

**CENTRAL VENOUS CATHETER CARE AND MAINTENANCE GUIDELINE DRAFT**

CATHETERS	CATHETER FLUSHING	DRESSING	REFLUX VALVE /CAP	BLOOD WITHDRAWAL
<p><b>Catheters without valve, with external clamp</b> (PICC &amp; Tunneled) Example:</p> <ul style="list-style-type: none"> <li>• Cook™</li> <li>• Broviac™</li> </ul>	<ul style="list-style-type: none"> <li>• When used intermittently, flush with:               <ul style="list-style-type: none"> <li><b>S – Saline</b> Adult: 5 ml Pediatric/NICU: Amount needed to clear line (Peds: Usually 3-5 ml)</li> <li><b>A - Antibiotic/I.V. solution</b> (all medications)</li> <li><b>S – Saline</b> Adult: 3 ml Pediatric/NICU: Amount needed to clear line (Peds: Usually 3-5 ml)</li> <li><b>H - * Heparin (3 ml)</b> <ul style="list-style-type: none"> <li>- Adult: 100 units/ml</li> <li>- Pediatric:                   <ul style="list-style-type: none"> <li>&lt; 12 kg - 10 units/ml</li> <li>≥ 12 kg - 100 units/ml</li> </ul> </li> <li>- NICU: 10 units/ml (maximum 3 ml) or per physician’s order</li> </ul> </li> </ul> </li> <li>• When not in use, flush as follows:               <ul style="list-style-type: none"> <li>- Adult flush q day                   <ul style="list-style-type: none"> <li>- Tunneled catheters: * 300 units of heparin diluted in 5-10 ml Normal saline (NS). (Do not use less than 5 ml)</li> <li>- PICC: 5 ml NS followed by * 3 ml Heparin 100 unit/ml</li> </ul> </li> <li>- Pediatric:                   <ul style="list-style-type: none"> <li>- Tunneled catheters: q day</li> <li>- PICC: q 8 hr</li> <li>- * With 3 ml of heparin:                       <ul style="list-style-type: none"> <li>&lt; 12 kg - 10 units/ml</li> <li>≥12 kg - 100 units/ml</li> </ul> </li> </ul> </li> <li>- NICU                   <ul style="list-style-type: none"> <li>- Tunneled catheter: q 12 hr</li> <li>- PICC: q 6-12 hr</li> <li>- *With maximum 3 ml heparin 10 units/ml or per physician’s order</li> </ul> </li> </ul> </li> <li>• After administration of viscous fluid flush with NS               <ul style="list-style-type: none"> <li>- Adult: 20 ml</li> <li>- Pediatric/NICU: Amount of NS</li> </ul> </li> </ul>	<p><b>CHANGE</b> as follows:</p> <ul style="list-style-type: none"> <li>• Gauze - q24 hrs</li> <li>• Transparent only - q72 hrs or if dressing becomes non-occlusive</li> <li>• Transparent with Biopatch™ - q5 days or if dressing becomes non-occlusive</li> <li>• Check Biopatch™ :               <ul style="list-style-type: none"> <li>- a minimum of q4h</li> <li>- before and after an infusion</li> <li>- q dressing change</li> </ul> </li> <li>• Post-bathing or when soiled/wet</li> <li>• NICU - Broviac™ only M-W-F</li> <li>• NICU – PICC dressing changes by Fellow/Nurse Practitioner</li> </ul>	<p><b>CHANGE</b> as follows:</p> <ul style="list-style-type: none"> <li>• Positive flow reflux valve q72h</li> <li>• When positive flow reflux valve becomes ineffective (e.g., leaking, soiled, cracked)</li> <li>• Change cap every time it is disconnected from catheter hub</li> <li>• Before sending patient home</li> <li>• Coordinate cap/ positive flow reflux valve change with Heparin flush</li> </ul>	<ul style="list-style-type: none"> <li>• Use only ≥10 ml syringes</li> <li>• Place fluids running into other ports on hold prior to withdrawing blood (Exception: vasoactive drugs)</li> <li>• Adult:               <ul style="list-style-type: none"> <li>- Discard 4-6 ml blood</li> <li>- Withdraw required amount of blood</li> <li>- Flush with 10 ml NS                   <ul style="list-style-type: none"> <li>* followed by 3 ml Heparin 100 units/ml diluted in 5-10 ml NS</li> </ul> </li> </ul> </li> <li>• Pediatric/NICU:               <ul style="list-style-type: none"> <li>- Withdraw blood (amount needed to clear the line)</li> <li>- Withdraw required amount of blood</li> <li>- Reinsert initial blood withdrawn</li> <li>- Flush with the amount of NS needed to clear line</li> <li>- * Follow with flush of 3 ml Heparin                   <ul style="list-style-type: none"> <li>Pediatric:                       <ul style="list-style-type: none"> <li>&lt; 12 kg - 10 units/ml</li> <li>≥12 kg - 100 units/ml</li> </ul> </li> <li>NICU:                       <ul style="list-style-type: none"> <li>10 units/ml or per physician’s order</li> </ul> </li> </ul> </li> </ul> </li> <li>• ONLY withdraw blood using the following PICC sizes:               <ul style="list-style-type: none"> <li>- Gauge 16 (Fr 5) - adult</li> <li>- Gauge 18 (Fr 4) - adult/ped</li> <li>- Gauge 20 (Fr 3) - adult/ped                   <ul style="list-style-type: none"> <li>- <i>Controversial, blood may hemolyze</i></li> </ul> </li> </ul> </li> <li>• DO NOT use the following PICC sizes to withdraw blood:               <ul style="list-style-type: none"> <li>- Gauge 24 (Fr 2) or smaller</li> </ul> </li> </ul>

