peripheral locks in adults and children older than 12 years old (American Society of Hospital Pharmacists Commission on Therapeutics, 2006).

- Either preservative-free heparin or preservative-free 0.9% sodium chloride may be used to flush a PIV line; however, catheter patency may be maintained by flushing with saline when converting from continuous to intermittent use (Infusion Nurses Society, 2011).

- After each catheter use, peripheral catheters should be locked with preservative-free 0.9% sodium chloride (Infusion Nurses Society, 2011).

Apply the Evidence: Nursing Implications

There is **low-quality evidence with a weak recommendation** (Guyatt, Oxman, Vist, et al, 2008) for using NS versus HS flush solution in pediatric IV lines. Further research is still needed with larger samples of children, especially preterm neonates, using small-gauge catheters (24 gauge) and other gauge catheters flushed with NS and HS as intermittent infusion devices only (no continuous infusions). Variables to be considered include catheter dwell time; medications administered; period between regular flushing and flushing associated with medication administration; pain, erythema, and other localized complications; concentration and amount of HS used; flush method (positive-pressure technique vs. no specific technique); reason for IV device removal; and complications associated with either solution. NS is a safe alternative to HS flush in infants and children with intermittent IV locks larger than 24 gauge; smaller neonates may benefit from HS flush (longer dwell time), but the evidence is inconclusive for all weight ranges and gestational ages.

Quality and Safety Competencies: Evidence-Based Practice*

Knowledge

Differentiate clinical opinion from research and evidence-based summaries.