



VACUETTE® Blood Collection Techniques

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An Informative Guide
to Blood Collection




Preface


Formal education and studies rarely cover blood collection technique in detail, even though this is an area which is often critically observed by patients. It is, therefore, of great importance that the best technique is applied in every situation.


Before taking a blood sample, it is extremely important to be fully familiar with the collection system being used. It will make an unprofessional impression to mishandle the blood collection equipment and make the patient feel increasingly anxious, which will have a negative influence on the condition of the veins.


This guide should help to quickly develop good phlebotomy technique, and avoid unnecessary errors. The required skills can only be obtained by consistent training and practice.

Equipment Required for Blood Collection


 **VACUETTE®** Blood collection system

 Tourniquet

 Disposable gloves

 Gauze pads

 Alcohol wipe

 Bandage

 Sharps container

Inspection

Before deciding on a puncture site, an inspection of all possible areas is imperative, checking both the right and left arms. The order of inspection should correspond to the list of priority sites, whereby the first and second sites should be suitable in most cases.

Vein Selection: Priority List

1. Median cubital vein

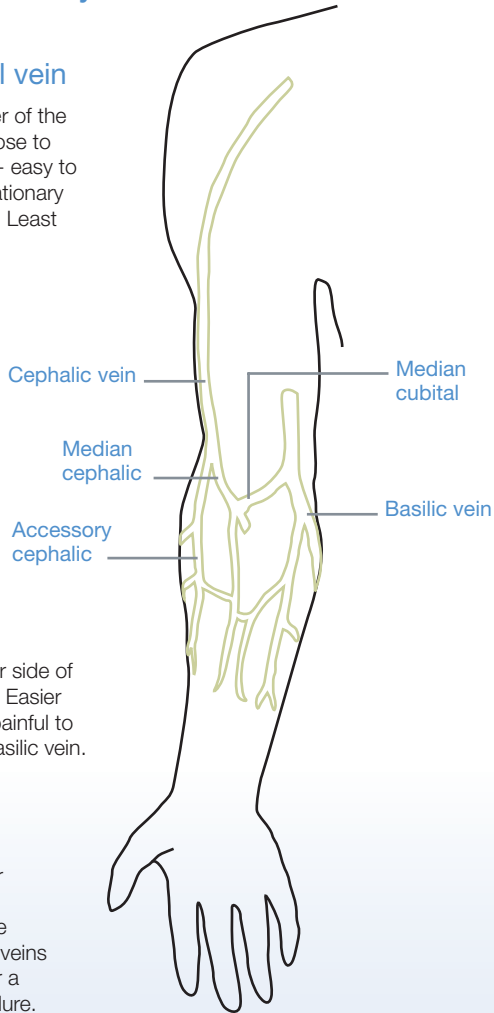
Located in the center of the antecubital area - close to the skin. Large vein - easy to anchor - remains stationary during venipuncture. Least risk of injury.

2. Cephalic vein

Located on the outer side of the antecubital area. Easier to anchor and less painful to puncture than the basilic vein.

3. Basilic vein

Located on the inner side (medial) of the antecubital area. Use only when the other veins are unacceptable for a venipuncture procedure.



Vein Selection: Priority List *continued*

4. Dorsal hand veins

Acceptable secondary site if veins in the antecubital area of both arms are not viable.



Patient Identification

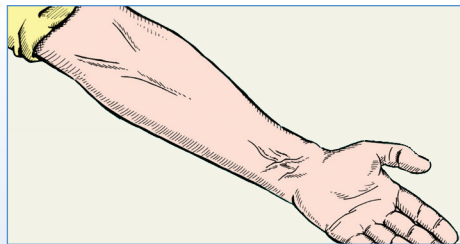
Prior to blood collection, the patient should state and spell his or her name and provide other identifying information. The response should correlate with the wristband and test requisition. If patient is unable to respond verbally, someone else must identify the patient; e.g., family member or nurse. The phlebotomist should record the name of the person identifying the patient.

