

## Chapter 1

# Introducing IV Therapy: A Purpose-Driven Practice

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### *In This Chapter*

- ▶ Exploring the types of IVs and the different methods of administration
  - ▶ Figuring out what your role is in IV therapy
  - ▶ Getting familiar with standards of care to protect yourself and your patient
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**I**ntravenous (IV) therapy is more than just another medical procedure. It's a universal method of saving lives and restoring health that healthcare facilities all around the world use every day.

In this chapter, you find out how IV medications work to restore vital signs and relieve pain, and you get a glimpse of the various types of IVs used to treat clinical conditions, as well as the assorted methods of administering them. You take a journey through all aspects of IV therapy, including starting, monitoring, and discontinuing IVs, and you explore important methods of promoting patient safety and preventing complications. Finally, you get a closer look at the medical-legal implications of IV therapy and the importance of performing to national standards of care, particularly those set by the Infusion Nurses Society (INS).

## *What's the Point? The Purpose of IV Therapy*

Doctors prescribe IV therapy when they need to deliver fluids and medications quickly, copiously, and frequently. They also use it to administer products like blood, parenteral nutrition, and chemotherapy that can't be delivered any other way.

As a healthcare worker, you use IVs to administer all types of therapies, ranging from a simple normal saline drip to hydrate a depleted marathon runner to a sophisticated thrombolytic drug infusion to dissolve blood clots in a patient who just had a heart attack. Regardless of which type of therapy you use them for, the main purpose of IVs is to save lives.

## *Administering emergency fluids and medications*

During emergencies, you use IV fluids and medications for countless reasons, including the following:

- ✓ To stabilize blood pressure
- ✓ To dilate bronchial tubes in patients with asthma
- ✓ To convert heart arrhythmias back to sinus rhythm
- ✓ To relax vocal cords to facilitate intubation
- ✓ To restore blood volume to prevent circulatory collapse

In short, IV fluids and medications are vital, irreplaceable elements in an emergency response, and they frequently make the difference between life and death. For details on preparing for and administering IV therapy, check out Parts III and IV.

## *Delivering pharmacological agents*

When patients need to receive medications quickly, frequently, or over a long period of time, the intravenous route is the method of choice. The use of IV medications has skyrocketed since the advent of modern IV therapy in World War I. Today, every department of the hospital, from intensive care to medical-surgical units to labor and delivery and beyond, uses IV medications.

Nurses who administer IV medications must know how to administer IV drugs safely, prevent potential complications from both the drug itself and the IV, and monitor the patient's response to therapy. For details on administering IV medications and managing complications, go to Chapter 14. For drug classifications and other IV medication basics, see Chapter 4.

## *Replacing blood and blood products*

Since the first successful human blood transfusion was performed in 1818, blood transfusions have become a mainstay in replacing blood lost through injury, surgery, or disease. Today, more than 5 million people receive blood transfusions each year in the U.S. alone.

Blood transfusions through IV therapy are now routine and relatively safe. In fact, the greatest danger patients face when receiving blood today is having a life-threatening reaction caused by getting the wrong blood type by accident. That's where knowing more about IV therapy becomes essential.

Because nurses administer the vast majority of blood and blood components, they're the last safety net to ensure delivery of compatible blood products. But even with all the safety precautions of initially checking the blood and verifying it again at the bedside, patients still die from blood incompatibilities every year. The biggest key to preventing deaths and other complications related to the administration of whole blood or blood products is a vigilant nurse. To find out more about administering blood components safely and preventing complications, check out Chapters 5 and 15.

## *Administering chemotherapy medications*

*Chemotherapy drugs* are *cytotoxic* (cell-killing) substances designed to attack and kill cancer cells. Unfortunately, chemotherapy can't distinguish between malignant cells and healthy cells, so it also destroys healthy cells and causes a cascade of debilitating side effects. Yet, even though the side effects may be severe and crippling, millions of cancer patients each year elect to undergo chemotherapy to combat the devastating effects of cancer.

Chemotherapy is a risky business for both the patient and the IV nurse. Patients are at risk for vein destruction and tissue necrosis if the IV becomes infiltrated, and IV nurses are at risk for chemical burns to the eyes, face, or hands when preparing and administering the drugs. In addition, long-term side effects of leukemia and blood abnormalities have been observed in oncology nurses with chronic exposure to chemotherapy agents.

Fortunately, awareness and technology eliminate some of these risks. For instance, nurses use implanted ports to reduce the risk of infiltration and leakage of toxic drugs into surrounding tissues in the patient. Nurses also use high-tech safety gear and protective equipment that shield their face, arms, and hands from the accidental spilling or splashing of toxic chemicals.

