Lakeridge Health ☑ Harmonized	**Midline Catheter (Adult 18 years of age or older) – Patient Care Standard**	
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	Document Applies to: Healthcare Professionals with the required knowledge, skill and judgment	
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Patient Care Standards provide a means to direct and evaluate the quality of care delivered and reflect the minimum level of care that all patients and families entering the organization can expect to receive. Patient Care Standards promote consistency of care among care providers.

Patient Care Standards differ from Professional Standards of Practice established by various Professional Colleges.

Patient Care Standards do not replace the Regulatory/Professional expectations of individual Health Professions to deliver optimal care. Patient Care Standards and Professional Standards of Practice work together to ensure quality patient care.

Introduction

The objective of this Patient Care Standard is to establish a standard evidence-based approach to the care and maintenance of Midline Catheters across Lakeridge Health (LH).

Patient Care Standard

1. The Procedures outlined in this document may only be performed by Health Care Providers (HCP) who are authorized to perform the controlled act of "administering a

substance by injection" and have the necessary knowledge, skill and judgment with the Care and Maintenance of Central Venous Access Devices (CVAD) and Peripheral Venous Access Device (PVAD).

2. Positive Patient Identification must be performed prior to any infusion therapy, intervention or treatment. Refer to *Positive Patient Identification* – Policy and Procedure.
    - If removal of identification band is necessary to accommodate access, it must be replaced immediately after or applied to an alternative limb.

3. Midline catheters are available as single or double lumen, are marked as such, and are power injection capable. **Note:** If double lumen, only one lumen is power injectable and marked as power injectable. Refer to Appendix A for example.

4. Indications for midline catheters:
    - Patients with difficult peripheral venous access (i.e. IV) when a CVAD is not indicated,
    - Patients with difficult vascular access, requiring frequent blood specimen collection when a CVAD is not indicated,
    - Patients with difficult vascular access requiring short-term intravenous (IV) access (i.e. less than 30 days).

5. Relative contraindications for midline catheters for when the patient has a history of:
    - Thrombosis,
    - Hypercoagulability,
    - Decreased venous flow to the extremities,
    - End-stage renal disease requiring vein preservation. (INS, 2021).

6. Absolute contraindications for midline use:
    - Continuous vesicant therapy; a medication or solution capable of causing tissue damage when it leaks from the intended vascular pathway (e.g. chemotherapy),
    - Parenteral Nutrition with Dextrose concentrations **greater** than 10% (e.g. 16%) must be administered via a CVAD, known as Central Parenteral Nutrition (CPN). Refer to *Parenteral Nutrition (PN)* - Policy and Procedure.
    - Refer to IV monographs, Lexicomp or consult pharmacist for additional information on irritant and vesicant medications (i.e. infusates with pH less than 5 or greater than 9, osmolality greater than 900 Osm/L)
    - All infusates requiring a CVAD.

7. Midline catheters have external clamps. Clamps **must** be closed/clamped when the catheter is not in use (e.g. no infusion) and when opening the system (e.g. changing needleless connectors) to prevent complications (e.g. air embolism, exsanguination).

8. The midline catheter must have a securement dressing applied at all times (i.e. Tegaderm CHG/Tegaderm IV Advance). Refer to Section B: Dressing

9. If an occlusion of the midline catheter is suspected (i.e. unable to aspirate or flush), reposition the patient and/or change needleless connectors and re-attempt to

aspirate/flush. If still unable to aspirate and/or flush, contact MRP to determine plan. **Note**: **DO NOT unblock with Alteplase** (i.e. Cathflo).

10. Assess external length by measuring from the exit site CM exposed, to the triangular hub and confirming it remains unchanged with each assessment (e.g. flushing post medication administration, etc.,), with each dressing change, and when dislodgement or migration suspected (INS, 2016; CVAA, 2019).

    For these instances:
    - Compare external length to documented external length in the health record,
    - In the presence of edema and/or signs and symptoms of deep vein thrombosis, measure arm circumference mid-way between insertion site and axilla and compare to previous assessment

11. Monitor for signs and symptoms associated with post-insertion complications (Appendix B and Appendix C) **minimally** once per shift and PRN, report to MRP, and document in the electronic health record, including:
    - Condition of site,
    - Type of dressing,
    - Phlebitis and infiltration scale, as applicable,
    - Photograph of the site (using camera and/or cell phone) (INS, 2016; CVAA, 2019):
        - Obtain consent from the patient,
        - Take photo of the site,
        - Print photograph,
        - Place in the patients chart (i.e. use as a point of reference).

Standards to maintain asepsis

- **Aseptic/no-touch technique** will be maintained in all aspects of midline catheter care and maintenance.
- Cleanse the needleless connector for a minimum of 15 - 30 seconds with 2% chlorhexidine and 70% isopropyl alcohol wipe using friction and **allow to completely dry prior to connecting.**
    - Perform skin preparation by using 2% Chlorhexidine (CHG) with 70% isopropyl Alcohol swab sticks. If alternative skin prep is required (e.g. allergy to CHG, rash or sensitivity) tincture of iodine, iodophor (e.g. Povidone-iodine 10 %), or 70% alcohol may be used.
- Coordinate tubing and needleless connector change with dressing change when possible.
- HCP must perform hand hygiene, and wear gloves and mask in order to maintain asepsis.
- The primary HCP in collaboration with the MRP, will assess necessity for midline catheter use daily (i.e. does the patient still require) to prevent Catheter Related Blood Stream Infection (CRBSI).

Standards to maintain patency

- Must have **either** an infusion in progress (using an infusion pump to reduce risk of air embolism) or flushed and locked with 0.9% Sodium Chloride (0.9%NaCl), through a needleless connector.