The following information should appear on the blood collection tube label:

- Last name, first name
- Unique patient identification number
- Date and collection time
- Collector's initials or other identifier

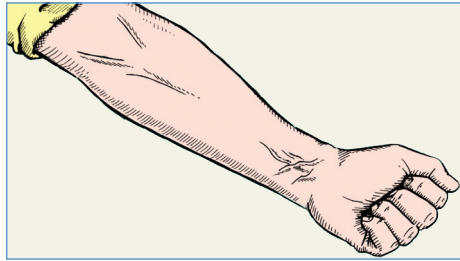
Measures to Improve Prominence of Vein

1. Incline the arm in a downward position

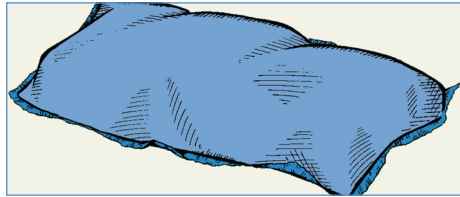


Measures to Improve Prominence of Vein *continued*

2. Clench the fist
(do not pump)



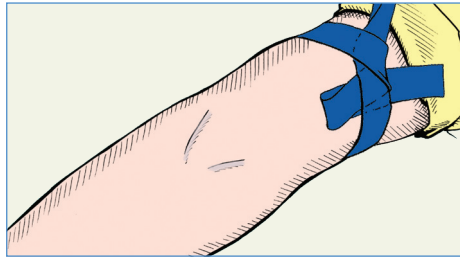
3. Warm the area



Applying the Tourniquet

A standard tourniquet or blood pressure cuff is applied proximal to the anticipated puncture site.

Application of the tourniquet or blood pressure cuff should not cause the patient any pain. If a blood pressure cuff is used, it should be inflated to just below the patient's diastolic pressure. Application of the tourniquet or blood pressure cuff should not exceed one minute to avoid altering laboratory results.



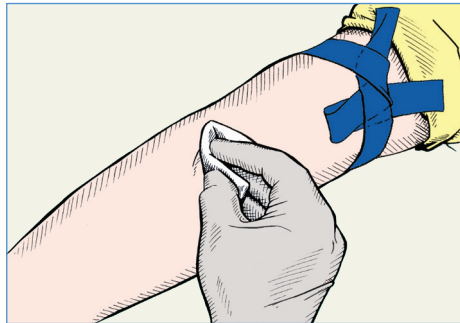
Applying the Tourniquet *continued*

If a longer application is required to locate the venipuncture site, then the tourniquet should be removed after 60 seconds and may be reapplied after two minutes have lapsed.

If the tourniquet has been applied too tightly, discoloration of the extremities may occur. The tourniquet should be released immediately until the skin returns to its normal color. The ideal application is as short as possible, and should not last longer than one minute. If the blood flow is insufficient for specimen collection, the tourniquet can be reapplied during the collection procedure.

Cleansing the Puncture Site

The puncture site should be cleansed thoroughly. The skin should be cleansed with an antiseptic solution, such as 70% isopropyl alcohol. For standard blood collection, reduction of bacteria in skin flora takes place after about 15-30 seconds* when an alcohol solution is used. Allow the area to dry completely.



It is obligatory to wear new disposable gloves for every venipuncture in accordance with standard precautions.

*If applicable, refer to the instructions for use for the antiseptic or cleaning method used.

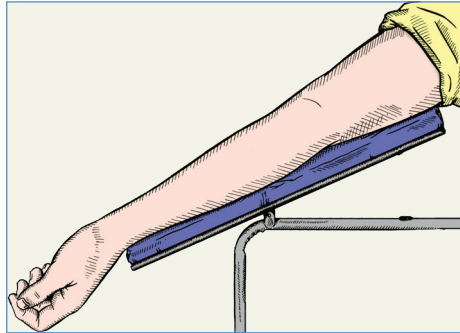
Routine Puncture Sites

Puncture site: median antecubital veins

The antecubital space is the most popular site for venipuncture.

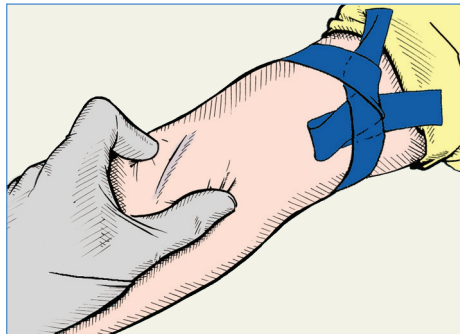
It is always worth taking time to inspect both arms, to be able to choose the arm with the most prominent veins.

If the patient has a particular preference for a puncture site, then this should be accommodated whenever possible.

