records copy- confidential garbage
- Patient Accounts copy- confidential garbage
- Family Physician copy- sent to Doctor's mailbox
- Emergency Physician copy- confidential garbage.

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APPENDIX A

Quinte Health Care
Phlebotomy
Training Checklist

Name: _____ **Designation:** _____

Unit: _____

	Date Completed
1. Demonstration Lab (Corporate Orientation or Unit Orientation	
2. Successfully completed supervised clinical practices: • Out Patient Laboratory Clinic • On Unit	
3. Completion of skills checklist for initiating *venipuncture*	
4. Completion of skills checklist for *capillary puncture*	

_____has met the criteria as outlined by QHC Guidelines and is approved for independent practice.

Date: _____

Signature: _____

Employee Signature_____

It is the staff's responsibility to complete the package and present to your manager

The staff is responsible to review educational material and arrange for monitoring at appropriate intervals

.

Quinte Health Care
Skills Checklist
Venipuncture for Laboratory Specimen Analysis

Name: _____

Nursing Unit: _____

	#1	#2
1. The Patient and Equipment		
a) Correct identification (asked for patient name; clearly legible identification; armband in place; verified doctor's order; labels at bedside).	☐	☐
b) Compares patient information on labels and patient armband.	☐	☐
c) Demonstrates knowledge of evacuated tubes (correct tubes; correct number of tubes; expiry date checked; additives tapped to base of tube).	☐	☐
d) Aware of correct order of draw	☐	☐
e) Aware of proper fill levels for the tubes.	☐	☐
f) Aware of tubes available in smaller sizes (when less vacuum is desirable).	☐	☐
g) Aware of two tube technique.	☐	☐
h) Aware of resources if unsure of tube selection.	☐	☐
2. The vein		
a) Demonstrates good knowledge of suitable veins (basilic and cephalic veins in anticubital fossa, back of arm, back of wrist, metacarpal vein and dorsal venous arch; no veins on feet without a doctor's order.)	☐	☐
b) Demonstrates an awareness of qualities that selected vein should possess (dimension or bounce, softness, pulseless; opposite limb to IV; no swelling or redness; proper direction, size and depth.)	☐	☐
c) Correct application of tourniquet (5cm above the site; restricts venous flow only; protects frail skin as needed; not left on longer than 1min).	☐	☐
d) While Pt is in sitting or lying position gave appropriate instructions (make fist and hold; do not pump; release fist prior to completion of the draw).	☐	☐
e) Thorough cleansing of the site: starting at the center working outward; no repalpation except with cleansed finger tip; allows antiseptic to air dry.	☐	☐
3. The Venipuncture		
a) Anchors and immobilizes vein correctly (pull skin taut below the site).	☐	☐
b) Venipuncture made correctly (needle bevel up; 15º angle; needle through the skin and vein		

in one swift motion or two step procedure).	☐	☐
c) Evacuated tube system used properly (held firmly, proper stabilization when tube changed).	☐	☐
d) Aware of troubleshooting measures if incomplete or no blood flow (adjust the needle angle; advance the needle or pull back slightly; remove the tourniquet; try another tube or a smaller tube.	☐	☐
e) Correct use and disposal of safety collection needle and non reusable multisample holder	☐	☐
4. The Specimen		
a) Correct filling of evacuated tubes (fill if possible; needle through stopper if collected by syringe; fill haematology tube according to vacuum level within tube; fill coagulation tube completely).	☐	☐
b) Correct mixing of blood and additives (gently rotating 5 to 10 times while other tubes are filling).	☐	☐
c) Correct specimen identification (compare information on labels with armband including Blood Bank identification; apply the labels at the bedside).	☐	☐
d) Appropriate care of venipuncture site (arm straight while pressure applied to vein with dry swab for adequate period; checks that bleeding has stopped prior to securing pressure dressing).	☐	☐

SIGNATURE AND COMMENTS SUPERVISING NURSE #1

NURSE #2

It is the staff's responsibility to complete the package and present to your manager

Quinte Health Care
Skills Checklist
Capillary Puncture (Finger stick) for Laboratory Specimen Analysis

Name: _____ **Designation:** _____

Unit: _____

		#1	#2
1.	Procedure is thoroughly explained to patient/family	☐	☐
2.	Exercises standard precautions	☐	☐
3.	Correct patient identification	☐	☐
4.	Compares patient information on labels and patient's arm band	☐	☐
5.	Chooses appropriate collection site	☐	☐
6.	Knowledgeable of techniques to increase blood flow	☐	☐
7.	Properly cleanses skin with alcohol and lets skin air dry	☐	☐
8.	Punctures finger in appropriate region, utilizing appropriate technique (lateral to ball of finger and perpendicular to lines of the fingerprint)	☐	☐
9.	Wipes off first drop of blood with sterile gauze	☐	☐
10.	Utilizes appropriate technique to increase capillary blood flow (puncture site downward and apply and release pressure to surrounding tissue proximal to the puncture site and tapping the tube)	☐	☐
11.	Appropriate filling of microtainers	☐	☐
12.	Proper mixing of specimen (tap tube during collection and invert tube minimum of 10 times)	☐	☐
13.	Correct disposal of equipment	☐	☐
14.	When collection is complete, appropriately treats puncture site	☐	☐
15.	Specimen appropriately handled after collection (labels, storage, transport)	☐	☐

16. Documents collection (label, nursing notes) ☐ ☐

SIGNATURE, DESIGNATION AND COMMENTS OF SUPERVISING STAFF #1

_____

_____

SUPERVISING STAFF #2 _____

_____

It is the staff's responsibility to complete the package and present to your manager

APPENDIX B

ORDER OF DRAW

The most current information on the order of draw can be found in the QHC Specimen Procurement Manual.

