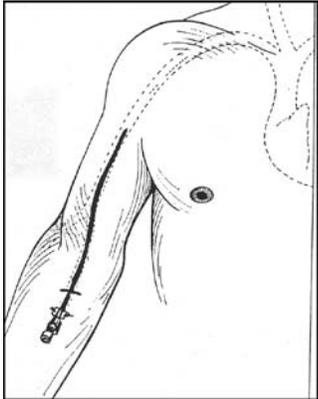


## Appendix E: Overview of Vascular

TYPE OF DEVICE	CONSIDERATIONS
<p><b>Peripheral – Short</b></p> <p><b>Device Description:</b> Catheter, less than 3 inches (7.5 cm) in length; over-the-needle catheter is most common. Inserted by percutaneous venipuncture, generally into a hand or arm vein (Halderman, 2000).</p>	<p><i>Peripheral catheters should be used for anticipated IV therapy not greater than 6 days, infusions which are iso-osmotic or near iso-osmotic and whose pH value is between 5 – 9.</i> <i>Central access is recommended for vesicant drugs.</i></p> <ul style="list-style-type: none"> <li>■ Repeated venipunctures may be needed to maintain IV access.</li> <li>■ Infiltration, phlebitis or catheter obstruction can interrupt therapy.</li> <li>■ Dwell time and types of medications that can be given are limited.</li> </ul> <p style="text-align: right;">(Halderman, 2000)</p>
<p><b>Peripheral – Midline</b></p> <p><b>Device Description:</b> Between 3 – 8 inches (7.5 – 20 cm) long; inserted within 1.5 inches (3.75 cm) above or below the antecubital fossa. Catheter tip ends in the peripheral vasculature below the axilla (Halderman, 2000).</p> 	<p><i>Midline catheters should be considered for IV therapy where more than 3 IV catheters may be needed, infusions which are iso-osmotic or near iso-osmotic and whose pH value is between 5 – 9.</i> <i>Central access is recommended for vesicant drugs.</i></p> <ul style="list-style-type: none"> <li>■ Maintains IV access without repeated venipunctures.</li> <li>■ Requires a large diameter vein such as the basilic vein.</li> <li>■ Upper arm contractures, injury or other vascular or musculoskeletal conditions may prevent successful insertion.</li> <li>■ Types of medications that can be infused are limited.</li> </ul> <p style="text-align: right;">(Halderman, 2000)</p>

## Access Devices

### DISCUSSION OF EVIDENCE

#### Gauge and Length of Device

- The vasculature shall accommodate the gauge and length (INS, 2000).
- Select the smallest gauge and shortest length (Camp-Sorrell, 1996; CDC, 2002; INS, 2000; Markel Poole, 1999).

#### Length of Dwell

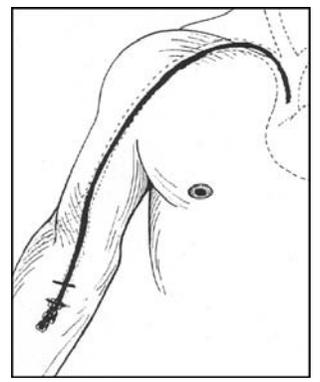
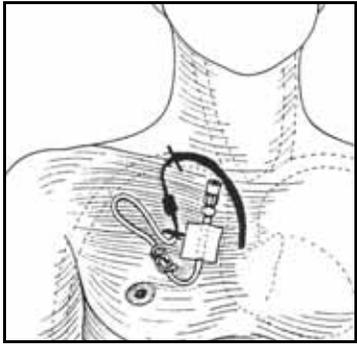
- Three days has been established as the maximum length of time to use peripheral intravascular lines. Health Canada retains 3 days as the upper limit for peripheral sites in all settings (Health Canada, 1997).
- Peripheral veins are prone to phlebitis and subcutaneous perivenous infiltration, and the catheter should not stay in one site longer than 48 – 72 hours (Vanek, 2002a).
- Rotate sites q72 – 96 hours to reduce risk for infection and phlebitis (CDC, 2002).

#### Length of Therapy

- Steel or plastic cannula may be left in place for up to 72 hours (Health Canada, 1997).
- Use a midline catheter or PICC when the duration of therapy will likely exceed 6 days (CDC, 2002).
- Devices used for short term use (Markel Poole, 1999); Short term therapy – contraindicated for therapy longer than approximately 5 days (Vanek, 2002a).