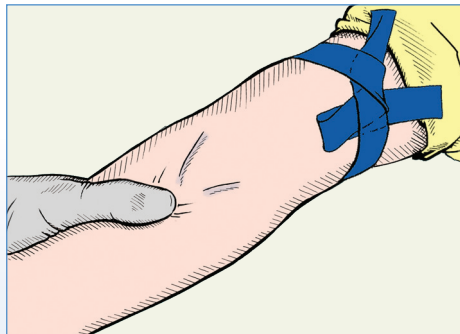


It is of utmost importance that the patient is relaxed and sitting comfortably. The arm should be extended in a downward position.

The forefinger should be used to palpate the vein and to ensure the vein is appropriate for venipuncture. The area is then thoroughly cleansed.

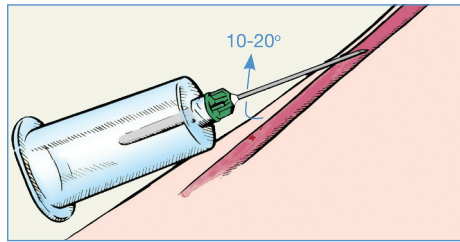


Anchor the vein below the intended puncture site. This reduces the chance of veins moving as the needle is inserted.

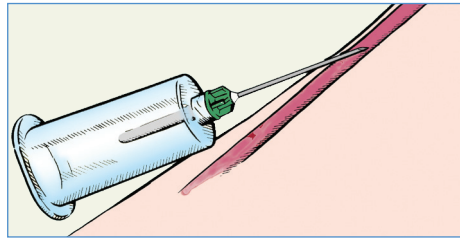


Routine Puncture Sites *continued*

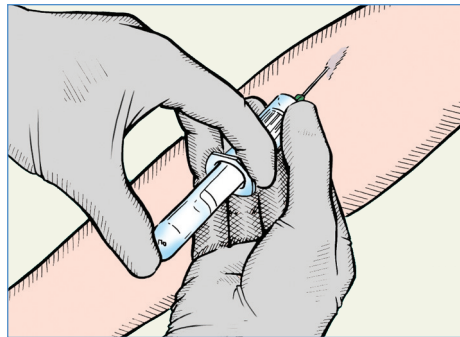
The venipuncture is carried out at an insertion angle of less than 30 degrees with needle bevel up.



Use a steady advance until the needle bevel is in the lumen of the vein. Puncture depth varies depending on the patient and the vein utilized for collection.



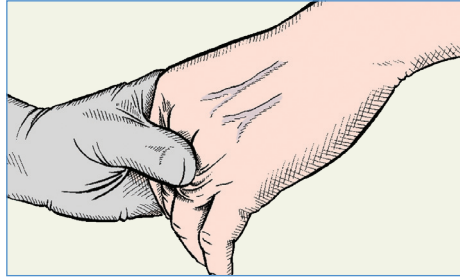
Using the free hand, insert an evacuated tube into the holder. As soon as blood flow is established, the tourniquet should be released to minimize hemoconcentration. Unnecessary hand changes should be avoided. Any unnecessary movements within the vein may cause additional pain.



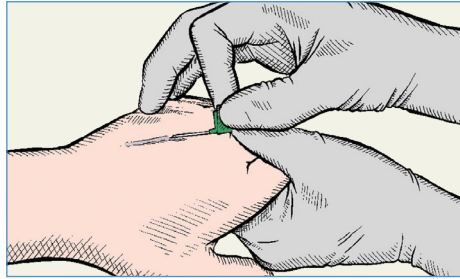
Routine Puncture Sites *continued*

Puncture site: Dorsal hand veins

Grasping the patient's hand for venipuncture, pull the skin in a downward direction until taut.



The needle or blood collection set is inserted into the middle of the targeted vein, at an angle of 10-20 degrees. As soon as the blood flow starts, the tourniquet can be released.



Factors Leading to Difficult Venipuncture

- ⤵ Anxiety
- ⤵ Cold
- ⤵ Thin veins
- ⤵ Vasoconstriction of veins
- ⤵ Sclerosed veins
- ⤵ Long term treatment with steroids
- ⤵ Shock
- ⤵ Poor hydration
- ⤵ Small veins (children/women)
- ⤵ Repeatedly punctured veins
- ⤵ Cachexia

The above list of possible unfavorable factors is by no means complete. It is a well known fact that there are a number of adverse situations that can make blood collection difficult.

