



Healthcare

INBRIEF®

A Risk Management Bulletin for Allied Healthcare Facilities | 2020 Issue 1

Venipuncture Safety: Evaluating Key Policies and Procedures

Venipuncture – the process of penetrating a patient’s vein with a hypodermic needle to sample blood or administer intravenous (IV) therapy – is one of the most common of clinical procedures, and is usually performed safely and competently by certified phlebotomists, nurses and medical assistants. However, on the rare occasion when an error occurs, it can lead to a variety of serious clinical complications, including the following:

- **IV infiltration**, as intravenous fluids flow into surrounding tissues.
- **Compartment syndrome**, secondary to IV infiltration as infused fluids accumulate near the injection site and around the vein. (See [“Avoiding Compartment Syndrome Following Intravenous Infiltration”](#) on page 2.)
- **Extensive bruising**, caused by a needle perforating the lower wall of a vein.
- **Hematoma or thrombus**, as blood leaks into adjacent tissues due to improper technique or delayed clot formation.
- **Phlebitis or site infections**, due to disregard of sound infection control practices.
- **Prolonged bleeding**, typically resulting from a failure to note and compensate for the patient’s use of blood thinners or history of coagulopathies (i.e., bleeding disorders).
- **Long-term swelling above the puncture site**, due to traumatic insertion.
- **Post-tourniquet syndrome** (i.e., pronounced swelling and stiffness of the affected extremity), consequent to prolonged use of a tourniquet.
- **Osteomyelitis or osteochondritis**, when the needle nicks a bone.

- **Lymphedema**, subsequent to use of an at-risk limb for venipuncture, such as an arm on the same side as a prior mastectomy. (Lymphedema can also be associated with the presence of peripheral edema or an arteriovenous fistula in patients undergoing dialysis therapy.)
- **Pressure injuries**, as a consequence of hematoma formation causing pressure on adjacent tissues.
- **Nerve damage**, when the needle penetrates a nerve.
- **Falls**, when a patient who has not been seated safely during a venipuncture procedure experiences syncope.
- **Infection** due to accidental needlestick and/or inadequate preventive measures.

Liability claims alleging negligent venipuncture are often based upon errors in the clinician’s technique (such as improper angle of needle insertion, unnecessary capillary probing or arterial nicks) or judgment (such as incorrect site selection, poor infection control practices or too-deep needle insertion). Claims also may derive from administrative oversights, such as lack of formal policies and procedures governing venipuncture practice, deficient screening of phlebotomists’ qualifications upon hire or inadequate training. In most cases, venipuncture-related claims are difficult to defend and may result in awards or settlements in the six-figure range or even higher for pain and suffering and other non-economic damages, in addition to medical treatment costs and lost wages due to debilitating long-term injuries.

Legal defense of claims can be hindered by a number of factors, including but not limited to the following:

- **Absence of written policies** on IV initiation, maintenance and discontinuation, as well as treatment of at-risk limbs.
- **Lack of documented clinician education and training** in such areas as anatomical structures, IV site evaluation and correct insertion technique.
- **Evidence of poor clinical judgment**, such as performing a venipuncture procedure in an area of impaired lymphatic drainage.
- **Inadequate assessment and documentation of the insertion site** before and after administration of fluid or medication.

This edition of *inBrief*® offers a [venipuncture safety checklist](#) designed for use by both healthcare organizations and clinicians, addressing such critical areas as policy and procedure, phlebotomy training and evaluation, patient histories, informed consent, clinical safeguards, infection control, IV monitoring and documentation requirements.

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Avoiding Compartment Syndrome Following Intravenous Infiltration

Compartment syndrome refers to increased pressure inside a confined space within the body, especially the fascial compartments around muscles. It can occur as a result of IV infiltration, when infused fluids leak near the injection site and around the vein. The excessive fluid in one or more compartments of a limb may cause damage to adjacent nerves, arteries and muscles, which can result in permanent loss of function.

