ALERT
Don appropriate personal protective equipment (PPE) based on the patient’s signs and symptoms and indications for isolation precautions.

Strictly adhere to guidelines for hand hygiene, standard precautions, and site preparation to minimize the risk of a health care–associated infection.¹²

Signs of nerve injury include severe, unusual or shooting pain, tingling or numbness, or a tremor in the arm. If the patient complains of any of these symptoms during venipuncture, withdraw the needle immediately.²

Draw specimens for culture before administering antibiotics.

OVERVIEW
Although recommendations are that trained phlebotomy personnel collect peripheral blood specimens by venipuncture to minimize collection errors,³ nurses may be responsible for specimen collection. Nurses should be familiar with the organization’s practice and the state’s nurse practice act regarding venipuncture, blood specimen collection, and delegation.

Infection control standards must be observed when a blood specimen is obtained. For culture specimens, caution should be taken to avoid contaminating the skin or equipment to minimize the risk of false-positive test results, which can lead to inappropriate antibiotic use. Appropriate safety devices should always be used. Blood-borne pathogen standards should be followed to minimize the risk of exposure to pathogens.¹³ The use of safer needleless devices, such as those with a reliable integrated safety feature, is recommended.¹³

Venipuncture requires an aseptic, no-touch technique.⁸ Veins used for venipuncture should be repeatedly assessed for infiltration, extravasation, infection, and phlebitis using standardized scales.⁸ Pain, burning, stinging, erythema, warmth, and subcutaneous swelling should be reported to the practitioner.

Venipuncture with a syringe requires the nurse to exert aspiration pressure against the syringe plunger. This method involves inserting a hollow-bore needle attached to a syringe into the lumen of a large vein to obtain a specimen. A hollow-bore straight needle or winged-butterfly needle with a short length of tubing is connected to an appropriate-size syringe. After blood is drawn into the syringe, the needle is withdrawn from the patient’s vein while a safety device is engaged and then detached from the syringe. The syringe is then connected to a blood-transfer device housing a rubber-sheathed needle with a Luer lock. The rubber-sheathed needle housed in the collection barrel is used to puncture the rubber top of a vacuum test tube. Once punctured, the vacuum in the tube extracts a set volume of blood from the syringe.

The correct volume of blood required by the laboratory must be drawn into each collection chamber to ensure accurate results and decrease the patient’s risk of anemia.⁸ Some tubes contain fixative agents that require an exact amount of blood in the tube. Tubes without fixative agents allow variable amounts of blood. Some tests require less blood than others; the minimum amount needed for a required test should be confirmed with the organization’s
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Laboratory. Some fixatives are more likely to contaminate other specimens when tubes are sequentially engaged in the rubber-sheathed needle. Knowing the prescribed laboratory order of the draw into the collection tubes is essential. The sequence is different when using a syringe and transfer device than when using a vacuum-extraction system. Some specimens may require special storage or handling, such as being placed on ice, refrigerated, or frozen.

Because limited venous access may be a life-threatening complication of venipuncture, maintaining the vein's integrity is essential. A patient with veins that may collapse or become injured from excessive syringe pressure may require an alternate method of venous sampling or the use of a smaller syringe. In addition, a patient's veins may be difficult to locate because of unusual anatomy, trauma from repeated phlebotomy, or edema.

Tourniquets should be used with caution. If a tourniquet is deemed necessary, the nurse should apply one for no longer than 1 minute to obtain valid test results. Prolonged tourniquet application can cause stasis and hemoconcentration. Infection control standards require that tourniquets be single use. Staphylococcus aureus contamination from reused tourniquets is a common finding.

When preparing a specimen label, the nurse should confirm the patient’s identifying information. The patient should state and spell his or her full name and date of birth (if possible). A laboratory cannot process a mislabeled specimen or one that does not arrive in a timely manner. Some specimens, such as those used for blood product administration, require a witness of identity and the time and date. Errors in any aspect of blood sampling may require repeat samples, placing the patient at risk for blood loss and venous injury.