    - When there is a continuous infusion in progress and infusing well, the lumens **DO NOT require** flushing as patency is established.
- Aspirate alternative locking solutions (e.g. antibiotic lock), prior to use.
    - Attach an empty 10 mL sterile syringe, aspirate 6 mL and **discard prior to accessing**.
- To keep vein open (TKVO) is not to be used/accepted as an order. If a TKVO order is written, collaboration with the Most Responsible Practitioner (MRP) **must occur as soon as possible for an appropriate order**. Until such time, the infusion may be maintained at 30 mL/hr.
- Flushing is done using the turbulent (i.e. push-pause) flush method.
- Syringes used for flushing must be 10 mL (or equivalent diameter) or larger to minimize the pressure exerted on the lumen.
- All lumens must be manually (syringe) flushed with 0.9% NaCl (CVAA, 2019):
    - Before accessing the midline (i.e. to assess for patency),
    - Between incompatible solutions,
    - After medications,
    - Before and after blood sampling (i.e. blood specimen collection),
    - After disconnecting an infusion or medication infusion,
    - Locking the midline catheter.
- The lumen(s) are flushed with 20 mL 0.9% NaCl through the needleless connector(s) once per shift when not in use/dormant.
- For double lumen midline catheters, ensure **all** lumens are assess for patent and/or locked if not in use.

Definition(s)

Midline Catheter- is a PVAD catheter, measuring between 8 cm – 20 cm in length that is inserted in the peripheral veins of the arm (e.g. basilic vein, cephalic vein, brachial veins, and veins of antecubital area). The tip of the Midline Catheter terminates at or below the axillary line (i.e. it does not enter the central vasculature); is not a Central Venous Access Device (CVAD) and therefore **DOES NOT** require x – ray confirmation prior to use. Midline catheters may remain in place for up to 30 days.

External Length Measurement- The centimeters exposed (marked on the catheter) at the exit site.

Procedure(s)

A. **Insertion of a Midline Catheter Standards and Procedures**

Standard:

- Informed consent from the patient or Substitute Decision Maker (SDM) must be obtained prior to insertion. **Exception:** in emergency situations.

- Optimal site and catheter selection will be made with consideration of the potential risk of infection and other associated complications.

- The insertion of a midline catheter is performed by a physician/HCP (e.g. Medical Radiation Technologist) with the knowledge, skill, judgement and authorization to perform the Delegated Controlled Act of performing a procedure below the dermis or mucous membrane.

- The physician/HCP with the competency to insert Midline Catheters will use ultrasound for vessel assessment and insertion to reduce the number of cannulation attempts and mechanical complications.

- Midline Catheters **DO NOT** require x-ray confirmation prior to use as the catheter does not enter the central vasculature, and distal tip should be at or below the axillary vein.

- Procedure documentation will include:
    - Size, gauge, and length,
    - Type of midline and number of lumens,
    - Insertion site using anatomical descriptor,
    - Site and vessel assessment and size,
    - Administration of local anesthetic, into or onto, intact tissue (CVAA, 2019, p.23)

Procedure:

1. The HCP checks the patient's health record for the following:
    - Allergies
    - Consent obtained
    - Positive patient identification, using 2 positive patient identifiers. Refer to *Positive Patient Identification* – Policy and Procedure.

2. The HCP gathers the following equipment:
    - Sterile gown, sterile gloves, operating room cap/hats, surgical disposable masks with visor for physician and HCP (anyone closer than 2 meters requires sterile attire),
    - Sterile drape, size as appropriate,
    - Midline Catheter prepackaged kit (size and type as per the physician's choice/order),
    - 2 – 2% chlorhexidine (CHG) with 70 % isopropyl alcohol maxi swab sticks. If alternative skin prep is required due to rash or known sensitivity, tincture of iodine, an iodophor (Povidone-iodine 10%), or 70% alcohol may be used,

- Lidocaine 1% or 2% (physician preference) **without** epinephrine and 3 mL syringes,
- Sterile towels as required,
- 0.9% NaCl sterile prefilled 10 mL syringes (1 per lumen),
- Securement dressing (e.g. Tegaderm CHG) or as required,
- Needleless connector: 1 per lumen (e.g. Max Zero),
- Ultrasound, sterile gel pack and sterile sleeve for ultrasound.

3. The physician/HCP prepares the patient for procedure and applies tourniquet, as required, under the proximal end of the humerus.

4. Teach the Valsalva maneuver if required; to be performed by the patient when physician/HCP inserts the catheter. The patient should perform this maneuver throughout the insertion as required.

5. Position the patient flat (e.g. supine).

6. Physician/HCP performs hand hygiene and applies mask to patient or have patient apply mask, if tolerated. If patient unable to wear mask, ensure the patient's head is turned away from the insertion site.

7. The physician/HCP performs hand hygiene/surgical scrub and dons appropriate sterile Personal Protective Equipment (PPE).

8. The physician/HCP prepares site using 2% chlorhexidine with 70% Isopropyl alcohol maxi swab stick(s) or alternative skin prep as required and allows area to dry completely.
   Note: palpation of the insertion site will not be performed after the application of the antiseptic, unless aseptic technique has been maintained.

9. Physician/HCP drapes the patient with full-length sterile drapes and prepares equipment on the sterile field. The HCP assists the physician with:
   - Local anesthetic and/or administers local anesthetic,
   - Equipment as required; ensuring to maintain sterility of the sterile field and equipment.

10. The physician/HCP performs ongoing assessment for changes (e.g. respiratory status, pain) and advises/reports changes to the MRP, as appropriate.

11. After the Midline Catheter has been inserted, the physician/HCP will:
    - Confirm placement by aspirating blood from lumen(s),
    - Using sterile syringe, prime needleless connector, attach to each lumen and flush with 0.9% NaCl through each needleless connector using push-pause technique,
    - Applies securement dressing (e.g. Tegaderm CHG) with date and initials,
    - Remove any sharps and needles and dispose of them appropriately,

- Disposes of sterile drapes and other disposable equipment, removes soiled attire, etc.

12. Physician/HCP removes gloves and performs hand hygiene as per doffing procedure.

13. Physician/HCP that inserted the midline catheter, will document:
    - The number of attempts performed,
    - Catheter type (e.g. Double lumen Teleflex catheter),
    - Length; total length, including CM exposed,
    - Insertion site,
    - Date,
    - Patient status

B. **Dressings**

Standard:

1. Dressing must be changed:
    - Every 7 days,
    - Upon suspected contamination,
    - When integrity of dressing is compromised (e.g. when damp, loosened or visibly soiled),
    - Unable to visualize the insertion site (e.g. dried blood, blood clot, etc.).

2. Dressings must be clearly labeled with:
    - Date,
    - Time,
    - Initials of the HCP.

3. Cleanse an area larger than the size of the dressing using friction, for no less than 15 seconds, in a crosshatch technique.