Factors Leading to Difficult Venipuncture *continued*

Every step that can lead to vasoconstriction in a patient is a hindrance. Comments such as “You’ve got bad veins” are not very helpful, and serve more to express helplessness of the blood collector. The first priority is to reduce the patient’s anxiety, which is the main cause of vasoconstriction. A calm atmosphere is of prime importance. A hectic environment, a cold room or personnel with cold hands can lead to vasoconstriction.

If a patient would prefer to lie down or if a particular venipuncture site is preferred, these wishes should be accommodated whenever possible.

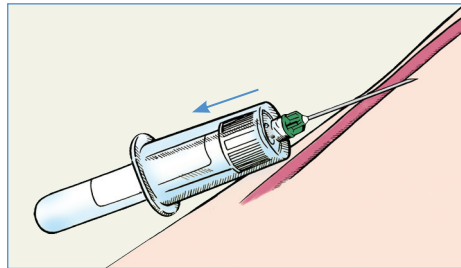
Helpful Hints for Blood Collection

After removing the rear protective cover, the double-ended blood collection needle is threaded into the holder. The front protective cap is removed before puncture. For hygienic reasons as well as to protect against exposure, gloves are required.

The blood collection equipment is held between the forefinger, middle finger and thumb.

The hand carrying out the venipuncture should not be swapped unnecessarily during the procedure. After penetrating the vein, the free hand is used to push the evacuated tube into the holder.

If the needle is in the correct position, blood flows into the tube. If there is no blood flow, it is likely that the needle tip is not in the vein lumen. Lightly pulling back or moving the needle slightly forward to correct the needle position can remedy this.

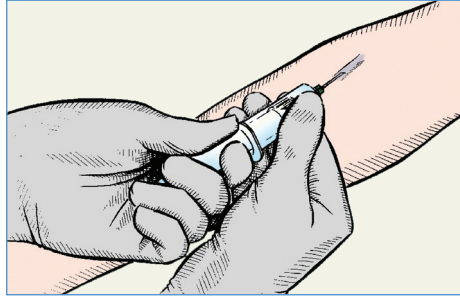


Procedure After Blood Collection

Nothing is more unsightly than a bruise after blood collection. The phlebotomist is, to a certain extent, judged on successful vein penetration and the extent of any bruising afterwards.

This complication can largely be avoided. Before removing the needle from the vein, the tube is removed from the holder. The tourniquet should have previously been released.

Needle removal is followed by compression using a gauze pad.



If the compression is applied while the needle is being removed, the vein wall could be injured. This can lead to a large hematoma at the puncture site. The compression must be carried out directly after removing the needle. Taking normal coagulation time into account, 2-4 minutes time for compression is necessary to prevent a hematoma from forming.

If the patient is too weak, the phlebotomist should make sure that compression is adequately applied.

A sterile bandage should only be applied when compression is complete.

For patients undergoing anticoagulation therapy, good manual compression is essential.

Physical exertion should be avoided immediately following blood collection, as this could lead to formation of a hematoma.

Venipuncture With Small Children

Technically speaking, blood collection with children from 2 years and up is not that different from blood collection with adults.

The collection equipment must be suitable for the smaller dimensions of the vessels. Above all, a calm and friendly atmosphere is extremely important for young patients.

Children are far more cooperative if the procedure has been explained to them prior to collection.

Venipuncture With Small Children *continued*

Venipuncture should be carried out using a small gauge needle such as a winged collection set and a reduced volume evacuated tube. The situation can be made easier if the child is sitting on the mother's lap or the lap of an assistant. It is very important to hold the arm steady, as reflex movements should be expected.

Puncture in the antecubital area

The phlebotomist should anchor the vein by pulling the skin below the puncture site in a downward direction until taut. The needle of a blood collection set is inserted into the vein at an angle of approximately 15 degrees. A **VACUETTE**[®] tube with reduced vacuum can then be inserted into the holder. When the vein has been reached and blood flow can be seen in the plastic tubing of the collection set, the tourniquet can be released. A visual flash of blood in the body of the device indicates successful venipuncture. The assistant or accompanying parent makes sure that the child remains as calm and quiet as possible during the whole procedure.

Dorsal vein puncture

Apply the tourniquet approximately a hand's width above the wrist. The fingers are held and bent downward so that the skin on the back of the hand is taut. The needle should be inserted at an angle of 10-20 degrees. The limb should be held firmly during the whole venipuncture procedure in order to avoid sudden movements that could pull the needle out of the vein.