#### Length of Therapy

- Use a midline catheter or PICC when the duration of IV therapy will likely exceed 6 days (CDC, 2002).
- For therapy of more than 5 days, to preserve the integrity of the veins and increase client comfort (Camp-Sorrell, 1996).
- Fluids and medications close to normal serum osmolality and pH to prevent vein wall irritation.
- Not recommended for the infusion of parenteral nutrition solutions, vesicants or other irritant medication (Orr & Ryder, 1993).
- Medium term (Markel Poole, 1999); short term 3 days to 6-8 weeks (Vanek, 2002a); intermediate dwell (Lawson, 2003); mean anticipated length of therapy = 13 days (King, 1995).

TYPE OF DEVICE	CONSIDERATIONS
<p><b>Central – Peripherally Inserted Central Catheter (PICC)</b></p> <p><b>Device Description:</b> A single or double lumen central venous catheter inserted via a peripheral vein – the tip terminates in the superior vena cava (SVC) (Halderman, 2000).</p> 	<p><i>PICCs are recommended for all infusion therapies. If anticipated therapy exceeds more than one year, a tunneled catheter or implanted port should be considered.</i></p> <ul style="list-style-type: none"> <li>■ May be inserted at the bedside or in radiology under fluoroscopy.</li> <li>■ Use of maximum sterile barrier during insertion (CDC, 2002; EPIC, 2001c).</li> <li>■ Low rate of infection.</li> <li>■ Upper arm contractures, injury or other vascular or musculoskeletal conditions may prevent successful insertion (Halderman, 2000).</li> <li>■ Radiographic confirmation of tip location is required prior to use.</li> </ul>
<p><b>Central – Tunneled Central Venous Catheter</b></p> <p><b>Device Description:</b> Single, double or triple lumen device, surgically tunneled through subcutaneous tissue to an exit site generally on the chest or abdominal wall. The tip rests in the vena cava. A cuff that lies in the subcutaneous tunnel, around which fibrous tissue grows, helps to secure the device (Halderman, 2000).</p> 	<ul style="list-style-type: none"> <li>■ Requires surgical placement.</li> <li>■ Cuff secures catheter in place, and prevents bacteria from migrating into the bloodstream (Halderman, 2000).</li> <li>■ Use optimum aseptic technique, including a sterile gown, gloves, and a large sterile drape for the insertion of central venous catheters (CDC, 2002; EPIC, 2001c).</li> </ul>

DISCUSSION OF EVIDENCE

**Length of Therapy**

- Duration of IV therapy will likely exceed 6 days – use for clients requiring frequent or continuous access.
- Several weeks or months (EPIC, 2001c; Winslow et al., 1995); medium term (Markel Poole, 1999).
- Intermediate to long term access in general, or the need for central vascular access (Vanek, 2002a).
- Specific diagnoses that are often associated with prolonged needs for reliable access (Bowen Santolucito, 2001).
- IV access greater than 10 – 14 days (Ryder, 1995).
- For therapy lasting more than 6 days to preserve the integrity of veins and increase comfort (CDC, 2002; Camp-Sorrell, 1996).

**Tip Position**

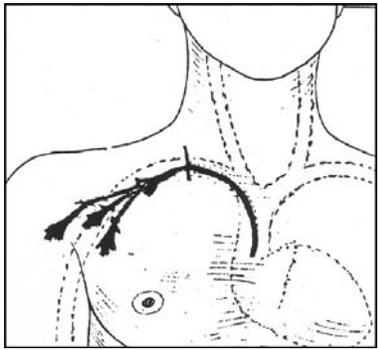
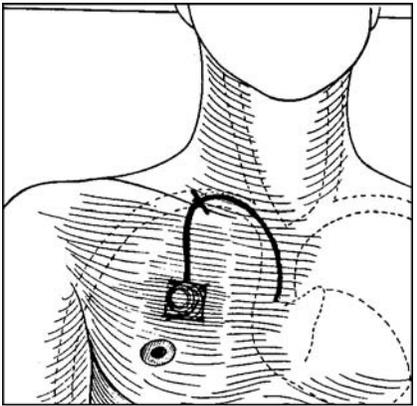
- Tip dwelling in the superior vena cava (INS, 2000).
- If the catheter tip is located outside of the vena cava, the catheter is no longer considered a central catheter and should be removed as the tip location may no longer be appropriate for the prescribed therapy (INS, 2000).