4. Allow site to completely dry prior to dressing application to prevent site irritation.

Dressing / Assessment	**Frequency**
Initial dressing	• Transparent dressing **with** Chlorhexidine (CHG) pad (e.g. Tegaderm CHG) – change in 7 days and PRN (e.g. If dressing is lifting, or if exit site not visible (e.g. blood clot), remove and apply new dressing for total of 7 days, unless otherwise ordered. • Other transparent dressing (e.g. Tegaderm IV Advance): Change within **24 hours** of insertion.
Site assessment	• Every shift (minimally every 12h) and PRN.
Securement Dressing/device	• Change every 7 days **and** PRN (e.g. damp/loose)
Dry gauze (e.g. Medipore dressing, if indicated for drainage/oozing)	• Change every 24 hours and PRN.

Procedures:

1. Obtain equipment:
   - 2 pairs clean gloves
   - 1 mask with visor for HCP
   - 1 mask for patient, if tolerated
   - 2 - Chlorhexidine 2% with Isopropyl Alcohol 70% swab sticks or alternative cleanser (e.g. Povidone-Iodine 10%)
     Note – May need more swab sticks if site contains exudate.
   - Dressing: Transparent securement dressing (e.g. Tegaderm IV Advanced or as ordered by MRP)
   - 2x2 sterile gauze for wicking sites with drainage (if indicated)

   If infection suspected:
   - 0.9% NaCl (syringe or vial to cleanse site)
   - Culture and Sensitivity (C&S) swab (requires order from MRP
2. Perform positive patient identification, as per the *Positive Patient Identification* – Policy and Procedure.

3. Encourage patient to perform hand hygiene and apply mask, if tolerated.

4. Perform hand hygiene and don appropriate PPE.

5. Complete dressing change using aseptic/no-touch technique:
   a. Remove old dressing, ensuring stabilization of the catheter
   b. Remove gloves and perform hand hygiene
   c. Apply new clean gloves
   d. Assess:
      - **Site and track** of the vein including the chest and neck for the presence of:
        - Edema
        - Erythema
        - Drainage/leaking of fluid
        - Skin colour

Note: If infection suspected, swab site and collaborate with MRP for an order for a C&S swab. Refer to How to Obtain a Swab for Culture. Refer to Adult (18 years of age or older) Central Venous Access Devices (CVAD) Care and Maintenance – Patient Care Standard.

- **The catheter:**

  Note: Confirm that the external length measurement is unchanged since insertion; verify with every dressing change and once per shift to ensure it has not accidentally dislodged or migrated.
  - If bleeding noted, apply manual digital pressure until bleeding subsides,
  - If the Midline catheter is partially dislodged/migrated, **DO NOT use advance or remove**. Secure in place and notify MRP to determine plan of care.
  - If the Midline catheter has totally dislodged/migrated out, reassure the patient, clean site with 2% chlorhexidine and 70% isopropyl alcohol swab and apply dressing, preferably Tegaderm CHG dressing (use alternative if patient has an allergy to chlorhexidine) and digital pressure, if required **AND** notify MRP.

- **Axilla and chest** wall for:

- Pain,
- Heat,
- Palpable venous cord (phlebitis that tracks further along the length of the vein, greater than 2.54 cm (1 in) in length, eventually leading to induration and a “palpable venous cord”.

6. Cleanse the site with 2% chlorhexidine and 70% isopropyl alcohol or alternative cleanser, utilizing a crosshatch cleaning technique, **for no less than 15 seconds** and allow to completely dry.

7. Apply appropriate dressing.

8. Remove mask from patient or patient removes mask and performs hand hygiene.

9. Remove PPE and perform hand hygiene as per doffing procedure.

10. Document assessment and intervention in the patient’s health record.

How to Obtain a Swab for Culture Procedures:

1. Remove dressing.

2. Remove gloves and perform hand hygiene.

3. Apply clean gloves.

4. Cleanse area with 0.9% NaCl.

Note: Swabbing area prior to cleansing with 0.9% NaCl may result in a false positive result.

5. Obtain swab by rolling a culture swab once forwards and backwards at the insertion site.

6. Cleanse with 2% chlorhexidine with 70% isopropyl alcohol swabs, or alternative as required.

7. If there is exudate or if MRP has ordered ointment or cream to the site, a gauze and tape dressing **must** be ordered by prescriber, for the duration of the treatment or until infection resolved, and changed q24h. Once treatment course completed or infection resolved, the MRP **must** re-order the standard dressing.

8. Apply sterile transparent dressing (e.g. Tegaderm I.V. Advance).
9. Remove mask from patient or have patient remove mask and performs hand hygiene.

10. Remove PPE and perform hand hygiene as per doffing procedure.

11. Document assessment and intervention in the patient’s health record.

C. Tubing and Needleless Connectors:

Standard:

1. Clamping is necessary for Midline Catheter when not in use (e.g. no infusion in progress).
2. Use gauze square for a better grip, to remove needleless connector(s), if required.
3. Allow 2% chlorhexidine and 70% isopropyl alcohol cleanser to completely dry before applying new needleless connector(s) and **DO NOT** over tighten connections. Over-tightening and/or applying new needleless connector(s) to the hub when not dry can lead to the inability to remove the needleless connector(s) and breakage of the midline catheter hub.
4. When flushing, use turbulent (i.e. push-pause) flush method.
5. When accessing; aspirate gently – pull back 1 mL and pause for 1-2 seconds, holding continuous pressure. Maintain negative pressure on plunger and **PULL SLOWLY**, staying just ahead of the blood flow.
    - If unable to confirm blood return, position the patient in gravity dependent position with palm up and wait for 30 – 60 seconds to allow for venous pooling. Attempt to flush with 0.9% NaCl and repeat assessment for blood return.
    - If after repositioning patient, no blood return confirmed, change needleless connector as per instructions above, and attempt to flush with 0.9% NaCl. Repeat assessment for blood return.
    - If blood return remains absent, consult MRP for plan of care.
6. **Changing tubing and Needleless Connectors:**