Safety Aspects During Blood Collection

Due to the high risk of exposure, great care should be taken to ensure correct application of materials and equipment, taking particular care to avoid distractions or loss of attention.

Use of plastic tubes

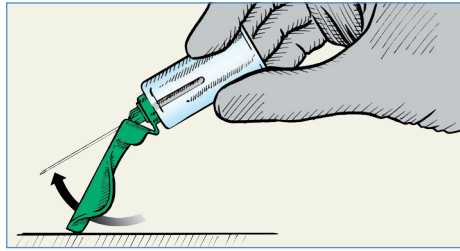
By using thick-walled plastic tubes (PET) instead of glass, the risk of tube breakage and thus injury due to glass shards is virtually eliminated.

VACUETTE[®] QUICKSHIELD Safety Tube Holder

When using the **VACUETTE**[®] QUICKSHIELD Safety Tube Holder, blood collection is carried out as usual. When the last tube has been filled, withdraw the needle carefully from the vein.

Safety Aspects During Blood Collection *continued*

With the aid of a solid surface or using the thumb to activate the safety shield, the needle is enclosed by the protective shield attached to the holder.

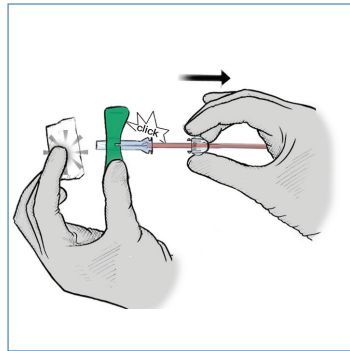
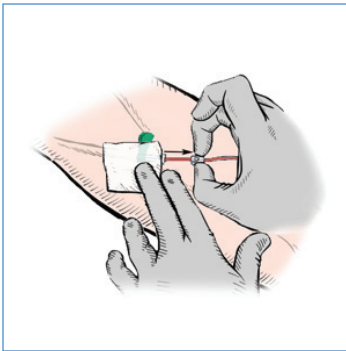


An audible “click” signifies to the user that the safety shield has been properly activated.

VACUETTE® Safety Blood Collection Set

After using the safety blood collection set, the safety mechanism is activated as the needle is withdrawn from the patient's vein.

After completion of blood collection, place gauze over the site and anchor the wing with one hand.



With the other hand, activate the safety mechanism by pressing in both sides of the hub to engage the lock. Slide the safety mechanism backward until an audible “click” is heard.

Laboratory Requirements

Complaints about incorrect laboratory values can usually be traced back to the blood collection procedure.

From the laboratory's point of view, the stasis resulting from extended tourniquet application should always be as short as possible to avoid altered test results.

Prolonged stasis can have an effect on several values including proteins, cell counts, lipids and other protein bound substances.

Furthermore, excessive application of the tourniquet can lead to hemolysis.

To prevent potassium values from increasing, excessive manipulation of the veins, such as heavily tapping the veins, should be avoided.

Coagulation tubes should be fully inverted (180°) 4 times after filling, EDTA tubes 8-10 times and all others 5-10 times. To obtain the full effect of anticoagulants, a thorough mixing is necessary. The air bubble should move from one end to the other, and then back again, for a full inversion.

Incorrect blood collection from vascular access devices can lead to contamination from infusion solutions or dilution.

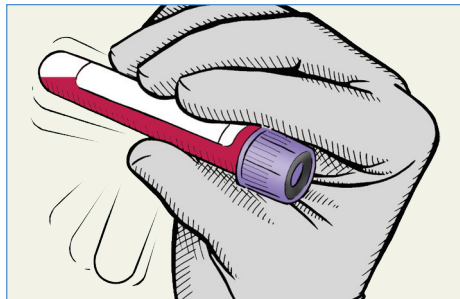
Clear labelling of samples with patient data is essential. Any labels attached should not block view of blood as it flows into tube. The tubes should be transferred to the laboratory immediately after blood collection.

These guidelines are recommendations. Your facility protocol should be adhered to at all times.

Order of Draw

- Blood culture tubes
- Citrate tubes for coagulation diagnostics*
- Serum tubes with and without gel
- Heparin tubes with and without gel
- EDTA tubes
- Glucose tubes
- Others

**If a winged blood collection set is used AND the coagulation specimen is drawn first, a discard tube is recommended to be drawn prior to this tube to ensure the proper anticoagulant-to-blood ratio.*



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Literature

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