Venipuncture can be painful, and a patient may experience anxiety or fear before the procedure. In some cases, just the appearance of a needle is frightening. A calm approach and skilled technique may help limit a patient’s aversion to venipuncture. Anxiety may be assuaged by communicating with the patient about how to help relieve his or her concerns.

EDUCATION
- Provide developmentally and culturally appropriate education based on the desire for knowledge, readiness to learn, and overall neurologic and psychosocial state.
- Explain the purpose of collecting the blood specimen and the method to be used.
- Explain how a tourniquet, antiseptic swab, and venipuncture may feel.
- Explain that pressure is applied to the venipuncture site briefly after the needle is withdrawn. Explain that the patient may apply pressure if he or she is able. If the patient has a bleeding disorder or is undergoing anticoagulant therapy, explain that applying pressure for a longer period of time may be required to achieve clotting.
- Instruct the patient to report persistent or recurrent bleeding or an expanding hematoma at the venipuncture site after the initial hemostasis is achieved.
- Encourage questions and answer them as they arise.

PROCEDURE
Before Arrival to the Home
1. Review the patient’s electronic health record for history and the practitioner’s orders.
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a. Assess the patient’s history for risks associated with venipuncture, such as anemia, anticoagulant therapy, low platelet count, a bleeding disorder, venous collapse, traumatic venipuncture, or phlebitis.
b. Assess the patient’s history for contraindications for specific venipuncture sites.
   i. A site on the arm on the side of a mastectomy or other lymphatic system compromise
   ii. A site affected by radiation, tissue injury, or infection
   iii. A site on the arm on the side affected by a stroke
   iv. A current or planned hemodialysis arteriovenous fistula site

2. Review other resources as needed.
   a. Review the anatomy of the venous system and the organization’s practice for the preferred veins for venipuncture.
   b. Determine whether cautions or preconditions must be met before the specimen can be collected. Specimen timing can be related to medication administration, nutritional intake, procedures, or diagnostic testing.
   c. Identify the appropriate laboratory tubes and validate the order in which the specimens are to be transferred into the collection tubes (if multiple specimens are required) and the volume required for each test with the laboratory.
   d. Identify special requirements for the laboratory specimen, such as whether it must be placed in an ice slurry.
   e. Review the laboratory’s requirements for labeling and handling the specimens.
   f. Review the practitioner’s orders for blood specimens and any additional laboratory test required during venipuncture and compare them with the laboratory requisitions and labels.

Upon Arrival to the Home

1. Perform hand hygiene and don gloves and appropriate PPE based on the patient’s signs and symptoms and indications for isolation precautions.
2. Introduce yourself to the patient, family, and caregivers.
3. Verify the correct patient using two identifiers.
4. Explain the procedure to the patient, family, and caregivers and ensure that the patient agrees to treatment.
5. Verify the practitioner’s order and assess the patient for pain.
6. Prepare an area in a clean, convenient location and assemble the necessary supplies.
7. Determine the patient’s ability to cooperate with the procedure and his or her experience with blood specimen collection.
8. Review the patient’s history of venipunctures and ask about signs of adverse responses to previous venipunctures, including a vagal response.
9. Assess the patient for anxiety or fear related to the procedure. Provide reassurance and inquire about how to provide comfort.
10. Assess the need to apply a local anesthetic to reduce pain from the venipuncture, per the organization’s practice.
11. Assess the patient for an allergy or a sensitivity to antiseptic or analgesic agents or to latex (if latex is used in equipment [e.g., collection barrels, sheathed needles, tourniquets, bandages, specimen tube tops, gloves]).
12. Assess the patient for sites contraindicated for venipuncture.
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13. Assess the patient’s hydration and perfusion status.
14. Provide privacy for the patient.
15. Ensure that the lighting is appropriate for observing vein contours and colors.
16. Raise or lower the bed or chair, if possible, to a comfortable working height to prevent injury.
17. Assist the patient to a comfortable supine or low-recumbent position and have him or her remove gum, mints, or food from the mouth.