Tubing and Needleless connector	Frequency
Administration sets, filters, extension sets	• **Continuous infusions:** Every 96 hours and/or PRN (primary and secondary continuous infusions) (INS, 39(S1):84). • **Intermittent infusions:** (whenever there is a break in the system it is considered an intermittent infusion): Every 24 hours and/or PRN
Needleless connector (e.g. Max Zero)	• Every **96 hours and/or:** o Prior to blood culture collection o Contaminated/suspected contamination o Residual blood/debris o Compromised membrane integrity (e.g. unable to aspirate, visible leakage) o As required
Intravenous Solutions A) Solutions that are mixed/prepared on the patient units (e.g. antibiotics)	• **Every 24 hours** (regardless if continuous or intermittent infusion; unless otherwise indicated as per IV monograph) as there is increased risk of contamination when medication is being prepared

Tubing and Needleless connector	Frequency
B) Commercially and/or pharmacy prepared solutions (e.g. 0.9% NaCl) and medications (e.g. Heparin)	• **Every 96 hours. Note:** Coordinate tubing change with solution/medication bag changes when approaching the 96-hour mark, to avoid wasted products **OR** as per the expiration date indicated for medication compounds prepared by Pharmacy Services; discard after expiration date. • If the infusion bag lasts longer than 96 hours, change the tubing at 96-hour mark and discard the remainder of the infusion bag. Hang a new infusion bag with new tubing.
Blood products	As soon as possible after the transfusion and/or after 2 units or maximum 4 hours. **Exception**: Refer to *Blood and Blood Product: Massive Transfusion (Adult)* Policy and Procedures
Lipids	• Lipid containers and tubing every **12 hours** or when not in use, using no port no filter tubing. Refer to *Parenteral Nutrition (PN) Adult* Policy and Procedure.
Amino Acids	• Amino acid containers and tubing; change every **24 hours**. Refer to *Parenteral Nutrition (PN) Adult* Policy and Procedure. **NOTE:** Dextrose concentrations greater than 10% (e.g. 16.6%) **MUST** be administered via a CVAD.
Dead-ender	• One-time use. **MUST** apply sterile dead-ender to intravenous tubing each time tubing is disconnected
➢ For all of the above: Change immediately when contamination suspected or when product integrity is compromised. ➢ For all of the above: Prepare just prior to use	

Changing Needleless Connector(s)

Procedures:

1. Obtain equipment:
   - One pair of clean gloves
   - 1 mask with visor for HCP (if not already wearing mask from dressing change)
   - 1 mask for patient, if tolerated
   - 2 -3 2% chlorhexidine with 70% isopropyl alcohol wipes, or as required per lumen
   - Needleless connector (1 per lumen) – primed with 0.9% NaCl
   - Intravenous set as needed – primed with ordered solution and using Infusion pump
   - 1-2 0.9% NaCl 10 mL prefilled syringe(s) as required, per lumen
   - 1-10cm x 10cm sterile gauze, if necessary

2. Encourage patient to perform hand hygiene and apply mask/have patient apply mask, if tolerated.

3. Perform hand hygiene and don appropriate personal protection equipment (PPE).

4. Stop all infusions and close all clamps, as required.

5. Remove all air from the syringe and attach 0.9% NaCl 10 mL prefilled syringe to needleless connector and prime.

6. While holding the Midline Catheter, use aseptic/no-touch technique to remove old needleless connector(s) and cleanse the midline catheter hub for a minimum of 15 seconds, using 2% chlorhexidine with 70% isopropyl alcohol and allow to completely dry.

7. Attach new primed needleless connector.

8. Attach 10 mL prefilled 0.9% NaCl syringe, unclamp clamps, aspirate to confirm blood return and flush using turbulent (i.e. push- pause) technique. Repeat for each lumen, as applicable. If lumen is not in use, flush with a total of 10 mL 0.9% NaCl per lumen.

9. Clamp Midline Catheter and remove syringe(s).

10. Remove mask from patient or patient removes mask and performs hand hygiene.

11. Remove PPE and perform hand hygiene as per doffing procedure.

12. Document assessment and intervention in the patient's health record.

D. Intravenous Solutions

Standard:

- **Only solutions that can be administered via the intravenous route will be administered via a midline catheter.**
- **Do not** use for continuous vesicant therapy, infusates with osmolarity greater than 900 mOsm/L or parenteral nutrition with dextrose concentration greater than 10%. Refer to *Peripheral Venous Access Device (PVAD)* – Patient Care Standard, product monograph and/or Lexicomp online resource.

1. Ongoing monitoring will be as follows:
   - **Site:** every hour and PRN by:
     - Observing/asking the patient if there are and signs of discomfort at the insertion site,
     - Inspect insertion site for complications (e.g. phlebitis, infiltration). Refer to Appendix C.
     - Suspected infusion related infection/complications; the MRP will be notified to obtain treatment orders
       - Document any infusion-related complications
   - **Solutions:**
     - Ensuring correct solution/medication is hung,
     - Assessing expiration date,

- Ensure correct amount of solution is infusing/infused as prescribed,
- Ensure correct flow rate (i.e. count flow rate/check rate on infusion pump),
- Check patency of intravenous catheter (i.e. functionality).

2. Fluid intake and output will be monitored and documented, as per the *Fluid Balance* Patient Care Standard.

3. For suspected infusion related infection/complications, the MRP will be notified to determine plan of care.

E. Accessing, Flushing/Locking and Occlusion

Standard:

- Midline Catheters will be assessed for patency and flushed with 20 mL of 0.9% NaCl before and after:
  - With tubing change
  - Each infusion
  - Administration of medication
  - Blood and/or blood products,
  - Lipid infusion
  - Blood specimen collection
  - Flushed BID when not in use (e.g. no infusion in progress)

Note: When there is a continuous infusion in progress and infusing well, the lumens **DO NOT** require flushing as patency established. Refer to *Adult (18 years of age and older) Central Venous Access Device - Care and Maintenance* – Patient Care Standard.

1. **Accessing:**
   a) Cleanse each needleless connector with 2% chlorhexidine and 70% isopropyl alcohol for a minimum of 15 seconds and allow to completely dry.
   b) Attach 0.9% NaCl prefilled syringe and assess patency of each lumen for:
      - Ease of blood return,
      - Lack of resistance to flushing,
      - Colour and amount of return.

2. **Flushing:**
   a) Flush each lumen with 20 mL of 0.9% NaCl prefilled syringes using turbulent (i.e. push-pause) flush method.

