

The *Infusion Therapy Standards of Practice* provide evidence-based recommendations for infusion and access device related care in any healthcare setting. Developed and published by the Infusion Nurses Society, the *Standards* have increased the frequency of the revision process from an every 5-year cycle to a 3-year cycle due to the growing base of literature and to deliver the most updated and current practice recommendations. This article provides an overview of the development process and a brief description of selected standards. Notably, a new standard entitled *Home Infusion Therapy* was added in this latest edition. The *Standards* are an essential reference that should be available to every home care agency that provides home infusion therapy.

# Update: The 2024 Infusion Therapy Standards of Practice

I have served as the chairperson of the Infusion Nurses Society (INS) Standards Committee for the 2011, 2016, 2021 editions and as co-chair of the 2024 committee. The *Standards* is a significant work having impacted clinical practice across the globe. With each edition since 2016, I have provided a summary of selected standards with a focus on application to home infusion therapy. Because of a growing body of research, the INS *Standards* have transitioned from an every 5-year update to an every 3-year update, thus this 2024 update. Important changes to the 2024 committee included the addition of non-nurse committee members including a pharmacist and an infection preventionist. Due to the strong global impact of the *Standards*, non-U.S. members have been part of the committee since 2016 with representation in 2024 from both Australia and the United Kingdom.

To review, the *Standards* provide recommendations for infusion administration and access device care including not only intravenous infusion but also subcutaneous, intraspinal, and intraosseous infusion. The *Standards* are intended for clinicians in any setting where infusion therapy is

administered including acute care, outpatient, ambulatory care, long-term care such as skilled nursing facilities, and of course, home care. This article offers a brief overview of the process used in the *Standards* development, describes the format of each standard, and provides a short summary of selected standards as applied to home care. Notably, 2024 heralds a new standard “Home Infusion Therapy.” The full table of contents for the *Standards* is found in the Table. Two additional new standards include: Drug Diversion in Infusion Therapy and Vasopressor Administration. Some standards have been combined (e.g., Vascular Access Device Planning and Site Selection) or reordered. The *Infusion Therapy Standards of Practice* can be obtained from the INS at [www.ins1.org](http://www.ins1.org).

## Development of the Standards

A brief review of the development process is provided as several new processes were employed. As a committee, we had an initial in-person meeting at the INS offices, whereas subsequent contacts and communication among the committee members included frequent virtual meetings, tele-

Lisa A. Gorski, MS, RN, HHCNS-BC, CRNI, FAAN



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phone calls, and emails. Each committee member was assigned specific standards to draft. A health sciences librarian hired by INS conducted an initial comprehensive literature search for each standard. As committee members, we collaborated with the librarian to refine search terms. All potential citations were entered into a reference citation platform (EndNote). Databases searched included the Cochrane Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, Google Scholar, Ingenta Connect, MEDLINE, PubMed, ScienceDirect, Scopus, UpToDate, and Web of Science. The committee members also reviewed reference lists from the retrieved articles, identifying additional potential references for our review. All studies and articles were appraised and abstracted into a program which allowed for generation of an evidence table.

Upon completion of the initial drafts, the first level of review ensued. This involved an entire committee review of each of the drafts with multiple meetings and continued revisions. A final draft was created by the committee and reviewed by 144 peer reviewers including 117 from the United States and 28 international reviewers representing 12 countries. Every comment from the

reviewers was evaluated by the committee and necessary revisions were made. The final document with 9 sections includes 66 standards with more than 2,500 references cited to support recommendations. The reader is referred to the *Standards* for a detailed discussion of the methodology (Nickel et al., 2024).

### Format of the Standards

The basic format of the *Standards* is unchanged. Each standard consists of two components: Standards and Practice Recommendations. The standards are declarative statements and do not include references as the standards are an expectation by which quality of practice, service, or education can be judged.

The Practice Recommendations (PR) provide specific evidence-based guidance in the implementation of the corresponding standard. Each PR is supported by evidence that is rated as reflecting the strength of the body of evidence, and all references to support the criteria are cited. The rating scale ranges from the highest ranking of “I” which represents a PR based upon a meta-analysis and other research on research (e.g., systematic review of randomized controlled trials) to the lowest

level of “V” which includes evidence such as clinical articles, case reports, and quality improvement studies. There is also a level “A/P” which is evidence from anatomy, physiology, and pathophysiology. “Committee Consensus” was used when there was a lack of or very low levels of evidence and when the committee decided that a recommendation was warranted.