The following tips are intended to help clinicians minimize the likelihood of IV infiltration and mitigate the potential consequences of infusion-related occurrences:

1. **Before initiating an infusion, aspirate the IV catheter for a blood return**, in order to verify correct vein placement.
2. **Once an infusion is started, monitor the insertion site** for signs and symptoms of local edema, skin blanching, skin coolness and leakage at the puncture site. Do not rely entirely on infusion pump alarms to detect infiltration.
3. **Respond promptly to patient complaints of pain and/or feelings of tightness or pressure**, documenting all comments and assessment findings in the patient health-care information record.
4. **Compare the injected site with the contralateral limb** for differences in appearance and circumference.
5. **If signs and symptoms of infiltration are detected, immediately stop the infusion** and remove the needle or catheter.
6. **Document the infiltration and initiate appropriate interventions**, which – depending upon the type of fluid infused and the severity of the infiltration – may include thermal manipulation, application of cold packs or, in the case of a severe infiltration, immediate surgical decompression.

Sources: Bonsall, L. "Complications of Peripheral IV Therapy," in the *Lippincott NursingCenter Blog*, February 9, 2015; "How to Start an IV: Starting an IV Clinical Nursing Skills," posted on *RegisteredNurseRN.com*; MacArthur, R. "IV Infiltration," at *MyIV.com*, January 8, 2018.

Venipuncture Safety Checklist: Assessing Clinical and Administrative Practices

Risk Management Measures	Status (Check If Present)	Comments
Basic policy and procedure:		
<p>1. Evidence-based practice standards on intravenous (IV) initiation, maintenance and discontinuance are adopted and integrated into clinical practice. (See Quick Links on page 8 for relevant resources.)</p>		
<p>2. Specially trained nurses and other experienced blood-drawers are assigned backup duty when no phlebotomist is available to perform venipuncture/IV insertion.</p>		
<p>3. A formal patient identification process is in place and is utilized consistently prior to venipuncture procedures.</p>		
<p>4. Patients are safely secured while blood is being drawn to prevent falling and consequent injury due to syncope.</p>		
<p>5. A physician's order is required for use of a limb restraint on pediatric patients receiving IV therapy.</p>		
<p>6. Clinically recognized methods are used to facilitate vein identification, including tourniquets, blood pressure cuffs and heat.</p>		
<p>7. Written policy addresses contraindications for using a tourniquet or blood pressure cuffs to identify veins (e.g., patient has fragile veins), as well as appropriate placement of these devices (i.e., distally from the joint proximal to the insertion site).</p>		
<p>8. Limbs at higher risk for lymphedema – i.e., swelling that generally occurs in the arms or legs following cancer therapy – are identified, and policy directs healthcare workers to avoid drawing blood from or infusing these limbs, to the extent possible.</p>		
<p>9. Slapping the vein and clenching a fist before venipuncture are prohibited to avoid contraction of the vein, leading to elevated levels of potassium in subsequent blood analysis.</p>		
<p>10. A limit is set on the number of unsuccessful venipuncture attempts that can be made before the clinician is required to request assistance from one or more properly trained staff members.</p>		
<p>11. Specified interventions are initiated whenever IV infiltration occurs, including thermal manipulation for certain non-vesicant drugs and cold packs for hypertonic or hyperosmolar fluids.</p>		