3. **Locking:**
   a. Lock midline catheters with 20 mL of 0.9% NaCl.
   b. Use turbulent (i.e. push-pause) flush method and clamp. Remove syringe.

Refer to Adult (18 years of age and older) Central Venous Access Device – Insertion, Removal, Occlusion, Blood Specimen, Implanted Ports) – Patient Care Standard.

4. **Occlusion:**
   - Should occlusion be suspected, reposition the patient, change out needleless connectors and reattempt.

- If unable to aspirate or flush, notify MRP to determine plan of care (e.g. removal, re-site).
- **DO NOT** administer Alteplase (Cathflo) to unblock.

F**. Blood Specimen Collection**

Standards

- Midline Catheters may be used for routine blood specimen collection.
- Prior to collecting blood specimen via Midline Catheter, stop all infusions on collection side, for a minimum of 1-3 minutes prior to obtaining sample.
    - Caution must be taken when interpreting drug level results when samples are taken from the same catheter used for drug infusion.
    - Disinfect needleless connectors with 2% chlorhexidine and 70% isopropyl alcohol for a minimum of 15 seconds prior to access,
    - Flush with 10 mL 0.9% NaCl prior to blood specimen collection,
    - Discard 6 mL of blood prior to obtaining sample, using 10 mL syringe,
    - Use the indirect, syringe method **ONLY** using transfer device to obtain blood specimen samples,
    - Collect blood specimens using order of draw (Appendix D),
    - Flush with 20 mL of 0.9% NaCl using turbulent (i.e. push-pause) technique, post sampling.

Procedures:

1. Obtain equipment.
    - Blood Transfer Device (Appendix E),
    - Required number of blood specimen tubes,
    - 2-3 Empty 10 mL syringe (use one syringe for discard) or as required,
    - Clean gloves,
    - Mask/mask with visor ,
    - Mask for patient, if tolerated,
    - 2% chlorhexidine with 70% isopropyl alcohol wipes,
    - 3 - 10 mL prefilled 0.9% NaCl syringes for flushing,
    - Sterile dead ender if required.

2. Perform positive patient identification, using 2 positive patient identifiers with specimen labels at the bedside. Refer to *Positive Patient Identification* – Policy and Procedure.

3. Stop all infusions for 1 - 3 minutes prior to blood draw. Disconnect tubing(s) and using aseptic technique: connect dead ender to end of tubing(s).

4. Determine the order of draw when obtaining multiple specimens (Appendix D).

5. Apply mask to patient or have patient apply mask, if tolerated, or have patient turn head in the opposite direction (i.e. away from site).

6. Perform hand hygiene and done PPE as per donning procedure.

7. Cleanse needleless connector(s) with 2% chlorhexidine with 70%isopropyl alcohol using friction minimally for 15 seconds and allow to completely dry.

8. Attach 0.9% NaCl pre-filled syringe, aspirate and flush midline catheter.

9. Attach empty pre-marked “discard” 10 mL syringe to needleless connector.

10. Withdraw 6 mL of blood; aspirate gently – pull back 1 mL and pause for 1-2 seconds, holding continuous pressure. Maintain negative pressure on plunger and PULL SLOWLY, staying just ahead of the blood flow.

11. Discard syringe into appropriate container.

12. Attach 2nd empty syringe to midline needleless connector, and aspirate the amount of required blood for the samples.

13. Using the blood transfer device, transfer the blood sample into the first blood collection tube (noting the order of draw and the number of inversions) – **DO NOT** use a needle to transfer blood to the specimen tube.

14. Repeat as necessary depending on the samples required.

15. Cleanse needleless connector with 2% chlorhexidine with 70% isopropyl alcohol using friction for 15-30 seconds and allow to completely dry.

16. Flush catheter with 20 mL 0.9% NaCl, using turbulent (i.e. push-pause) technique.

17. Remove syringe and clamp. Reconnect infusion as ordered, if applicable.

18. Label all blood tubes with appropriate labels. Labels should be marked with your electronic mnemonic, date, and time of collection as per *Inpatient Blood Collection* - Policy and Procedure.

19. Dispose equipment appropriately.

20. Remove mask from patient and performs hand hygiene.

21. Remove PPE and perform hand hygiene as per doffing procedure.

22. Ensure that transport of specimens to the Laboratory is timely and follow procedures as per clinical area.

23. Document the following in the patients’ health record:
    - Laboratory specimens collected,
    - Complications during collection, if any,
    - Subsequent actions taken, if complications occurred.

G. **Blood Culture Collection Procedure:**

- Obtain blood culture collection using the indirect syringe method **ONLY.**
- **DO NOT** flush and **NO** blood discard (e.g. 6 mL) prior to blood culture collection.

Procedures:

1. Gather supplies:
   - Mask with visor, for health care provider
   - Mask for patient, if tolerated
   - Pair of clean gloves
   - Blood culture bottles (1-anaerobic and 2-aerobic)
   - 3 -Transfer devices (Appendix E)
   - 3- empty 10 ml sterile syringes
   - 3- 2% chlorhexidine with 70% isopropyl alcohol swabs
   - 3- Alcohol swabs
   - 2 -10 ml 0.9% sodium chloride pre-filled syringe
   - Needleless connector (1 per lumen to be cultured)
   - Medication label
   - Specimen labels
   - Biohazard specimen bag

2. Perform positive patient identification with 2 positive patient identifiers, including specimen. Refer to *Positive Patient Identification* – Policy and Procedure.

3. Apply mask to patient or have patient apply mask, if tolerated.

4. Perform hand hygiene and don PPE as per donning procedure.

5. Clamp midline catheter.

6. Remove needleless connector, of the lumen to be cultured.
   - If multiple lumens to be cultured, follow same steps per lumen.

7. Cleanse the hub of the catheter with 2% chlorhexidine with 70% isopropyl alcohol swab using friction for a minimum of 15 seconds.

8. Allow hub to completely dry before applying new needleless connector.

9. Apply new needleless connector. **Do not prime needleless connector**.

10. Cleanse needless connector with 2% chlorhexidine with 70% isopropyl alcohol swab and allow to completely dry. **Do not flush or draw up discard prior to draw.**

11. Attach an empty 10 ml sterile syringe, unclamp midline and aspirate 8-10 ml of blood **(this is priming the needleless connector).**
    - Do not direct connect culture bottles to line.
    - **Use the syringe method only**.