Despite the risks, more than 100,000 doses of chemotherapy are given around the world every day, and IV nurses are a critical component in delivering this life-saving therapy. For more on how chemotherapy works, check out Chapter 6. For details on how to administer chemotherapy, turn to Chapter 16.

## *Maintaining fluid and electrolyte balance*

To function properly, the human body must keep fluid in its cells, between its cells, and in the bloodstream. The body maintains a state of equilibrium by keeping a vigilant watch over its fluid and electrolyte levels. When the body's fluids and electrolytes get out of balance, the heart beats irregularly, the kidneys shut down, and the circulatory system collapses. To treat this imbalance, healthcare professionals replace fluids or replenish electrolytes through IV therapy.

During therapy, the IV nurse is responsible for safely administering replacement fluids and electrolytes as prescribed by the physician and monitoring the patient's response to treatment. For the basics on fluid and electrolyte balance, go to Chapter 7. For the lowdown on using IV therapy to administer fluids and electrolytes, turn to Chapter 17.

## *Providing nutrition*

*Parenteral nutrition* delivers vitamins, minerals, lipids, and other nutritional substances directly into the patient's bloodstream through an IV. This life-sustaining infusion is especially critical for patients who can't absorb nutrients through the digestive tract or can't take foods orally due to injury or surgery. To explore the basics of planning, administering, and monitoring life-saving meals of IV nutrition, check out Chapters 8 and 18.

# *The Main Ways to Administer IV Therapy*

IV therapy isn't a *one-size-fits-all* type of procedure. Doctors use a variety of administration methods from low-tech gravity drips to high-tech smart pumps and everything in between to achieve rapid response to treatment and optimal patient outcome. The most common types of IV administration include the following:

- ✓ **Peripheral IVs:** These short-term vascular access devices (VADs) may be inserted by paramedics, nurses, or physicians. The tip of the device resides in the veins of the upper extremities. You typically use them for short-term rehydration or fluid administrations that last less than one week (see Chapter 12).

- ✓ **IV push and piggyback:** An *IV push* is when you use a syringe to push a specific dose of a medication through a peripheral or central VAD over a short period of time (usually less than 2 minutes). A *piggyback* is when you attach a secondary bag of fluid or medication to a primary IV set (check out Chapters 3 and 11).
- ✓ **Central lines:** Central VADs (CVADs) are inserted by physicians, physician assistants (PAs), or specially trained nurses (who may insert only peripherally inserted central catheters, or PICCs). CVADs are placed in the chest, neck, groin, leg, scalp, or arm with the catheter threaded into the veins of the central venous system, such as the superior vena cava or inferior vena cava. You can use them for short- or long-term therapy (turn to Chapter 13 for more info).
- ✓ **Infusion pumps, syringe pumps, and patient-controlled analgesia (PCA) pumps:** These electronic devices infuse fluids or medications intermittently or continuously with an automatic pump. They can infuse the correct dose at the correct rate for a prescribed amount of time. The *infusion pump* is larger, is usually pole mounted, and has preloaded drug information in its memory. *Syringe pumps* utilize a syringe to give smaller controlled doses of medications over a prescribed duration. *PCA pumps* are like syringe pumps, except they include a hand-held button the patient can use to give himself prescribed amounts of medications when he needs them (see Chapter 11).
- ✓ **Volume-metered, microdrip, and macrodrip systems:** These types of peripheral IV tubing deliver fluids and medications from their containers to the VAD and into the patient's bloodstream. *Volume-metered tubing* has a small, volume-controlled chamber that sits between the main fluid container and the insertion site; it can deliver a controlled volume of fluid or medication. A *microdrip system* infuses a smaller amount of fluid per hour (less than 100 milliliters per hour), while a *macrodrip system* delivers a large quantity of fluid at a rapid rate (100 milliliters or more per hour). (Skip to Chapters 3 and 11 for details.)
- ✓ **Intermittent and continuous infusions:** *Intermittent infusions* deliver medications or fluids at specific times and at designated intervals. *Continuous infusions* deliver medications or fluids at a constant rate, one drop at a time, over longer periods (check out Chapter 11).
- ✓ **Filtered and nonfiltered infusions:** *Filtered infusions* decrease the amounts of undissolved particles or bacteria that enter the patient's bloodstream; they're typically used for infusing blood, blood products, and total parenteral nutrition. *Nonfiltered infusions* are given without a filter (go figure!); they're typically used for maintenance fluids, such as normal saline or lactated Ringer's solution. (See Chapters 5 and 15 for details on administering blood and blood products and Chapters 7 and 17 for details on administering maintenance fluids.)