## An Overview of Selected Standards

### Standard 66 Home Infusion Therapy

Although this is the final standard in the document, it is logical to begin here as it is the heart of

home infusion therapy. The first statement is as follows:

“66.1 Home infusion therapy (HIT) is provided with attention to appropriate patient selection and in collaboration with the patient/caregiver and the interprofessional team.” (Nickel et al., 2024, p. S246).

Relative to patient selection, the references for the PRs support the importance of addressing patient/caregiver preference for home infusion and their motivation, ability, and willingness to

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participate in care, that the prescribed infusion therapy and the vascular access device (VAD) are appropriate for home infusion, and that the patient's condition is stable relative to their clinical condition and infusion therapy needs. The risk for potential adverse reactions and the ability to manage/reduce risk must be addressed; examples include first dose administration and provision of infusions associated with significant risk of adverse reactions. Reimbursement is also verified to ensure the patient is fully aware of any out-of-pocket costs. Consideration for the use of telehealth is also recommended. Although there is limited literature supporting its use in home infusion, it is certainly an option for reinforcement of patient education and for ongoing monitoring, especially for patients who reside in distant geographic areas. The use, benefits, and outcomes of telehealth for home infusion administration should be a research priority.

Environmental issues, including safety, are also addressed including both patient/caregiver and clinician safety (e.g., abusive patient/caregiver behaviors, drug use, aggressive pets). Recommendations include identification of risk factors and development of an alternative plan of care if the home is, or becomes, unsafe. Other home environmental issues addressed include ensuring that emergency medications and other supportive care interventions are available in the home based upon identified infusion risks. Safety products to protect the nurse (and competency in their use) must be in place when administering hazardous drugs in the home. Specific guidance is addressed in Standard 15 Hazardous Drugs and Waste which provides a listing of special personal protective equipment tested for use with hazardous drugs (e.g., gloves, gowns, eye/face protection) and spill kits.

This standard goes on to provide additional safety recommendations based upon the type of home infusion therapy, including antimicrobial, parenteral nutrition, biologic and antineoplastics, and cardiac infusions. One area and certainly a current issue in our culture is, can we administer intravenous (IV) antibiotics to the person who injects drugs? The answer is yes, this is possible based upon careful care coordination among the interprofessional team including infectious disease, addiction specialists, and case management (Norris et al., 2019; Price et al., 2020; Suzuki et al., 2018). Some factors identified as important to

success include care coordination between infectious disease and addiction specialists and case management, patient engagement, no illicit substance use during hospitalization, a safe home, and caregiver support. A major concern is misuse of the VAD; however, studies have found the incidence of misuse is low. There are “tamper evident” products available in the marketplace.

### **Standard 5 Competency and Competency Assessment**

Standard 5 continues to be critically important for home care providers. It states that “due to the invasive, high-risk nature of infusion therapy, the clinician with responsibility for the safe delivery of infusion therapy and VAD insertion and/or management demonstrates competency in this role” (Nickel et al., 2024, p. S29). This is further addressed in Standard 66:

“66.3 Home care organizations provide a comprehensive program that includes clinician education and competency assessment, evidence-based policies and procedures, and attention to quality improvement, including infection surveillance and reporting” (Nickel et al., 2024, p. S246).

Home care agencies should not accept patients for home infusion therapy unless they are prepared by having a sound program that includes documented infusion-related competencies (Gorski, 2020). In accordance with the *INS Standards*, competency should be assessed and validated before providing patient care (e.g., upon hire/during the onboarding process) and on a continual basis as driven by organizational outcomes.