12. Repeat steps #10 - 11 per culture bottle being collected, using a new syringe and transfer device per blood culture bottle and/or for each lumen if multiple lumens cultured. **Note:** if culturing multiple lumens, repeat steps # 6 – 12 for each lumen/collection.

13. Attach transfer set to the end of each 10 mL syringe and set aside, ensuring not to contaminate specimen.

14. Cleanse the needless connector with 2% chlorhexidine and 70 % isopropyl alcohol using friction and flush with 20 mL 0.9% NaCl, using push/pause (turbulent) method. Refer to *CVAD Care and Maintenance*- Patient Care Standard.

15. Remove dust cover(s) from blood culture bottle(s) and disinfect the culture bottle(s) with alcohol swab(s) **(use alcohol only).**

16. Instill blood into culture bottles. Refer to the *Laboratory Medicine Blood Culture Collections PRE02.22* for further details regarding blood culture collections.

17. Apply specimen labels that include mnemonic, date and time, to culture bottles and place in biohazard bag.

18. Remove mask from patient or patient removes mask and performs hand hygiene.

19. Remove PPE and perform hand hygiene as per doffing procedure.

20. Document in the patients' health record.

I. Midline Catheter Removal

Procedures:

1. The MRP to order removal of the Midline Catheter (e.g. patient is being discharged) as appropriate.

2. Notify MRP of signs and symptoms of suspected CRBSI and determine plan of care (e.g. blood cultures, catheter tip for culture & sensitivity) **before** removing the midline catheter.

3. Detach all administration sets and aspirate 6 mL (i.e. discard) from the lumen(s) prior to catheter removal in the event of extravasation, to remove medications from the catheter lumen and as much as possible from the tissue

4. Gather equipment:
   - 1-2% Chlorhexidine (CHG) with 70% isopropyl alcohol swab stick(s). If alternative skin prep is required due to rash or sensitivity, tincture of iodine, an iodophor (e.g. Povidone- iodine 10%), or 70% alcohol may be used
   - 1 - 10 cm x 10 cm sterile gauze (as many as needed)
   - 2- pairs of clean gloves
   - Mask with visor

- Mask for patient, if tolerated
- Simple sterile dressing or pressure dressing as required
- Sterile scissors and sterile container if catheter tip culture required

5. Obtain order from the Most Responsible Practitioner (MRP) prior to removal and perform positive patient identification using 2 positive patient identifiers. Refer to *Positive Patient Identification* – Policy and Procedure.

6. Prepare equipment, including preparation of dressing.

7. Position patient's arm so that it is a 45-degree angle to their body. This allows for a straight pathway for catheter removal.

8. Encourage patient to perform hand hygiene and apply mask or have patient apply mask, if tolerated.
9. Perform hand hygiene and don PPE.

10. Remove dressing and assess site. If signs present of possible infection, collaborate with MRP to determine plan (e.g. blood cultures and catheter tip culture).

11. Remove and dispose of used gloves and dressing.

12. Perform hand hygiene.

13. Apply new clean gloves.

14. Cleanse the site with 2% chlorhexidine with 70% isopropyl alcohol or alternative if required and allow to completely dry.

15. Apply sterile gauze over the exit site and have the patient perform Valsalva maneuver while slowly and gently removing the catheter.
    - If the patient is unable to follow instructions or perform Valsalva maneuver, remove the catheter at the end of expiration.
    - **I**f resistance encountered, reposition patient and re-attempt. If resistance remains after repositioning patient, stop immediately, secure the catheter with a dressing (e.g. Medipore) and notify MRP as forcing resistance may result in catheter facture or embolism.

16. Apply continuous uninterrupted pressure with sterile gauze for 5 minutes.

17. Examine catheter to ensure it is intact and in its entirety; refer to insertion procedure record. If any concerns, notify MRP and anticipate an order for x-ray to rule out catheter embolization.

18. Once bleeding has stopped, examine the site, noting any abnormalities. Apply sterile dressing to site.

19. Remove mask from patient/patient removes mask and performs hand hygiene.

20. Dispose of supplies, remove gloves and PPE and perform hand hygiene as per doffing procedure.

21. Document the procedure and assessments in the patient's health record.

Reference(s)

Adult (18 years of age and older) Central Venous Access Device (CVAD) Care and Maintenance – Patient Care Standard. Lakeridge Health.