Risk Management Measures	Status (Check If Present)	Comments
Phlebotomy training, certification and evaluation:		
<p>1. Phlebotomists and other designated blood drawers are given formal training in best practices, utilizing such resources as the <i>WHO Guidelines on Drawing Blood: Best Practices in Phlebotomy</i> from the World Health Organization. (See “Annex E: Training Course Content for Phlebotomists.”.)</p>		
<p>2. All clinicians responsible for drawing blood are thoroughly trained on venous, arterial and capillary blood sampling in both adult and pediatric patients.</p>		
<p>3. All clinicians responsible for drawing blood are trained to assess limbs for potential safety issues, as well as to start with distal veins and to avoid areas where skin is damaged, inflamed, infected or scarred.</p>		
<p>4. All clinicians responsible for drawing blood are trained to select the appropriate needle cannula size, based upon the patient’s vascular condition and the purpose of the venipuncture (i.e., a larger cannula is used for blood transfusion and a smaller size for blood analysis).</p>		
<p>5. All clinicians responsible for drawing blood are trained to prevent hematomas (i.e., blood clots at the insertion site), hemolysis (i.e., destruction of red blood cells) and hemoconcentration (i.e., over-concentration of blood molecules due to prolonged tourniquet use).</p>		
<p>6. All clinicians responsible for drawing blood are trained to take additional precautions in certain clinical situations, such as when drawing blood from older, obese or darker-skinned individuals.</p>		
<p>7. Phlebotomists and blood-drawing medical assistants are properly certified through national or state-based programs, whichever are more stringent.</p>		
<p>8. A certificate of competence in phlebotomy practices is kept on file for all healthcare workers responsible for drawing blood, together with up-to-date records of other relevant credentials.</p>		
<p>9. The needle insertion skills of all clinicians responsible for drawing blood are evaluated to ensure that they consistently ...</p>		
<ul style="list-style-type: none"> • Utilize sterile technique. 		
<ul style="list-style-type: none"> • Position their finger above the insertion site. 		
<ul style="list-style-type: none"> • Insert the needle at an appropriate angle (i.e., approximately 15 to 30 degrees relative to the limb surface). 		
<ul style="list-style-type: none"> • Place the bevel of the needle in an upward position. 		
<ul style="list-style-type: none"> • Withdraw the needle using a quick backward motion. 		

Risk Management Measures	Status (Check If Present)	Comments
Phlebotomy training, certification and evaluation (cont.):		
10. Phlebotomy practices are audited annually and a record is maintained for each healthcare worker responsible for venipuncture, focusing upon the following performance measures and quality indices, among others:		
<ul style="list-style-type: none"> • Verification of patient consent (i.e., a signed consent-to-treat form or other acceptable documentation of a methodical and consistent informed consent process). 		
<ul style="list-style-type: none"> • Use of correct (i.e., proper gauge) needles. 		
<ul style="list-style-type: none"> • Selection of anatomically appropriate insertion sites. 		
<ul style="list-style-type: none"> • Employment of sound technique for needle insertion and removal, as well as IV catheter aspiration. 		
<ul style="list-style-type: none"> • Utilization of recommended blood collection tubes. 		
<ul style="list-style-type: none"> • Proper verification and labeling of blood samples. 		
<ul style="list-style-type: none"> • Safe transport of blood samples. 		
Patient history:		
1. Patients are asked if they take blood thinners (including aspirin), have undergone a mastectomy or axillary node dissection, or have a history of bleeding disorder.		
2. Patients are asked about any history of hypovolemia (i.e., reduced blood volume), and, if the answer is yes, provision is made to draw blood from a large vein.		
3. Patients are asked about any problems associated with past blood draws , such as fainting, bruising or swelling at the site, or sharp or prolonged pain.		
4. Patients are asked to identify needle insertion sites that have been successful in the past , as well as past problem sites.		
Informed consent:		
1. Patients undergoing a phlebotomy are given written information describing the nature, purpose and possible complications of the procedure.		
2. The benefits and risks of venipuncture are fully described to patients , any questions they have are answered, and discussions are documented in the patient healthcare information record, together with a signed consent-to-treat form. (An informed consent discussion script is included in the <i>WHO Guidelines on Drawing Blood: Best Practices in Phlebotomy</i> . See " Annex F: Explaining the Procedure to a Patient. ")		