Competency to perform infusion therapy procedures is assessed using a variety of techniques. For psychomotor skills, competency is assessed in four consecutive phases: knowledge acquisition, observation, simulation (e.g., port needle insertion on a chest model), and clinical performance (Nickel et al., 2024). Other methods of competency validation include written tests to assess knowledge and clinical scenarios used to assess critical thinking skills. Qualifications for the competency “assessor” most often called the “preceptor” must be established. Substandard practice may be passed on to newly hired nurses if the preceptor is not competent with infusion administration. Preceptors should be assessed for

expertise, competence, and ability to observe and provide critique of nurses' skills. Also important is that the preceptors not only validate competent performance of the skill but also ensure the nurse is knowledgeable and understands the rationale for any given step in the observed procedure. As a nurse who has reviewed malpractice cases against home care organizations, education and competency or lack thereof, are often implicated as contributory factors to the patient's injury.

### **Standard 30 Pain Management for Venipuncture and Vascular Access Procedures**

There is a rapidly growing research base supporting pain interventions for venipuncture and vascular access procedures. In fact, the number of references for this standard grew from 51 in 2021 to 94 in the 2024 *Standards*. Although nurses may think inserting an IV catheter "will only hurt for a minute," it is distressing for many patients. Barriers that influence our decisions include underestimation of pain associated with needle-related procedures, focusing on the technical task (i.e., inserting the peripheral IV catheter [PIVC]), time, lack of orders, and cost. Standard 30.1 states that "All patients undergoing painful procedures have the right to safe and effective pain management" (Nickel et al., 2024, p. S101). It is important to engage patients about the potential for pain and involve them in decision making for pain management. Over the years, I have accessed many implanted ports, and I always ask the patient about their preferences for pain management during port access. Although many do decline, others appreciate being asked and having their pain management needs addressed.

For children who receive home infusions, it is important to understand that repeated needle-related procedures in children increase the risk for development of long-term consequences such as procedural anxiety, hospital avoidance, and even needle phobia (Lunoe et al., 2021; McMurtry et al., 2015). Research cited in this standard has shown that any type of distraction is associated with reduced anxiety and perception of procedural pain in children with reported distraction techniques including television, DVDs, videos, computers/tablets, smartphones, video games, virtual reality, humanoid robots, therapeutic clowning, breathing exercises, hypnosis, and toys (Nickel et al., 2024). Notably, the research has also found that adolescents receive less attention to

pain management. In addition to distraction, a variety of pharmacological interventions have been found to be effective in both children and adults such as topical lidocaine/prilocaine (disadvantage is length of time to anesthetic effect), needleless lidocaine, and vapocoolant spray (Nickel et al., 2024).

### **Standard 37 Site Protection and Joint Stabilization**

In the 2021 *Standards*, these two topics were separate standards. Site protection refers to "strategies used in addition to VAD insertion site securement, including interventions or products used to reduce the risk of VAD dislodgement due to pulling at the administration set; interventions to protect or disguise the VAD from manipulation; and strategies to prevent exposure of the VAD site to water or other contaminants" (Nickel et al., 2024, p. S124). These are important considerations and teaching topics for home care patients, generally more active than a patient in an acute care setting.

Many home infusion pharmacies routinely provide products, such as plastic sleeves for water protection during bathing when the patient has a midline or a peripherally inserted central catheter (PICC). When specific products are not available, the use of plastic wrap products can work well. A quick web search for IV catheter protection products will yield information about a number of different products, some designed by patients.

To reduce inadvertent dislodgment of a midline or a PICC, use of a single tubular sleeve over the upper arm serves to protect the area and eliminate the catheter dangling down the arm; the catheter and extension sets can be tucked up under the sleeve. A central line vest that serves to secure the catheter has been studied in pediatric patients (St. Pierre-Hetz et al., 2022).

Joint stabilization is generally not an issue for home infusion. PIVCs should *not* be placed in an area of flexion in the home care patient due to interference with activities of daily living. The exception might be the patient who receives an intermittent infusion for a few hours with the PIVC removed post infusion (e.g., a periodic biologic infusion). For these short infusions, most patients will be cooperative in reducing movement should the PIVC require temporary insertion in an area of flexion.

