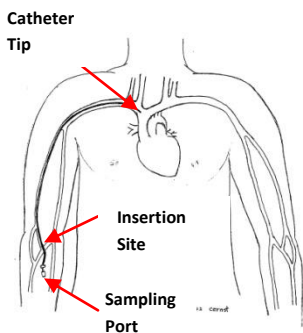


## Phlebotomists Guide to PICC Lines, Central Catheters, and Imbedded Ports #3248

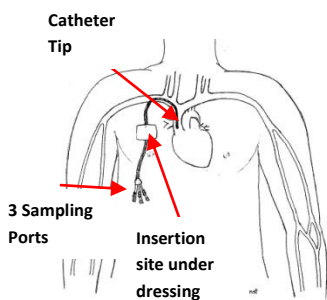
There is a multitude of vascular access devices used to infuse fluids, medications and blood products into the system. Sometimes those same devices are also used to obtain blood specimens. Managing peripherally inserted catheters, central lines, and ports generally resides within the realm of the nursing department. Phlebotomists, however, may be called upon to receive the sample. Although there should be a written procedure for the nurse to follow, phlebotomists sometimes have to answer questions as to how the specimen must be obtained. Obtaining a blood specimen from a vascular access device (VAD) may not be in your job description, but understanding the proper procedure will be helpful when guiding nursing staff in sample collection.

VADs come in a variety of sizes and shapes and go by many names. Peripherally inserted devices are inserted into a vein in an extremity, usually an arm, and threaded up the vein to a predetermined point. This type of VAD may be as short as eight inches long, with its tip resting in the middle of the upper arm. Others may be threaded up the vein until the tip is just above the heart. Some types of VADS are inserted through the chest wall into a large vein close to the top of the heart. These VADs may have one, two, or three lumens (openings), with port ends extending for several inches outside the chest wall. Imbedded ports are also inserted through the chest wall, but are tunneled under the skin and don't have tubing extending through the chest wall.



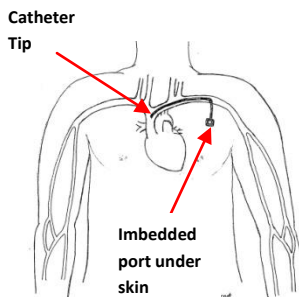
### PICC Lines (Peripherally Inserted Central Catheters)

PICC lines are inserted into a vein in the antecubital area. The catheter is then threaded up towards the heart. The tip of the catheter may rest just above the right atrium of the heart, or if there was difficulty threading it that far, the tip may lie in a vein somewhere in the shoulder area. Four to six inches will protrude from the insertion site in the antecubital area and be secured by a dressing. If a venipuncture is required to collect a blood specimen, use the other arm if possible. If not possible, the collection must be completed from a vein below the insertion site of the PICC. To prevent damage to a PICC line, never place a tourniquet above its insertion site.



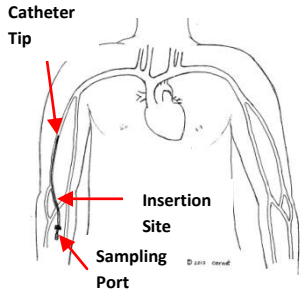
### Central Catheters (often referred to as Hickmans or Groshongs)

This type of catheter is inserted through the chest wall into a large vein above the right side of the heart. Central catheters may have one, two, or three lumens (open tubes) running the length of the catheter. The insertion site on the chest is covered by a dressing and one to three "ports" will be seen, each with a clamp attached to it. Each port is usually a different color and is attached to one of the hollow tubes that run the length of the catheter. Unless contraindicated for other reasons, blood collections by venipuncture may be performed on either arm using a tourniquet.



### Imbedded Port

Imbedded ports are tunneled under the skin, and other than a firm mound below the skin on the chest, you do not usually see them. The port has a round, dime-size opening, covered with a rubber-like material. The catheter section is inserted into a large vein and threaded until it rests just above the right side of the heart. The port is accessed by inserting a special needle, called a "Huber" needle (which looks a bit like a fish hook) through the skin and into the rubber-like portion of the port. Unless contraindicated for other reasons, blood collections by venipuncture may be performed on either arm using a tourniquet.



## Midline Catheter

A midline catheter looks much like a PICC line, except it is not as long. Midlines can be from 3" to 10" in length. As you can see from the illustration, the tip of the midline catheter rests in the upper part of the arm. This type of catheter is useful for patients who must go home with IV infusions for several weeks. If a venipuncture is required to collect a blood specimen, use the other arm if possible. If not possible, the collection must be completed from a vein below the insertion site of the midline. To prevent damage to the midline catheter, never place a tourniquet above its insertion site.