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	<p>needed to clear line</p> <ul style="list-style-type: none"> <li>- NICU: PICC <math>\leq</math> 1ml</li> <li>• <b>ALWAYS use 10 ml syringe or greater (3 ml - NICU) even if the amount of solution is &lt;10 ml.</b> Small syringes create high pressures which may rupture the catheter</li> <li>• NICU: PICCS are always connected to continuous IV infusion</li> </ul>			<p>pediatric</p> <ul style="list-style-type: none"> <li>- Gauge 28 (Fr 1.2) or smaller neonate</li> </ul>
<p><b>Catheters with valve, without external clamp</b> (PICC &amp; Tunneled) Example:</p> <ul style="list-style-type: none"> <li>• Groshong™</li> </ul>	<p>The use of Heparin is not necessary:</p> <ul style="list-style-type: none"> <li>• When used intermittently, follow <b>SAS</b>:  <b>S</b> - Saline  <b>A</b> - Antibiotic/I.V. solution (all medications)  <b>S</b> – Saline</li> <li>• Flush with NS                      Adult: A minimum of 5 ml                      Pediatric/NICU: Amount needed to clear line (Peds: Usually 3-5 ml)                     <ul style="list-style-type: none"> <li>- After administration of I.V. medications/solutions</li> <li>- q 7 days when not in use</li> <li>- q cap change</li> </ul> </li> <li>• After administration of viscous fluid such as TPN flush with NS                     <ul style="list-style-type: none"> <li>- Adult: 20 ml</li> <li>- Pediatric/NICU: Amount of NS needed to clear line</li> <li>- NICU: PICC <math>\leq</math> 1 ml</li> </ul> </li> <li>• Flush with NS:                      Adult: 10 ml                      Pediatric/NICU: Amount needed to clear line (Peds: Usually 3-5 ml)                     <ul style="list-style-type: none"> <li>- Post-insertion after verifying correct placement with chest x-ray by physician</li> <li>- If blood reflux is present in the tubing</li> </ul> </li> </ul>	<p>See catheters without valve</p>	<p>See catheters without valve</p>	<ul style="list-style-type: none"> <li>• Use only <math>\geq</math>10 ml syringes</li> <li>• Place fluids running into other ports on hold prior to withdrawing blood (Exception: vasoactive drugs)</li> <li>• Adult:                     <ul style="list-style-type: none"> <li>- Discard 4-6 ml blood</li> <li>- Withdraw required amount of blood</li> <li>- Flush with 10 ml NS</li> </ul> </li> <li>• Pediatric/NICU:                     <ul style="list-style-type: none"> <li>- Withdraw blood (amount needed to clear line)</li> <li>- Withdraw required amount of blood</li> <li>- Reinsert initial blood withdrawn</li> <li>- Flush with the amount of NS needed to clear line</li> </ul> </li> <li>• Withdrawal of drug levels                     <ul style="list-style-type: none"> <li>- Flush with 3 ml NS prior to withdrawing blood</li> </ul> </li> <li>• Withdrawal of blood during or immediately after a TPN infusion                     <ul style="list-style-type: none"> <li>- Adult: Flush with 20 ml NS before drawing blood specimen</li> <li>- Pediatric/NICU: Flush with the amount of NS needed to</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>• <b>ALWAYS use 10 ml syringe or greater (3 ml - NICU) even if the amount of solution is &lt;10 ml.</b> Small syringes create high pressures which may rupture the catheter.</li> <li>• NICU: PICCS are always connected to continuous IV infusion</li> </ul>			<p align="center">clear line</p> <ul style="list-style-type: none"> <li>• ONLY withdraw blood using the following PICC sizes:                             <ul style="list-style-type: none"> <li>- Gauge 16 (Fr 5) - adult</li> <li>- Gauge 18 (Fr 4) - adult/ped</li> <li>- Gauge 20 (Fr 3) - adult/ped</li> <li>- <i>Controversial, blood may hemolyze</i></li> </ul> </li> <li>• DO NOT use the following PICC sizes to withdraw blood:                             <ul style="list-style-type: none"> <li>- Gauge 24 (Fr 2) or smaller pediatric</li> <li>- Gauge 28 (Fr 1.2) or smaller neonate</li> </ul> </li> </ul>
<p><b>Implantable Ports</b></p>	<ul style="list-style-type: none"> <li>• Use a non-coring needle to access implanted port. It may be left in place for continuous or intermittent use as a heplock. Change needle q72h.</li> <li>• When used intermittently follow <b>SASH</b>:                             <ul style="list-style-type: none"> <li><b>S</b> – Saline Adult: 10 ml Pediatric/NICU: Amount needed to clear line (Usually 3-5 ml)</li> <li><b>A</b> - Antibiotic (all medications)</li> <li><b>S/H</b> - * ¥ Heparinized Saline (10 ml)</li> </ul> </li> <li>• When not in use, flush q day with 3 ml NS * followed by 3 ml Heparin                             <ul style="list-style-type: none"> <li>- Adults 100 unit/ml</li> <li>- Pediatric/NICU:                                     <ul style="list-style-type: none"> <li>&lt;12 kg – 10 units/ml</li> <li>≥12 kg – 100 units/ml</li> </ul> </li> <li>- Frequency:                                     <ul style="list-style-type: none"> <li>Adults: q day</li> <li>Pediatric: q8h</li> <li>NICU: q12h</li> </ul> </li> </ul> </li> <li>• One time use only - flush using SASH (see above) then remove needle</li> </ul>	<p>See catheters without valves</p> <ul style="list-style-type: none"> <li>• Secure needle to port with dressing (transparent preferred) if using intermittently or continuously</li> </ul>	<p>See catheters without valves</p>	<ul style="list-style-type: none"> <li>• Discard 10 ml blood (Adult only)</li> <li>• Withdraw required amount of blood</li> <li>• Flush with 10 ml Heparinized saline solution:                             <ul style="list-style-type: none"> <li>¥ <b>10 ml = 7 ml of NS + 3 ml of Heparin</b></li> <li><b>Adult : 100 units/ml</b></li> <li><b>Pediatric:</b> <ul style="list-style-type: none"> <li>&lt; 12 kg - 10 units/ml</li> <li>≥12 kg - 100 units/ml</li> </ul> </li> <li><b>NICU: 10 units/ml</b></li> </ul> </li> </ul>