Rationale: A low, supported position and an empty mouth reduce the risk of injury if the patient experiences lightheadedness, faints from vagal stimulation, or experiences a seizure.

18. Be prepared to manage a venipuncture-associated vasovagal or seizure reactions for an at-risk patient.
19. At the patient’s side, access or complete laboratory requisitions or orders. Obtain labels per the organization’s practice. Compare the labels with the patient’s self-identification (per the organization’s practice) by having the patient confirm the spelling of his or her full name and date of birth (when possible). Do not draw blood if there is a discrepancy between the laboratory requisitions or labels and the patient’s identity.

20. Support the patient’s selected arm and extend it to form a straight line from the shoulder to the wrist. Place a small pillow or towel under the upper arm or place the arm on the arm of the chair or on a table.

Rationale: Proper patient positioning helps stabilize the extremity.

21. Place a clean cloth or paper drape under the patient’s arm.
22. Identify the best sites for venipuncture per the organization’s practice. Avoid contraindicated sites, such as IV access sites.

a. Choose a vein that is easily visible without applying a tourniquet.

Avoid the use of a tourniquet if possible.

i. If IV fluid is being administered in one arm, choose a site on the opposite arm for blood specimen collection. If unable to locate a site on the opposite arm, look for a venipuncture site distal to the IV infusion site.

Consult with the practitioner about stopping the IV infusion for 2 minutes before obtaining the blood specimen.

ii. Choose a vein that is straight and does not divert into another branch; that has no swelling, hematoma, phlebitis, infection, infiltration, or recent venous
access or venipuncture. Typically, the median cubital vein is the easiest to puncture because it lies between the muscles (Figure 1).^16

Obtain the sample below a peripheral access device, if applicable.^

Obtaining a blood sample from an extremity with a peripheral access device in place may cause specimen contamination or hemolysis.

To reduce the risk of a hematoma, avoid venipuncture in locations where a vein branches. Puncturing the basilica vein is associated with damage to the underlying artery or nerve and is typically more painful.^

b. If a tourniquet is deemed necessary, apply a single-use tourniquet proximal to and four to five finger widths from the site. If the venipuncture site will be on the same arm as an IV infusion site, place the tourniquet between the IV infusion site and the intended venipuncture site.^

Rationale: A tourniquet blocks venous return to the heart from the extremity, causing the veins to dilate for easier assessment.

i. Encircle the extremity and pull one end of the tourniquet tightly over the other, looping one end under the other.

Apply the tourniquet loosely or do not use a tourniquet for a patient who has a history of bleeding, is easily bruised, has fragile skin, or has diminished circulation.

ii. Apply the tourniquet so that it can be removed by pulling one end with a single motion.

Do not keep the tourniquet on the patient longer than 1 minute. Prolonged tourniquet application causes stasis, hemolysis, and hemoconcentration because of changes in the vascular epithelium from increased venous pressure and hypoxia.

c. Palpate the selected vein for firmness and rebound.

Rationale: A healthy vein is elastic and rebounds on palpation. A thrombosed vein is rigid, rolls easily, and is difficult to puncture.

Do not use a vein that feels rigid or cordlike or one that rolls when palpated.

d. Instruct the patient to make a fist without vigorously opening and closing it.

Rationale: Making a fist facilitates the distention of the veins by forcing blood up from the distal veins. Vigorously opening and closing the fist may cause pseudohyperkalemia.
e. If the selected vein cannot be palpated or viewed easily, apply a warm compress over the extremity for several minutes per the organization’s practice. If a tourniquet was used, remove it and apply a warm compress for several minutes and then reapply the tourniquet.

Rationale: Warming enhances blood flow, making veins more prominent.

f. Inspect the vein to confirm the selected venipuncture site. If a tourniquet has been reapplied, quickly inspect the vein distal to the tourniquet, then release the tourniquet.

Do not select a vein on the ventral surface of the wrist.

23. As prescribed or per the organization’s practice, apply a topical anesthetic if required to reduce pain. Remove the anesthetic completely from the skin after the prescribed dwell time.