## *Understanding the Important Role You Play in IV Therapy*

IV therapy is one aspect of nursing that's prevalent in all areas of the health-care spectrum. As an IV nurse, you must have a broad knowledge of pharmacology and technology, including the techniques of starting and monitoring IVs. But you must also be skilled in the art of patient assessment, and you need to be able to deal with a full array of patient populations.

IV therapists are special nurses who relish the challenge of starting IVs in critically ill patients and who reap the rewards of seeing their patients improve with treatment. They understand that their number one role in IV administration is delivering safe, life-sustaining therapies that restore health and extend life.

### *Getting down to brass tacks: Starting IVs*

Whether you're a practicing healthcare professional who wants to brush up on IV techniques or a student nurse who wants to learn all aspects of IV therapy for the first time, one of the most basic and fear-evoking procedures is starting an IV. Practicing on IV mannequins in a safe classroom setting can certainly help prepare you for this task, but facing a real patient in a real-life clinical situation still strikes fear in even the most intrepid nurse.

Chapter 12 gives you a head start on starting peripheral IVs, while Chapter 13 focuses on central lines. Both chapters help you select the appropriate VAD, prepare and assess the insertion site, initiate therapy, and perform proper care and maintenance of the VAD. Chapter 19 takes you on a similar journey, covering IV therapy in children, and Chapter 20 focuses on the other end of the age spectrum with geriatric patients.

### *Preventing infection*

Protecting yourself and your patient from infectious disease is one of your major responsibilities as an IV nurse. This vital role requires vigilance on two important fronts:

- ✓ You must protect yourself from blood-borne pathogens, such as Hepatitis B and human immunodeficiency virus (HIV).
- ✓ You must protect your patients from infections acquired during their hospital stay, known as *hospital-associated* or *hospital-acquired infections* (HAIs).



Hand washing is the single most important means of preventing the spread of infection and minimizing risk for both healthcare personnel and patients. It's also the first step in building a chain of *aseptic technique* — when every member of the healthcare team adheres to strict guidelines of proper hand washing, appropriate use of sterile gloves and supplies, and prevention of cross-contamination between patients. When any team member fails to maintain a sterile or aseptic environment, the chain of aseptic technique is broken and the patient is at increased risk for infection.

Maintaining a chain of aseptic technique begins with proper hand washing (see the nearby sidebar for a refresher) and continues through the following procedures:

- ✓ Inspecting sterile supplies and preparing IV medications and fluids
- ✓ Starting and changing IVs, infusion bags, and tubings
- ✓ Cleansing insertion sites and changing dressings
- ✓ Administering medications and discontinuing IVs

In addition to practicing proper hand washing and aseptic techniques, you need to maintain a safe, clean IV environment by following these steps:

- ✓ Use antiseptic solutions and disinfectants to clean treatment rooms and medication preparation areas.
- ✓ Frequently disinfect high-touch areas associated with patient care, such as bedrails, bed tables, and faucets.
- ✓ Ensure that hand sanitizers are available for use by both patients and visitors.



Partnering with your patient is an excellent way to promote infection control. Teach your patient about her role in prevention and ask her to follow these simple techniques to prevent cross-contamination:

- ✓ Ask visitors to avoid sitting on the bed.
- ✓ Don't place food, eating utensils, or personal items on the bed.
- ✓ Request that visitors and healthcare workers wash their hands before and after visiting.
- ✓ Wash hands before touching the face or mouth.

## **Talk to the hand: Practicing good hand hygiene**

You've probably been using proper hand washing technique for a while now, but because it's such a critical first step in maintaining aseptic technique, we provide a quick refresher here. Follow these steps every time you wash your hands:

- ✓ Wet your hands with warm or cold water and apply soap.
- ✓ Rub your hands together to make a lather and scrub them well; be sure to scrub the backs of your hands, between your fingers, and under your nails.
- ✓ Continue scrubbing your hands for at least 20 seconds. Need a timer? Hum the "Happy Birthday" song from beginning to end twice.
- ✓ Rinse your hands well under running water.
- ✓ Dry your hands with a clean towel or allow them to air-dry.
- ✓ Use a towel or your elbow to turn off the water.

## ***Monitoring infusions and managing complications***

Monitoring infusions is an essential part of administering IV therapy, particularly in longer-term IVs. When IVs are in place for long periods of time, the risk for complications greatly increases. Frequent access through injection ports, multiple infusions of different medications, and maintenance flushing procedures increase the patient's risk for complications. The key to combating these complications is carefully assessing, monitoring, and maintaining every infusion from start to finish.