### **Standard 38 Flushing and Locking**

Maintaining patency of the VAD is always a priority and an important patient education focus for

those patients or caregivers who self-administer their infusions. To review, flushing is “the act of moving fluids, medications, blood and blood products out of the vascular access device into the bloodstream; used to assess and maintain patency,” whereas locking refers to the final flush for the purpose “to maintain patency in between VAD use and/or reduce risk of catheter-associated bloodstream infection” (Nickel et al., 2024, pp. S263, S265). The general guideline for locking is to use a volume that is at least twice the priming volume of the catheter and any add-on devices (e.g., extension set). For any type of peripheral catheter, including midlines, preservative free 0.9% sodium chloride (i.e., saline) is used to “lock” the catheter after each intermittent infusion or at least every 24 hours. For peripheral catheters, 2- or 5-mL prefilled syringes are often supplied by the pharmacy and will exceed the calculated priming volume, which is acceptable. Locking of central vascular access devices (CVADs), such as PICC, may be accomplished with either saline or heparin (e.g., 10 unit/mL). The standard includes the recommendation that the prefilled syringes are single-use items; separate saline syringes are used for flushing and establishing patency before the infusion and for the post-infusion flushing procedure. This is due to the risk of contamination of the syringe tip when it is set aside for use after the infusion.

Antimicrobial locking solutions may be prescribed for patients with long-term CVADs, for example, those who have a history of multiple catheter-associated bloodstream infections. A home care patient population that might require antimicrobial locking includes those receiving parenteral nutrition. Such solutions include high concentrations of an antibiotic or antiseptic solutions such as 70% ethanol, taurolidine, and 4% tetrasodium ethylenediaminetetraacetic acid (Nickel et al., 2024). Although there is variation, the locking may require being instilled and left in the CVAD for a number of hours per day (e.g., 12–24 hours). Recommendations include the aspiration of the locking solution at the end of the locking period rather than flushing the solution into the bloodstream due to the risk of adverse reactions or development of resistant organisms.

#### **Standard 45 Nerve Injury**

Nerve injury associated with VAD insertions or phlebotomy procedures is a relatively uncommon,

but potentially serious complication. Although anatomical variations among people are common, there are peripheral sites associated with increased risk of nerve injury including:

- the cephalic vein at the radial wrist due to proximity to the radial nerve; recommendations include avoiding this vein for about the first quarter of the forearm.
- the inner aspect of the wrist due to proximity to the median nerve; avoid this area.
- at or above the antecubital fossa; avoid this site for PIVC insertion as it is in an area of flexion; relative to phlebotomy, the median cubital or cephalic veins are selected where nerve injury is less likely; the basilic vein should be avoided due to proximity to the median nerve as well as the brachial artery (Nickel et al., 2024, p. S164).

Multiple attempts at venipuncture should be avoided as well as subcutaneous probing to locate a vein as these practices are associated with increased risk. Should the patient experience symptoms including “electrical” type pain, tingling, burning, numbness or paresthesias, stop the insertion procedure immediately and inform the provider.

#### **Standard 41 Blood Sampling**

Obtaining blood from the VAD for laboratory studies, most often via CVADs, is a common home care practice with advantages including avoiding the pain, anxiety, and risks associated with venipuncture procedures. Risks associated with VAD blood sampling include more manipulation at the catheter hub which may increase the risk of contamination and the potential for catheter-associated bloodstream infections, the potential for erroneous laboratory values, and potential alterations in VAD patency (Nickel et al., 2024). The most common method used is the discard method. This includes saline flushing, withdrawal and discarding of several mLs of blood, followed by withdrawal of blood in the amount needed to fill the required laboratory tubes. The amount of “discard” is based upon the internal volume of the VAD.

When drawing drug levels (e.g., vancomycin, gentamicin), timing is critical to accuracy. Also, whenever possible, the drug level should be drawn from the lumen not being used for the drug administration. Serum trough levels are drawn

just prior to the infusion. If a peak level is ordered, consult with the laboratory or pharmacy for guidance. In general, for a 30- or a 60-minute infusion, the peak is drawn 30 or 60 minutes after the end of the infusion (Van Leeuwen & Bladh, 2023). When questionable results are obtained from any catheter, such as an unexpectedly high trough level or unusual chemistry result, retesting via venipuncture is recommended.