**Other considerations**

- Client selection criteria – infusion of vesicant or irritating drugs; hyperosmolar solutions, client preference, client location (home setting) (Camp-Sorrell, 1996);
- Consider the use of PICCs as an alternative to subclavian or jugular vein catheterization (EPIC, 2001c).

**Length of Therapy**

- Frequent or continuous access (CDC, 2002)
- Use a tunneled catheter or an implantable vascular access device for clients in whom long-term (>30 days) vascular access is anticipated (EPIC, 2001c)
- Tunneled catheters or totally implanted devices as appropriate for the intended purpose should be used for clients requiring long-term vascular access.
- Greater than 6 months (Winslow et al., 1995); long term (Markel-Poole, 1995),

TYPE OF DEVICE	CONSIDERATIONS
<p><b>Central – Percutaneous Non-Tunneled Catheter</b></p> <p><b>Device Description:</b> A catheter, often with multiple lumens, inserted percutaneously through the subclavian, jugular, or femoral vein (Halderman, 2000).</p> 	<p><i>Recommended for short-term access to the central circulation in critical situations, or when peripheral access is inadequate or inappropriate.</i></p> <p><i>Not generally recommended for home care, but client circumstances and care requirements should be considered on an individual basis.</i></p> <ul style="list-style-type: none"> <li>■ Use optimum aseptic technique, including a sterile gown, gloves, and a large sterile drape for the insertion of central venous catheters (CDC, 2002; EPIC, 2001c).</li> </ul>
<p><b>Central – Implanted Port</b></p> <p><b>Device Description:</b> An implanted reservoir generally placed in the chest or arm, attached to a catheter with tip position in the central vasulature. Infusate is delivered to the reservoir via an external non-coring needle and extension tubing (Halderman, 2000).</p> 	<ul style="list-style-type: none"> <li>■ Requires a minor surgical procedure for placement and removal.</li> <li>■ When not in use, requires less maintenance than other VADs.</li> <li>■ May preserve a client's body image.</li> <li>■ Medication delivery requires injection through skin (Halderman, 2000).</li> <li>■ Use optimum aseptic technique, including a sterile gown, gloves, and a large sterile drape for the insertion of central venous catheters (CDC, 2002; EPIC, 2001c).</li> </ul>

DISCUSSION OF EVIDENCE

Length of Therapy

- Short-term continuous therapy (5 – 10 days) (Camp-Sorrell, 1996).

Tip Position

- If the catheter tip is located outside the vena cava, the catheter is no longer considered a central catheter and should be removed as the tip location may no longer be appropriate for the prescribed therapy (INS, 2000).
- Tip dwelling in the superior vena cava (INS, 2000).

Length of Therapy

- Use smallest gauge needle and appropriate length to access – change every 7 days (INS, 2000).  
Needles should be changed frequently enough to prevent skin breakdown. This should be at least every 7 days (Health Canada, 1997).
- Use a tunneled catheter or an implanted vascular access device for clients in whom long-term (30 days) vascular access is anticipated (EPIC, 2001c).
- Long-term, intermittent therapy (CDC, 2002).
- Cuffed tunneled catheters or totally implanted devices as appropriate for the intended purpose should be used for clients requiring long-term vascular access (Health Canada, 1997).

TYPE OF DEVICE	CONSIDERATIONS	DISCUSSION OF EVIDENCE
<p><b>Subcutaneous Infusions (Hypodermoclysis)</b>                      a) intermittent                      b) continuous</p> <p><b>Device Description:</b>                      A fine gauge device developed specifically for the s/c route, placed in the subcutaneous tissue of the upper arm, chest wall, upper back, abdomen, thigh etc. as an alternative to vascular access, where appropriate.</p>	<ul style="list-style-type: none"> <li>■ Can be used for continuous or intermittent infusions of isotonic fluids and selected medications (e.g., s/c opioid infusion) (INS, 2000).</li> <li>■ Hypodermoclysis fluid administration is appropriate as a short-term measure to restore or to maintain hydration in clients who are mildly dehydrated or who are at risk of dehydration.</li> <li>■ Subcutaneous infusions are as effective as intravenous infusions in restoring and maintaining hydration and are less likely than intravenous infusions to produce fluid overload (O’Keeffe &amp; Geoghegan, 2000).</li> <li>■ In using as an alternative to infusion therapy, lower risk of complications.</li> </ul>	<p><b>Length of Therapy</b></p> <ul style="list-style-type: none"> <li>■ Rotate sites every 3-7 days, as necessary. Smallest, shortest gauge (INS, 2000).</li> </ul>