Purpose:
To avoid possible test result error due to cross contamination from tube additives. This order should be followed for both glass and plastic **venous** blood collection. There is a different order for capillary samples.

Order of Draw	**Collection Tube**	**Mix by Inverting**	**Effects of Under Filling**
Blood Culture (Green)	Aerobic Blood culture tube	8 to 10 times	Decreases possibility of bacterial recovery
Blood culture (Orange)	Anaerobic Blood culture tube	8 to 10 times	Decreases possibility of bacterial recover
Blood culture (Yellow)	Pediatric Blood culture tube	8 to 10 times	Decreases possibility of bacterial recovery
Light Blue	Coagulation tube (3.2% Citrate)	5 to 8 times	Coagulation results are erroneously prolonged. Overfilling could result in clot formation.
Red/Gold/Tiger Top	Serum tube with or without clot activator, with or without gel	Gel 5 to 10 times No Gel-none	Insufficient
Green	Heparin tube with or without gel plasma separator (Sodium or Lithium Heparin)	8 to 10 times	Erroneous results due to excessive heparin
Lavender	EDTA (K2 EDTA, K3 EDTA)	8 to 10 times	Erroneously low blood cell counts and hematocrits: morphologic changes to RBC's; staining alterations
Grey (Glucose)	Glycotic inhibitor (Potassium Oxalate Sodium Fluoride)	8 to 10 times	Erroneous results due to excessive fluoride
Black (ESR)	Sodium Citrate	5 to 8 times	Erroneous results due to dilution
Navy Blue (Aluminum, copper or zinc)	Metal Free	8 to 10 times	

Note: When using a winged blood collection set for venipuncture and a coagulation tube is the first tube to be drawn, a discard tube should be drawn first. The discard tube must be used to fill the blood collection tubing dead space and to assure maintenance of the proper anticoagulant/blood ratio. The discard should be a non additive or a coagulation tube.

ORDER OF DRAW FOR CAPILLARY SPECIMENS

Collect EDTA specimens first (lavender) to ensure adequate volume and accurate hematology test results. Other additive specimens are collected next. Specimens requiring serum (non additive tubes) are collected last. See next page.

BD Microtainer™ Tubes

Tube Guide and Order of Draw

Catalog #/Color Closure	Additive	Mix by Inverting	Laboratory Use
 365973 Lavender	K_2EDTA	10x	For whole blood hematology determinations. Tube inversions prevent clotting.
 365971 Green	Lithium Heparin	10x	For plasma determinations in chemistry. Tube inversions prevent clotting.
 365958 Mint Green	Lithium Heparin and Gel for plasma separation	10x	For plasma determinations in chemistry. Tube inversions prevent clotting.
 365956 Gold  365959 Gold	Clot Activator and Gel for serum separation	5x	For serum determinations in chemistry.
 365957 Red	No additive	0x	For serum determinations in chemistry, serology and blood banking.

BD Vacutainer Technical Services 1.800.631.0174
BD Customer Service 1.888.237.2762
www.bd.com/vacutainer

BD Vacutainer Systems
Preanalytical Solutions
1 Becton Drive
Franklin Lakes, NJ 07417

Made in USA 5/03 V55837-1

A

APPENDIX C

TEACHING/EMOTIONAL SUPPORT

PREBLOOD DONATION

1. Eat and drink before coming for donation.
2. Take your routine medications.
3. It is advisable to have someone come with you to drive you home if necessary.
4. Please discuss your work activities with your nurse.

POST BLOOD DONATION

1. No smoking for 12 hours.
2. No heavy lifting for 24 hours.
3. No weight bearing on donation arm, e.g. do not carry a purse on this arm, do not use a cane with this arm.
4. Dressing care: If bleeding is noticed, apply pressure, rest the arm and apply ice (approximately 20 minutes).
5. Increase you fluid intake for 24 hours and eat according to Canada's Food Guide for Healthy Living.
6. Your nurse will provide added information about iron and diet.

_____
Donor Signature

_____
Date

Notes:
_____
_____
_____

APPENDIX D

REFUSAL TO WEAR ARMBAND

Dear Patient

Your pre-admission blood work includes a group and antibody serum test. This has been performed as a precaution in case a blood transfusion becomes necessary during surgery. The security of patient identification is EXREMELY important with this procedure; therefore, you have been given a bracelet with your name and special transfusion identification number.

Keep this armband in a safe place.

Secure this armband on your right arm the day you are admitted to hospital.

If your bracelet is lost or forgotten, then another blood sample will be collected for repeat testing. This could delay your surgical procedure.

Thank you for your cooperation.

Quinte Health Care
Laboratory Medicine