Risk Management Measures	Status (Check If Present)	Comments
Procedural safeguards, preparation and technique:		
1. All blood-sampling devices utilized by the facility are engineered for safety, including standard needles and syringes, evacuated tube systems and winged infusion sets.		
2. Whenever possible, needleless transfer systems or adaptors are used during venipuncture and blood collection.		
3. Blood collection tubes are labeled prior to venipuncture and placed in a nearby tube holder.		
4. As a precautionary measure, ammonia ampoules are kept ready in the event a patient experiences syncope during venipuncture.		
5. Sharps disposal containers are readily accessible, closable, and puncture- and leak-proof.		
6. A colored band is tied around at-risk limbs, alerting staff not to draw blood from them.		
7. The non-dominant arm is selected for venipuncture whenever possible.		
8. Patients are appropriately positioned, with the selected limb situated below heart level, resting on a pad or bed.		
9. Safe, proven techniques are used to locate veins, such as placing a warm towel over the selected region or stroking veins in a distal to proximal direction.		
10. Tourniquets are removed before the needle is withdrawn from the vein, and instant pressure is applied to the site using a gauze pad and tape.		
Intravenous initiation and monitoring:		
1. Veins in the forearm are preferred over the hand, wrist and antecubital fossa for IV infusion therapy, as they present a lower risk of cannula dislodgment.		
2. IV catheters are aspirated for a blood return after needle insertion to verify the appropriate position.		
3. Continuous IV infusions are monitored hourly for the presence of local edema, skin blanching or coolness, leakage at the puncture site or diminished radial pulse, and the patient is asked about any pain, skin tightness or difficulty moving the fingers.		
4. IVs are immediately discontinued if infiltration occurs, and the situation is reported promptly to a physician.		
5. Patients undergoing an IV infusion are told to report pain, redness, swelling, temperature change and/or drainage at or near the venipuncture site.		
6. Patients are instructed in writing about how to care for any post-procedure swelling that may occur in areas of impaired lymphatic drainage.		

Risk Management Measures	Status (Check If Present)	Comments
Infection prevention and control:		
1. Vaccinations are kept up-to-date for all clinicians responsible for drawing blood , and immunization status is documented in personnel files.		
2. Ongoing training in infection prevention and control procedures is provided to all clinicians responsible for drawing blood.		
3. Personal protective equipment (PPE) and other essential supplies are available in sufficient quantities , including:		
• Gloves, goggles, masks and splash shields.		
• Hand and skin antiseptic products.		
• Tourniquets, needles, scissors and bandages.		
• Blood-sampling equipment.		
• Evacuated tube holders.		
• Blood transport trays and boxes.		
4. Clinical staff members are trained to wash hands thoroughly before donning PPE and performing venipuncture procedures.		
5. A sterile single-use needle and syringe is utilized for each patient and is disposed of properly.		
6. Skin at the venipuncture site is disinfected prior to needle insertion , taking into consideration the type of specimen to be drawn and the age and allergy history of the patient.		
7. Non-disposable items are disinfected after each use , including tourniquets and point-of-care testing devices.		
Documentation:		
1. The location and condition of IV sites are documented in the patient healthcare information record before, during and after administration of fluid, medication or contrast.		
2. Details of the procedure are documented in the patient healthcare information record , including number of times the venipuncture is attempted, any unsuccessful needlesticks that occur and remedial actions taken.		
3. Accidental staff exposures to blood or other bodily fluids are recorded in a designated register and reported to the state occupational health and/or infection control department.		

This checklist serves as a reference for organizations seeking to evaluate risk exposures associated with venipuncture. The content is not intended to represent a comprehensive listing of all actions needed to address the subject matter, but rather is a means of initiating internal discussion and self-examination. Your clinical procedures and risks may be different from those addressed herein, and you may wish to modify the tool to suit your individual practice and patient needs. The information contained herein is not intended to establish any standard of care, serve as professional advice or address the circumstances of any specific entity. These statements do not constitute a risk management directive from CNA. No organization or individual should act upon this information without appropriate professional advice, including advice of legal counsel, given after a thorough examination of the individual situation, encompassing a review of relevant facts, laws and regulations. CNA assumes no responsibility for the consequences of the use or nonuse of this information.

Quick Links

- [GP-41: Collection of Diagnostic Venous Blood Specimens, seventh edition.](#) Clinical and Laboratory Standards Institute, 2017. Available for purchase.
- Kelleher, K., Baum, R., Rogers, S. "[Venipuncture.](#)" Video review and demonstration from the American Academy of Pediatrics, 2019.
- "[Laboratory Patient Safety Tips: Blood Specimen Collection \(Venipuncture\).](#)" Brochure from the American Society for Clinical Laboratory Science, 2017.
- "[Lymphedema Risk Reduction Practices: Position Statement of the National Lymphedema Network.](#)" Revised May 2012.
- [WHO Guidelines on Drawing Blood: Chapter 2, "Best Practices in Phlebotomy,"](#) and Chapter 8, "[Implementing Best Phlebotomy Practices.](#)" World Health Organization, 2010.

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