

## Appendix 1

### Guidelines, manufacturers recommendations and clinician opinion

Current national guidelines continue to recommend the use of heparin to lock open ended CVAD's (RCN, 2010, INS 2011). The preferred lock solution concentration is Heparin 10 units/ml (INS, 2008, RCN, 2010, INS, 2011). However, there is emerging evidence that the use of heparin to lock CVAD's is changing and there is a move towards using sodium chloride 0.9% only. An on line survey undertaken in the USA showed that 45% of institutions used sodium chloride 0.9%, and 54% used heparin to lock central vascular access devices (INS 2011). A similar survey is being undertaken in the UK, to establish current practice for flushing long term CVAD's (Bravery, 2011, National Infusion and Vascular Access Society (NIVAS), 2011).

In accordance with the manufacturer's instructions for use pressure-activated valved catheters can be locked using sodium chloride 0.9% (RCN, 2010, INS, 2011). The valve may be located on the internal catheter tip or the external catheter hub (INS, 2011). Valved PICC's used in GOSH have a valve in the catheter tip.

Some manufacturers of implanted ports, open-ended catheters and CVAD's used for haemodialysis or apheresis may recommend heparin locks to maintain patency and many clinician's feel that heparin is appropriate to lock CVAD's that are infrequently accessed (Pratt et al, 2007).

Some clinician's maintain that a concentration of 10 units per ml of heparin, rather than 100 units per ml, can be used to lock implanted ports. If the patient is receiving one or more intravenous drugs each day via an accessed implanted port (needle in situ) then a concentration of 10 units per ml of heparin can be used to flush the device (Bravery, 2008, Frey, 2007, Hagle, 2007, INS, 2008). Bishop et al (2007) suggest a concentration of 10 units per ml heparinised saline is appropriate after each access or weekly for implanted ports.

When the implanted port will not be used for 4 weeks some manufacturers and clinicians recommend that a concentration of 100 units per ml of heparin is used to flush implanted ports (Frey, 2007, Hagle, 2007, RCN, 2010, Dougherty and Lister, 2008, Bravery, 2008, INS, 2008, INS, 2011). There is no research evidence to guide what concentration of heparin to use to lock implanted ports, only manufacturer's and clinician experience.