### ***Monitoring and managing peripheral IVs***

Peripheral IVs pose a risk for complications because they're placed in extremities that patients use constantly for eating, drinking, and performing other normal activities. Guarding against complications from peripheral IVs requires knowledge of the most common complications, such as phlebitis, infiltration, and clot formation. Vigilant monitoring of the insertion site and peripheral equipment are key elements in preventing these complications. Chapter 12 tells you what you need to know about monitoring peripheral infusions and discusses how you can minimize risk and maximize patient safety during IV therapy in peripheral veins.





As soon as you realize that a complication exists, stop the IV immediately, reassure the patient, and notify the physician. (Turn to Chapter 12 for more details.)

### ***Monitoring and managing central venous lines***

Central venous lines are at even greater risk for serious complications than peripheral IVs because they go directly to the patient's central venous system and can expose the patient to a catheter-related bloodstream infection (CRBSI) or *septicemia* (systemic infection).

Whenever you're dealing with a central line, frequently monitor the line to clear any problems that may impede flow and lead to clotting or infection. Also, ensure that the line is stabilized, assess the insertion site, and evaluate the line during routine maintenance procedures, such as flushing and locking. We cover all these procedures and more in Chapter 13.

## ***Supporting your actions by keeping careful records***

Keeping careful records through proper documentation is another key role of every IV nurse. In the medical field, documentation provides a clear, concise, permanent record of what you did, what happened when you did it, and what the outcome was after you did what you did. The four primary reasons that complete and accurate documentation is so important in healthcare are

- ✓ It provides continuity of care.
- ✓ It acts as your insurance policy against lawsuits.
- ✓ It tells a story about the steps you took to reach successful patient outcomes.
- ✓ It gives insurance companies a complete picture of your patient and the care you provided so they can issue reimbursement.

Documentation isn't always a nurse's favorite duty, but when done properly, it ensures that you delivered the highest quality of excellence and the greatest level of competence in patient care. Plus, proper documentation is often a nurse's only defense witness in front of a jury in cases of lawsuits. So make sure you document all your nursing actions, including all those related to IV therapy. Turn to Chapter 9 for the lowdown on maintaining proper documentation as an IV nurse.

## ***Familiarizing Yourself with Standards of Care***

Whether you like it or not, nursing actions are measured against standards of care and published guidelines, and those standards and guidelines basically determine what a nurse should and shouldn't do. Standards of care measure the degree of excellence and outline the expected level of competence in nursing care.

The nurse's most vital protective strategy in meeting standards of care is being a knowledgeable and safe practitioner of patient care. To do so, you must be aware of nursing standards, published guidelines, legal issues in nursing, scope of nursing practice, and limits of legal liabilities. The following sections touch on these issues; see Chapter 2 for more details.

### ***Understanding the importance of the Infusion Nurses Society***

The Infusion Nurses Society (INS) is the global authority on infusion nursing. Founded in 1973 by Ada Plumer and Marguerite Knight, the INS established the first infusion nursing standards of care in 1980 and continues to provide revisions and updates to the standards approximately every five years. The 2011 version, titled *Infusion Nursing Standards of Practice*, consists of 68 standards of care.

INS's standards of care are composed of two sections:

- ✓ The first section comprises broad statements applicable to all IV procedures, such as peripheral lines, peripherally inserted central catheters (PICC lines), central venous lines, and central venous ports.
- ✓ The second section consists of clinical practice criteria that provide guidance for implementing the standards.

The INS standards cover every IV topic, ranging from infrared light and ultrasound technology used for visualizing veins to catheter stabilization devices and sutureless securement options used to prevent central line infections.

Through these standards, the INS establishes a framework for monitoring nursing care and medical products and provides a structure of reference that distinguishes among malpractice, product failure, and negative patient

outcomes. The INS framework also assists in resolving ethical conflicts between infusion nurses and their employers.

In addition to protecting nurses and promoting patient safety, other goals of the INS standards include reducing malpractice and product liability claims and ensuring positive patient outcomes.

## *Implementing INS standards of care in your daily practice*

The best way for you to promote patient safety and avoid malpractice suits is to strictly comply with the current INS standards of care. Familiarize yourself with the standards that apply most frequently to your everyday activities and implement the standards, even when doing so takes a few extra minutes.

Take time to research or refresh your memory of the standards dealing with new procedures and to attend presentations on new infusion equipment. Utilize the chapters in this book to brush up on old skills and check out new ones. Remember that advocating for your patient and using critical-thinking skills are not only your right but also your responsibility.