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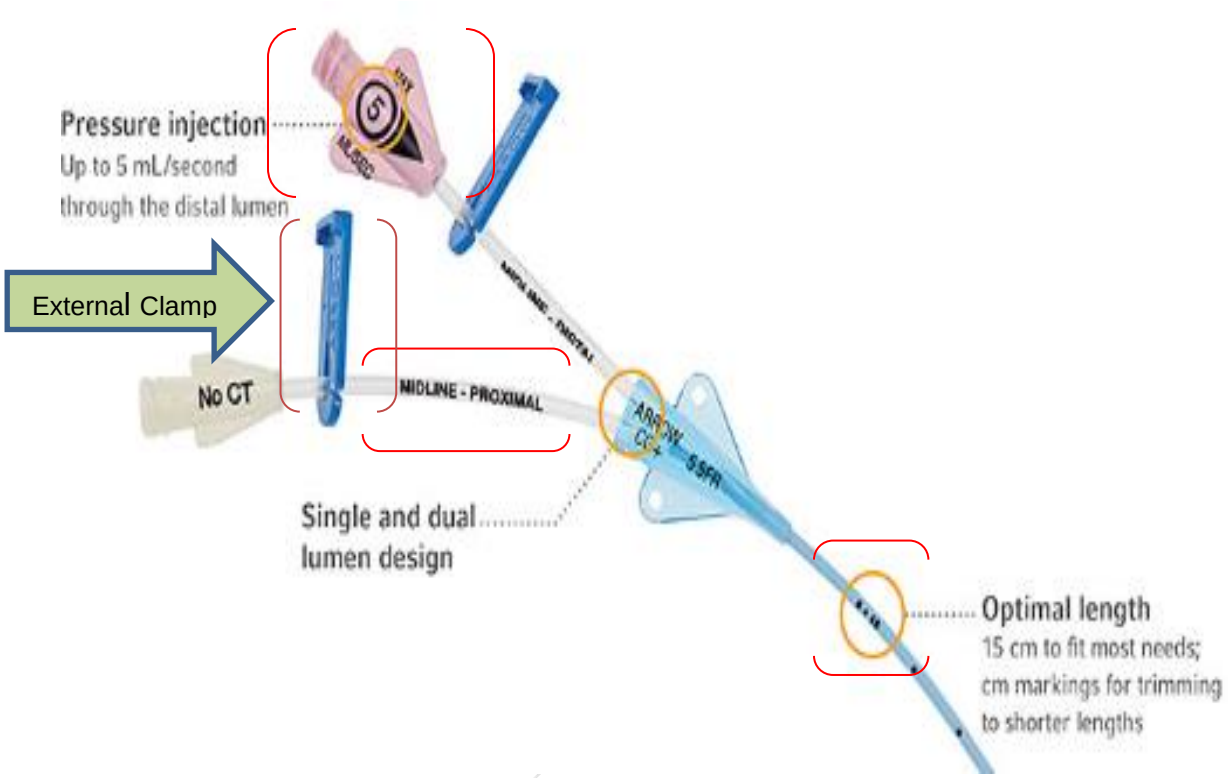
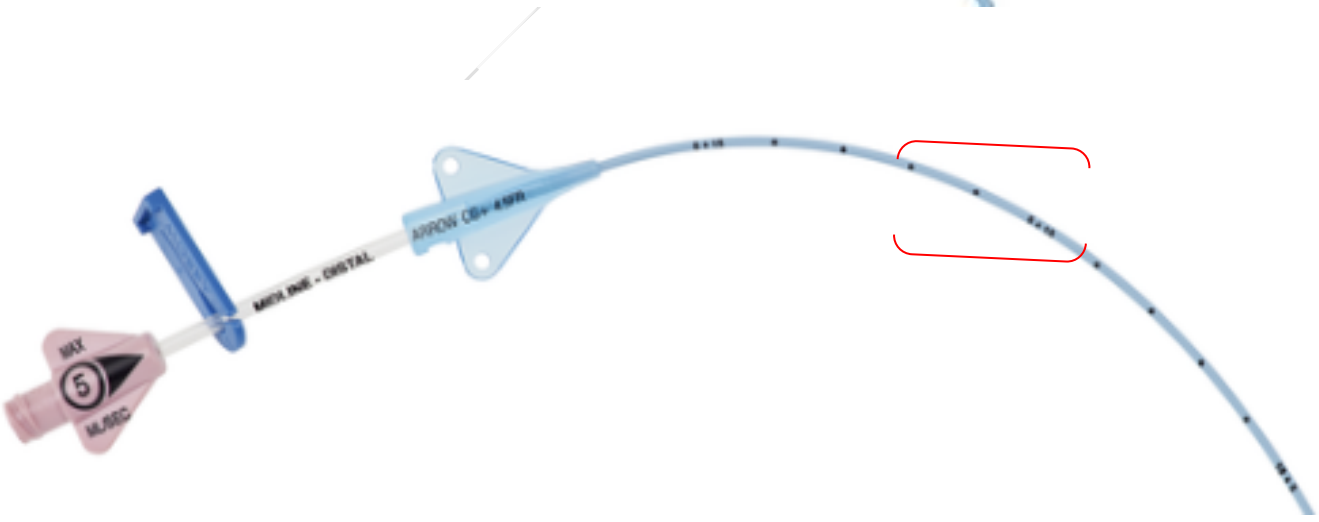
Appendix A:

Midline Catheter Example: Double and Single Lumen





Appendix B:

Potential Post-Insertion Complications

*** Signs and symptoms of complications **MUST** be reported to MRP immediately. ***

Possible Causes	Signs and Symptoms
Localized infection	• Erythema • Pain/tenderness at the catheter site • Discharge (e.g. purulent)
Sepsis	• Fever • Chills • General malaise • Rigors • Hypotension • Tachycardia • Elevated white blood cell count
Phlebitis	• Warmth • Erythema along the course of the vein • Pain upon palpation • Palpable venous cord
Venous Thrombosis	• Leaking of fluid from entry site • Edema; moderate to severe, affecting collateral (e.g. shoulder, chest, neck, • Discolouration • Pain in the affected extremity • Fever
Partial Catheter Occlusion	• Ability to flush but not aspirate • Leakage at the insertion site • Pain/discomfort with infusion
Complete Catheter Occlusion	• Inability to aspirate or flush/infuse

Appendix C
Phlebitis and Infiltration Scales

Visual Infusion Phlebitis Scale	
Visual Infusion Phlebitis Score (VIP)	**Intervention**
1 – IV site appears healthy	Continue to monitor site
2 – One of the following is evident: Slight pain near IV site or slight redness near IV site	Possible first signs of phlebitis – continue to monitor
3 – Two of the following are evident: Pain at IV site, erythema, or swelling	Early stage of phlebitis – re-site the cannula
4 – All of the following signs are evident: Pain along the path of the cannula, induration	Medium stage of phlebitis – re-site the cannula; consider treatment
5. All of the following signs are evident and extensive: Pain along path of cannula, erythema, induration, palpable venous cord	Advanced stage of phlebitis or start of thrombophlebitis – re-site the cannula; consider treatment
6. All of the following signs are evident and extensive: Pain along path of cannula, erythema, induration, palpable venous cord, pyrexia	Advanced stage of thrombophlebitis – initiate treatment; re-site cannula
Journal of Infusion Nursing (2021). Infusion Therapy Standards of Practice: Standard 46: Phlebitis. 44(139). Potter and Perry (2019). Canadian Fundamentals of Nursing, 40 (1051).	