Home care nurses typically perform venipuncture blood sampling for patients, regardless of whether the patient is receiving infusion therapy, and this standard also provides helpful guidance for general venipuncture. For example, inaccurate laboratory data is reduced by avoiding repetitive fist clenching or pumping, limiting tourniquet time to less than 1 minute, and by removing the tourniquet as soon as blood begins to flow into the tube (Nickel et al., 2024, p. S142).

### **Standard 53 Epidural and Intrathecal Access Devices**

Caring for patients who have an epidural or intrathecal (neuraxial) access device is clearly a highly specialized area. For home care organizations and nurses who provide this type of care, a dedicated education and competency assessment program is essential. A brief overview of the topics and recommendations from this standard are highlighted. Patients who require such devices are primarily those with chronic cancer or chronic non-cancer related pain or patients with spasticity. Examples of drugs infused via the neuraxial route include analgesics, anesthetic agents, and baclofen (Nickel et al., 2024). These are patients who have pain (or spasticity) that is refractory to or experience intolerable side effects associated with systemically administered drugs. Access options include long-term subcutaneously tunneled catheters or implanted ports (usually tunneled or located on a site in the abdominal area). In some situations, a temporary intrathecal or epidural catheter may be placed for a trial to assess the effectiveness of pain management with this route. Patients may be discharged with home care follow-up for ongoing assessment and catheter care. The *Standards* provide guidance for ongoing assessment including pain rating, vital signs, level of sedation (if opioid drugs), signs of adverse effects (e.g., nausea, pruritus, urinary retention, orthostatic hypotension, tinnitus), any changes in sensory or

motor function, and catheter site assessment (Nickel et al., 2024).

Home care nurses may care for patients who have an implanted intrathecal drug delivery system without an expectation of care relative to the infusion system by the home care nurse, other than assessment. The implanted pump requires periodic medication refills and sometimes changes in the delivery program. Only clinicians with specific competency are allowed to perform such procedures. Patients may go to the outpatient clinic for the medication fills or in some cases, home infusion companies with specialty nurses will provide this care. The home care nurse's responsibility would include assessment and identification of any changes in pain management or adverse effects. Increased pain and withdrawal symptoms may be indicative of problems (Nickel et al., 2024).

### **Conclusion**

In this article, I have provided an overview of just a few selected standards. I encourage home care organizations to obtain a copy of the *Standards* to evaluate how you provide infusion education, both upon hire and on an ongoing basis, assess nursing competency, and ensure that your policies and procedures are in place and up-to-date, and are accessible to nurses.

After a 20-year journey participating in the development of the *INS Standards*, this was my last time as a leader. I was honored to write an "Afterword" which is published in the 2024 *Standards* where I share a bit of my personal journey (Nickel et al., 2024, p. S272). Briefly, I became a home care nurse, transitioning from being a critical care nurse and educator in the 1980s, falling in love with home care and appreciating the opportunity to work with patients and families in their setting. The very first article that I ever wrote and published was in this journal and was entitled "Effective Teaching of Home IV Therapy" in 1987. This article was also reprinted in 2002, the 20<sup>th</sup> anniversary of our journal. Then, as now, I recognized that our skills in teaching technical skills to patients and caregivers are equally important to patient outcomes as our infusion/vascular access skills. Based on my acute care background and desire to provide care for those home care patients requiring a variety of infusions, I was given a position to develop a home infusion therapy program and have never looked back! Being involved with the *Standards* has provided me with the most incredi-

ble experiences in providing education, connecting with, and collaborating with clinicians across the US and many countries. Traveling to (and continued virtual connections!) Latin America, Africa, the Middle East, and China among others were highlights of my career. Although I will continue my passion for infusion therapy in new ways, I am thrilled to take on a new role with *Home Healthcare Now*, following in the steps of our past editors Carolyn Humphrey, Tina Marrelli, and Maureen Anthony. ■

**Lisa A. Gorski, MS, RN, HHCNS-BC, CRNI, FAAN**, is a Clinical Education Specialist, Ascension at Home, and Editor, *Home Healthcare Now*.

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Address for correspondence: Lisa A. Gorski, MS, RN, HHCNS-BC, CRNI, FAAN (lisagorski@hotmail.com).

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