24. Prepare the collection equipment using tubes, holders, needles, and syringes from the same system and manufacturer.

Rationale: Combining systems may cause injury to the patient or yield incorrect test results. Incompatibility of components may cause failure of the process.

a. Choose an appropriate-size needle that is small enough to fit in the vein but does not cause hemolysis.
b. Ensure that a double-ended straight needle or winged-butterfly needle with tubing and a safety device is securely attached to the vacuum-extraction system collection barrel. If a single-ended straight or winged-butterfly needle is used, make the Luer-lock connection between the needle and the collection barrel housing of a sheathed needle.

Keep the needle hub and the connection sites sterile.

Use a new collection barrel for each patient. Do not detach the needle from the collection barrel for disposal after use.

25. Locate the selected venipuncture site.

26. Perform hand hygiene and don gloves and appropriate PPE based on the patient’s signs and symptoms and indications for isolation precautions.

27. Prepare the venipuncture site.

a. If the skin needs cleansing, use soap and water first, then allow to dry completely.
b. Use an organization-approved antiseptic for routine venipuncture. These include 70% alcohol, greater than 0.5% chlorhexidine in alcohol solution, tincture of iodine, and povidone-iodine.

i. If using 70% alcohol, allow it to dry completely.
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ii. If using greater than 0.5% chlorhexidine in alcohol solution, use a back-and-forth motion for a minimum of 30 seconds, and allow to dry completely.

iii. If chlorhexidine is contraindicated, use tincture of iodine or an iodophor. Allow iodophors to dry a minimum of 90 to 120 seconds.

c. Do not touch the site after preparation.

28. Obtain the blood specimen.

a. Locate the selected venipuncture site. If a tourniquet is deemed necessary, reapply the tourniquet and locate the vein.

b. Remove the cap from the venipuncture needle, maintaining the needle’s sterility. Inform the patient that he or she will feel a stick.

If contamination occurs, discard the needle and the collection barrel or syringe in a sharps container and prepare a new venipuncture set.

c. Place the thumb or forefinger of the nondominant hand distal to the selected venipuncture site and gently pull and stretch the patient’s skin distal to the patient until it is taut and the vein is stabilized.

Rationale: Gently pulling and stretching the patient’s skin help stabilize the vein and prevent it from rolling during needle insertion.

d. If using a butterfly needle, hold it by the wings; if using a straight needle, hold it at the hub. Insert the needle at a 30-degree angle from the patient’s arm with the bevel facing upward, just distal to the selected site for vein penetration.

Rationale: The smallest and sharpest point of the needle should puncture the skin first to reduce the chance of penetrating the sides of the vein during insertion. Keeping the bevel up causes less trauma to the vein. Entering the skin distal to the vein prevents unanticipated vein puncture, which may result in inadequate blood specimen retrieval and hematoma.

e. Slowly insert the needle into the vein. If using a butterfly needle, look for blood return in the tubing of the butterfly set up.

Rationale: Inserting the needle slowly prevents puncture through the opposite side of the vein.

f. Hold the syringe securely and slowly and gently pull back on the plunger.

Rationale: Holding the syringe securely prevents the needle from advancing, which could cause the needle to puncture the other side of the vein. Gently pulling on the plunger creates just enough vacuum needed to draw blood into the syringe. If the plunger is pulled back too quickly, pressure may collapse the vein.
Carefully assess the patient for the potential for venous collapse when using a syringe barrel that is 10 ml or larger. Consider that some older adults and those who have received treatments damaging to the veins may not be able to withstand high pressure or may require a smaller syringe barrel. Pressure from a large barrel may cause vein wall damage, leading to infiltration. During aspiration, a smaller gauge syringe barrel exerts less pressure.

g. Look for blood return in the syringe.

   Rationale: If blood does not appear, the needle may not be in the vein.

h. Obtain the required amount of blood for all the ordered laboratory tests, keeping the needle stabilized.

   Rationale: Laboratory results are more accurate when the required amount of blood is obtained. Movement of the needle increases the patient’s discomfort.

i. If a tourniquet was used, release it after obtaining the blood.