## *Avoiding lawsuits by following standards of care*

When standards of care are questioned, nurses often find themselves personally involved in lawsuits. The biggest reasons for lawsuits against nurses are

- ✓ Communication errors and medication errors
- ✓ Failure to assess and monitor or advocate for the patient
- ✓ Inappropriate delegation or supervision
- ✓ Working while impaired, including excessive fatigue

Nurses are even held accountable by law for not using critical-thinking skills and common-sense judgment when giving patient care. So when a medication order appears unsafe, don't assume that contacting the physician and verifying the order gives you a green light to administer the med. If you administer an unsafe medication and ignore your critical-thinking process, you could find yourself on the wrong side of a lawsuit.



The best defense for the nurse facing a lawsuit is to prove that she performed to the expected level of competence by documenting her actions (refer to the earlier section “Supporting your actions by keeping careful records” and Chapter 9). After all, accurate documentation and thorough charting are the most vital aspects of proving that you’ve met all nursing standards of care.

Turn to Chapter 2 for more info on keeping within the letter of the law as an IV nurse.

## *Staying focused on ethical principles*

Ethics is an integral part of the foundation of nursing. IV therapy embodies the following ethical principles:

- ✓ Preventing illness by educating patients about the importance of wellness and fitness programs and the benefits of prophylactic activities, such as routine well-patient appointments and immunizations
- ✓ Alleviating physical suffering by administering IV pain relief and minimizing emotional suffering by providing psychological support to the patient and family
- ✓ Restoring health by providing IV medications that fight infection, combat cancer, and extend life
- ✓ Advocating for patients when family members are absent or nonexistent and collaborating with other professionals to provide patients with treatment options and needed resources
- ✓ Maintaining appropriate and safe healthcare environments in both the hospital and home setting and displaying moral self-respect through personal hygiene and professional behavior
- ✓ Maintaining personal accountability for standards of care by regularly attending competency and certification courses and complying with INS standards of care and state regulatory practices

## *Working within your scope of practice*

*Scope of practice* is usually determined by committees of experts focused on defining educational requirements for nurses working in specific areas of healthcare, such as IV therapy. Scope of practice varies from state to state and is based on the particular state’s licensing practices. In some states, such as California, licensed vocational nurses (LVNs) aren’t allowed to start IVs unless they’ve been certified through an approved IV certification course. In other states, LVNs are allowed to start IVs or inject medications into an infusion bag under an RN’s supervision.

To identify the educational requirements for IV therapy delivery by RNs, LVNs, or nonlicensed personnel in your state, check with the state licensing board to verify the scope of practice dictated by your license.

Some employers encourage nurses to take IV certification courses to ensure they possess a level of knowledge and competence in the specialty area of IV therapy. Check with your facility, nursing organizations such as INS or the Association for Vascular Access (AVA), or your state board to obtain information about IV certification.

## ***Implementing evidence-based infusion practice***

*Evidence-based practice* is a method of determining the best treatment for improved patient care based on evidence from clinical research studies. It's the opposite of the old method of determining treatment based on experience.

Interest in evidence-based practice emerged in the 1970s and is now accepted as the gold standard in dictating treatment and optimizing patient care. It has been incorporated into professional standards of care and implemented in healthcare fields throughout the world.

*Evidence-based infusion practice* calls for nurses to select and review research studies and apply relevant findings to patient care. Evidence-based nursing integrates the best research evidence with clinical expertise, patient preferences, and existing resources to enable the physician and infusion nurse to make informed decisions about the healthcare of individual patients.

## ***Documenting informed consent***

Documenting that informed consent has been obtained and/or placing the signed consent form in the patient's chart is the responsibility of the nurse. Standards specify that the nurse must be knowledgeable about the proper protocol for obtaining informed consent. Informed consent must be obtained from legally competent adults and children and must be documented in the patient's permanent record. Typically the physician has to obtain this consent.

## *Complying with your employer's policies and procedures*

Employer and facility policies and procedures are institutional guidelines designed to protect the patient, nurse, and institution. They act as a framework to enable healthcare professionals to carry out responsibilities while preventing complications and minimizing patient risk.



Of course, nurses have a duty to comply with their employer's policies and procedures, but they have a greater duty to advocate and promote patient safety. When policies and procedures impair a nurse's ability to provide appropriate patient care, medical ethics and standards of care become issues of concern. To address issues of medical ethics and standards of care, consult your local or national nursing organization, state Nurse Practice Act, or state board of nursing.