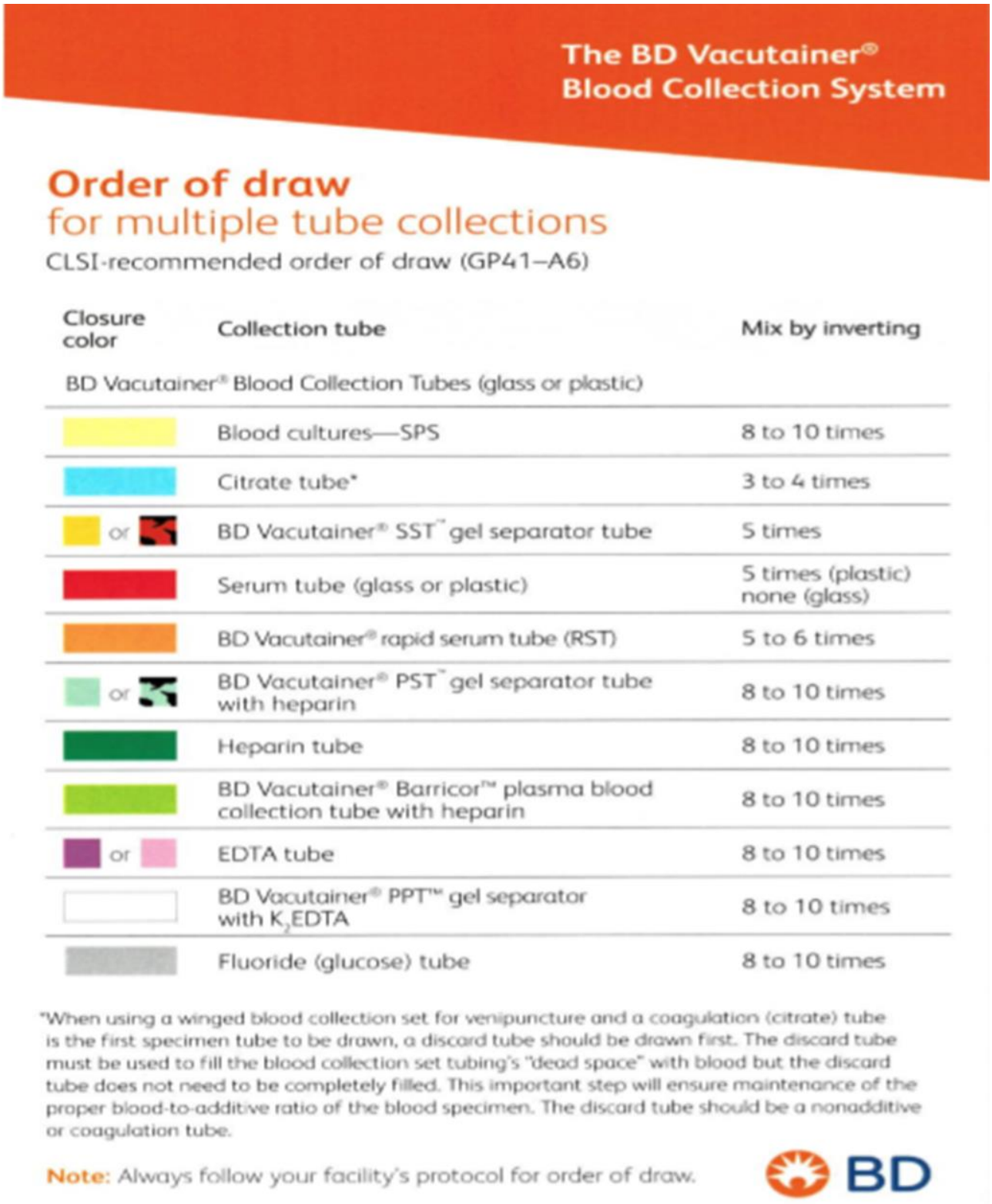
Phlebitis Scale		
0-4 Phlebitis Scale	**Assessment**	**Intervention**
Grade 0	No symptoms	No intervention
Grade 1	Erythema at access site with or without pain	**Promptly discontinue the infusion and notify the MRP**
Grade 2	Pain at access site with erythema and/or edema	
Grade 3	Pain at access site with erythema, possible numbness	
Grade 4	Pain at access site with erythema, streak formation, palpable venous cord (greater than 1 inch in length), purulent drainage	
Journal of Infusion Nursing (2021). Infusion Therapy Standards of Practice: Standard 46: Phlebitis. 44(139)		

Infiltration Scale		
Infiltration Scale	**Assessment**	**Intervention**
Grade 0	No symptoms	No intervention
Grade 1	Skin blanched, edema less than 1 inch, cool to touch, with or without pain	**Promptly discontinue the infusion and notify the MRP**
Grade 2	Skin blanched, edema 1-6 inches, cool to touch, with or without pain	
Grade 3	Skin blanched/translucent, gross edema greater than 6 inches, cold to touch, mild to moderate pain, possible numbness	

Grade 4	Skin blanched/translucent, skin tight/leaking/discoloured, bruised, swollen, gross edema greater than 6 inches, deep pitting tissue edema, circulatory impairment, moderate to severe pain, infiltration of any amount of blood product, irritant or vesicant	
Canadian Fundamentals. Potter and Perry (2019). 40(1051)		

Appendix D

Blood Specimen Collection: Order of Draw



The BD Vacutainer®
Blood Collection System

Order of draw
for multiple tube collections

CLSI-recommended order of draw (GP41–A6)

Closure color	Collection tube	Mix by inverting
BD Vacutainer® Blood Collection Tubes (glass or plastic)		
	Blood cultures—SPS	8 to 10 times
	Citrate tube*	3 to 4 times
or	BD Vacutainer® SST™ gel separator tube	5 times
	Serum tube (glass or plastic)	5 times (plastic) none (glass)
	BD Vacutainer® rapid serum tube (RST)	5 to 6 times
or	BD Vacutainer® PST™ gel separator tube with heparin	8 to 10 times
	Heparin tube	8 to 10 times
	BD Vacutainer® Barricor™ plasma blood collection tube with heparin	8 to 10 times
or	EDTA tube	8 to 10 times
	BD Vacutainer® PPT™ gel separator with K_2EDTA	8 to 10 times
	Fluoride (glucose) tube	8 to 10 times

*When using a winged blood collection set for venipuncture and a coagulation (citrate) tube is the first specimen tube to be drawn, a discard tube should be drawn first. The discard tube must be used to fill the blood collection set tubing's "dead space" with blood but the discard tube does not need to be completely filled. This important step will ensure maintenance of the proper blood-to-additive ratio of the blood specimen. The discard tube should be a nonadditive or coagulation tube.

Note: Always follow your facility's protocol for order of draw.

BD

Appendix E:

Transfer Device for Blood Specimen and Blood Culture Collection