   Rationale: Releasing the tourniquet reduces bleeding at the site when the needle is withdrawn.

j. Apply a sterile 2 × 2-inch gauze pad over the venipuncture site, but do not apply pressure. Quickly but carefully withdraw the needle from the vein, activating the safety mechanism to prevent an accidental needlestick injury.

   Rationale: Applying pressure over the needle can cause discomfort and injury. Carefully removing the needle minimizes discomfort and vein trauma.

k. Immediately apply pressure over the venipuncture site with gauze until the bleeding stops.

   Rationale: Direct pressure minimizes bleeding and prevents hematoma formation. A hematoma may cause compression and nerve injury.

   For a patient who has a bleeding disorder or who is undergoing anticoagulant therapy, maintain pressure for several minutes, as needed, until the bleeding stops.

   Do not use a cotton ball or a rayon ball when applying pressure because of the potential for dislodging the platelet plug at the venipuncture site.

l. Observe the venipuncture site for bleeding for 5 to 10 seconds before applying tape or a bandage to secure the gauze. Allow the gauze to remain in place for at least 15 minutes.
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Rationale: Applying gauze with tape or a bandage keeps the venipuncture site clean and controls final oozing.

**Instruct the patient not to bend his or her arm.**

29. Remove the protected needle from the syringe and immediately discard it into a sharps container. Do not recap needles or attempt to remove the needle from the collection barrel.

Rationale: Using the needle to pierce blood test tube stoppers for blood transfer increases the risk of needlestick injury. Placing tubes upright in a rack, using a one-handed technique or a needle shield, and refraining from placing pressure on the syringe plunger are recommended.

30. Transfer the blood in the syringe to the test tubes.

a. Connect the syringe to a sterile safety-transfer device to fill the tubes, ensuring that the syringe nozzle is not contaminated.

Rationale: Safety features help reduce needlestick injuries. Using a safety-transfer device with the tubes allows the vacuum to draw the blood into the tube, reducing the risk of needlestick injury.

b. Advance the first specimen tube into the sheathed needle inside the transfer device so that the needle pierces the rubber top of the tube.

Rationale: The order of the draw specified by the laboratory should be used for filling tubes from a syringe. Some laboratories vary the order from national recommendations.

**Follow the laboratory’s order of the draw for filling tubes from a syringe with a collection device; it may be different from the order used to fill tubes using a vacuum-extraction system.**

c. After the specimen tube is filled to the correct level for the ordered tests (indicated by the marking on the tube or by laboratory practice), grasp the transfer device firmly and remove the specimen tube.

Rationale: The tubes should be filled to the correct level because additives in certain tubes are measured in proportion to the filled tube.

**To prevent causing hemolysis, do not press the syringe plunger to force blood into a vacuum tube.**

d. In the order specified by the laboratory, insert additional specimen tubes into the transfer device and engage the sheathed needle, as needed, to fill the blood tubes.

e. If the tube contains additives, gently invert it back and forth immediately after it is filled with blood. Follow the manufacturer’s instructions for the number of inversions. Do not shake the tube.
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Rationale: Inverting the tube gently ensures that the additives are properly mixed and prevents erroneous test results. Shaking may cause lysis of the cells, resulting in inaccurate test results.

31. Immediately discard the syringe and transfer device into an easily accessible sharps container. Do not recap needles or attempt to remove the needle from the collection barrel.

Transfer devices and sheathed needles are considered sharps that are associated with needlestick injuries, and they must be disposed of in a sharps container. The sheathed needle’s flexible cover prevents blood from flowing when the needle is not engaged in a vacuum tube; however, the sheath does not prevent a needlestick injury if a finger inadvertently enters the collection barrel.

32. Check the collection tubes for any sign of external contamination. Decontaminate the tubes, if necessary, per the laboratory’s practice.

Rationale: Decontamination prevents cross-contamination and reduces the risk of exposure to pathogens in the blood.