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<b>Triple Lumen</b>	<ul style="list-style-type: none"> <li>• Follow <b>SAS</b> when used intermittently</li> <li>• When not in use, flush a minimum of q8 with NS Adult: 3 ml Pediatric/NICU: Amount needed to clear line (Peds: Usually 3-5 ml)</li> <li>• Flush with NS:               <ul style="list-style-type: none"> <li>- After verifying correct placement with chest x-ray</li> <li>- After blood withdrawal or blood transfusion</li> <li>- Amount Adults: 10 ml Pediatric/NICU: Amount needed to clear line</li> </ul> </li> <li>• <b>Only use <math>\geq 10</math> ml syringes for final flush</b></li> </ul>	See catheters without valve	See catheters without valve	See tunneled catheter <u>with</u> valve
Introducer Sheath Restricted to the ICU/CMA	<ul style="list-style-type: none"> <li>• Start a continuous I.V. infusion at a minimum of 10 ml/hr immediate post insertion</li> </ul>	See catheters without valve	<b>NEVER CAP</b> Always ensure that an I.V. solution is continuously infusing at a minimum rate of 10 ml/hour to avoid clotting.	<ul style="list-style-type: none"> <li>• Stop infusion</li> <li>• Discard 5 ml of blood</li> <li>• Withdraw required amount of blood</li> <li>• Flush with 5 ml NS</li> <li>• Restart I.V. infusion</li> </ul>

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