While the manufacturers of VADs allow aspiration of blood through their devices, incorrect technique used by the specimen collector can introduce preanalytical errors into the specimen. Specimen collections obtained through vascular access devices are notorious for hemolysis and contamination with medication and fluids. Excessive pulling pressure on a syringe plunger is the main reason VAD draws become hemolyzed. Inadequate discards frequently cause sample contamination. If at all possible, specimens intended for coagulation testing should not be obtained from VADs that have been infused or flushed with heparin. It is also inadvisable to obtain a specimen to be tested for electrolytes from a VAD if TPN has been infusing through the line.

Patients with VADs are at a greater risk for infection. When VADs are in use, impeccable infection control must be strictly observed. Everything coming into contact with the inside of a VAD port must be sterile. Items to be used with the VAD may never be put down on any surface unless it is a sterile field. Syringes must remain in the packaging until ready to insert into the hub of the VAD. If used, tube holders must remain in sterile packaging until ready to use. Don't forget your hand hygiene. Even if you won't be obtaining the sample yourself, you might be handing items to the nurse performing the procedure.

If called into service to assist nursing staff with a specimen collection from a VAD, be mindful of the following to obtain a specimen that is acceptable for testing:

- Nursing should stop fluids running through all single, double, or triple lumen catheters for two minutes
- Draw a discard volume of blood. Approximately 5ml is usually adequate.
- If a syringe will be used for sample collection, guide the collector in withdrawing the blood slowly to reduce hemolysis. A 10ml syringe is appropriate for specimen collection
- A tube holder may also be attached to the VAD and tubes filled in the correct order of draw after the appropriate discard
- The nurse should then flush the line with about 10ml of saline or per facility flushing policy, and any infusing fluids resumed
- Tubes must then be labeled at the bedside by the person who obtained the specimen (not the phlebotomist) and appropriate documentation completed
- Facility policies and procedures should always be followed.

While obtaining blood specimens through a VAD saves the patient a stick, they also introduce a new set of potential problems. Some types of VADS are more problematic than others when used for the purpose of obtaining blood specimens. Healthcare personnel must be thoroughly trained in managing VADS before attempting a sample collection through one. Even when proper procedure is followed, VADs can sometimes fail to produce a blood sample. There are several reasons blood may fail to flow from the line. The line may be clotted. It may have collapsed due to excess vacuum pressure while attempting to obtain the blood. Perhaps the tip is just in a funny position in the vein. When a specimen cannot be collected from a VAD, the phlebotomist should be prepared to perform a venipuncture or capillary puncture to obtain a sample for testing.

By having a basic understanding of the different vascular access devices, you will know the precautions you must follow when it is necessary to obtain a specimen by venipuncture from a patient with a VAD.



## Phlebotomists Guide to PICC Lines, Central Lines, and Imbedded Ports #3248

### Test your knowledge:

1. Which option(s) describes the potential risk of using a VAD for blood specimen collection?
  - a) the VAD can become blocked with clotted blood
  - b) the specimen could be hemolyzed
  - c) the specimen may become contaminated with fluids or medications
  - d) all of the above
2. When a VAD is used for blood sample collection, what step(s) should be taken just before obtaining the sample to be tested?
  - a) the nurse should stop any infusing fluids
  - b) a discard must be drawn
  - c) the line should be flushed
  - d) both a and b
3. What type of VAD may not be visible?
  - a) imbedded port
  - b) triple lumen central catheter
  - c) PICC
  - d) midline
4. If a sample must be obtained by venipuncture from a patient with a PICC in their left arm, where would you draw it from?
  - a) the right arm
  - b) the left arm below the PICC insertion site
  - c) both a and b
  - d) none of the above
5. Which statement below is correct?
  - a) a tourniquet should never be placed above a VAD insertion site
  - b) blood specimens for coagulation studies may be obtained from a VAD infusing heparin if a discard is used
  - c) A hard pulling pressure from a syringe is the best way to obtain a specimen from a PICC
  - d) VAD draws result in less hemolysis and fluid contamination
6. Which statement below is correct?
  - a) obtaining blood specimens from VADs is in the scope of practice for all phlebotomists
  - b) only properly trained healthcare personnel should obtain blood specimens from VADs
  - c) the phlebotomist may turn off the IV in preparation for the sample collection from the VAD
  - d) none of the above

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Facility/Supervisor \_\_\_\_\_ Dept: \_\_\_\_\_