33. Help the patient assume a comfortable reclining position. Allow the patient to maintain this position for several minutes.
34. In the presence of the patient, label the specimen per the organization’s practice.
35. Place the labeled specimen in a biohazard bag and transport it to the laboratory immediately per the organization’s practice.
36. Address any signs of anxiety or fear that the patient experienced during the venipuncture.

Rationale: A patient may require more venipunctures in the future; therefore, addressing concerns and letting the patient express emotions may reduce an aversion to future venipunctures. Documenting the patient’s response allows for improved care planning for future venipunctures.

37. Reassess the venipuncture site to determine whether bleeding has stopped or a hematoma has formed.
38. Monitor the patient for infection or phlebitis using standardized scales. Report pain, burning, stinging, erythema, warmth, or subcutaneous swelling to the practitioner.
39. Report adverse events in an organization-approved occurrence reporting system.
40. Assess pain, treat if necessary, and reassess.
41. Discard or store supplies, remove PPE, and perform hand hygiene.
42. Document the procedure in the patient’s record.

EXPECTED OUTCOMES
- Venipuncture is successful on initial attempt.
- Aseptic technique is maintained.
- Venipuncture site shows no evidence of continued bleeding or hematoma after specimen collection.
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• Patient tolerates procedure with minimal anxiety, fear, or discomfort.
• All required laboratory specimens are collected, and accurate results are obtained.

UNEXPECTED OUTCOMES
• Hematoma forms at the venipuncture site.
• Infection or phlebitis develops at the venipuncture site.
• Nerve or adjacent tissue injury occurs.
• Patient has vasovagal response, including dizziness, fainting, or loss of consciousness.
• Hemostasis is not achieved.
• Laboratory specimen is inadequate for testing or hemolyzed and cannot be processed.
• Aseptic technique is not maintained.
• Needlestick injury occurs.

DOCUMENTATION
• Date and time of venipuncture, number and location of attempts, and name and credentials of person performing procedure
• Specimens obtained and disposition of specimens
• Location and description of venipuncture site
• Volume of blood drawn for a patient undergoing frequent blood sampling or a patient with anemia
• Laboratory to which the specimen was delivered and any information required by the laboratory
• Inability to obtain sample, if unsuccessful
• Patient’s tolerance of venipuncture
• Education
• Patient’s progress toward goals
• Unexpected outcomes and related interventions
• Assessment of pain, treatment if necessary, and reassessment

OLDER ADULT CONSIDERATIONS
• Older adults have fragile veins that are easily traumatized during venipuncture. Applying a warm compress may help when samples are obtained. Using a small-gauge needle may also help.
• Use the appropriate-size vacuum tube. Large tubes may exert too much pressure on an older adult’s vein.

REFERENCES
Blood Specimen Collection: Venipuncture
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ADDITIONAL READINGS

*In these skills, a “classic” reference is a widely cited, standard work of established excellence that significantly affects current practice and may also represent the foundational research for practice.

Elsevier Skills Levels of Evidence
- Level I - Systematic review of all relevant randomized controlled trials
- Level II - At least one well-designed randomized controlled trial
- Level III - Well-designed controlled trials without randomization

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- Level IV - Well-designed case-controlled or cohort studies
- Level V - Descriptive or qualitative studies
- Level VI - Single descriptive or qualitative study

Supplies
Ensure that all necessary supplies and durable medical equipment are available.

- Adhesive bandage or tape
- Antiseptic agent for skin preparation (per the organization’s practice)
- Appropriate-size sterile needles
- Appropriate-size sterile syringes
- Clean cloth or paper drape
- Gloves, PPE as indicated for isolation precautions
- Ice slurry and additional occlusive bag, if needed
- Identification labels with proper patient identifiers
- Laboratory requisition (appropriate patient identification, date, time, and name of test)
- Occlusive biohazard bag or approved container for delivery of specimen to the laboratory
- Single-use tourniquet
- Small pillow or folded towel
- Sterile 2 × 2-inch gauze pads
- Sterile Luer-lock transfer device
- Topical anesthetic agent and occlusive dressing, if needed
- Vacuum blood tubes
- Warm compress, if needed
- Sharps container

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