Collecting a Blood Specimen

Note: In order to ensure accurate results, the patient and specimens must be appropriately identified, the samples must be collected properly, and the specimens must be processed correctly. Errors in any of these variables can adversely affect patient results, therefore it is vital that proper collection techniques be observed. Unsuitable samples may be rejected without being tested.

Patient Considerations:

Verify and document any items about the patient's condition that may be relevant to the testing being performed (fasting vs. non-fasting for chemistry samples, current medications such as anticoagulants or "blood thinners" for coagulation samples, history of transfusions or pregnancies for blood bank samples, etc.)

Check for any allergies or sensitivities with the patient regarding antiseptics, adhesives, or latex.

Patient Identification:

Personnel must confirm the patient's identity by checking at least two identifiers before collecting a specimen.

Ask the patient to state their name and date of birth (DOB).

Verify the name and DOB against the requisition, labels, and all other paperwork

Verify patient identification against the patient's wristband.

The patient must be identified using at least 2 identifiers (name and DOB) as mandated by JCAHO. Specimens must be labeled immediately after collection in the presence of the patient. Include the date and time collected.

Blood bank samples must also include an identifier of the individual collecting the sample such as initials or employee ID number.

Review the Orders:

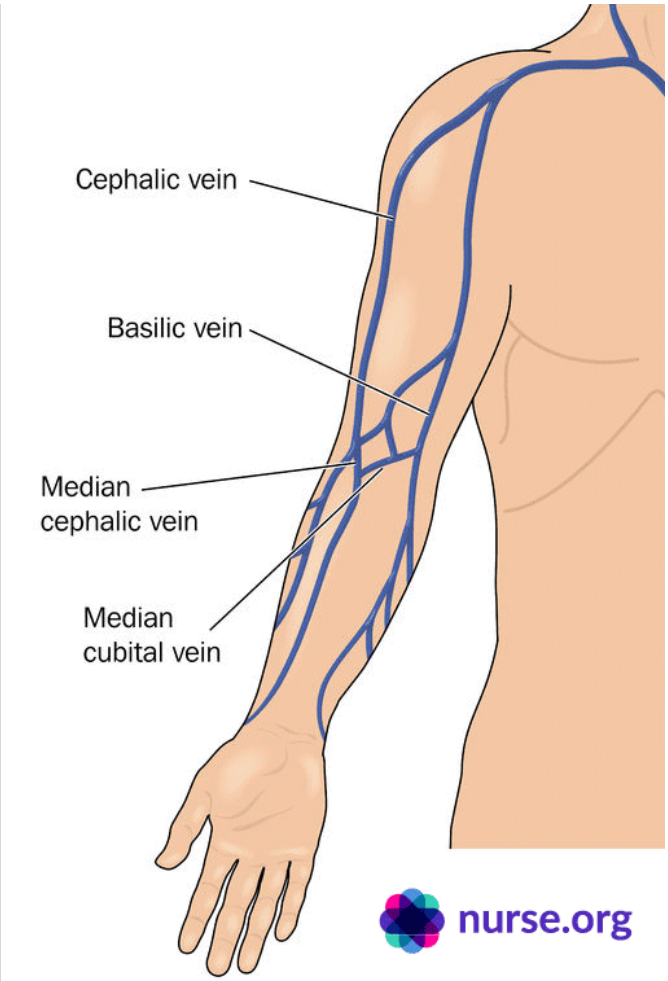
The patient's name and date of birth will be checked against the labels and requisition prior to specimen collection. For blood collected at NMC sites, staff will check for additional orders which may have been submitted by a different provider.

Identifying a Venipuncture Site:

The most common choice for venipuncture is the medial cubital vein located between the median cephalic and the median basilic vein. Other commonly used veins include the basilic vein and cephalic vein, to name a few.

If superficial veins are not apparent, you can try to apply a warm compress to the site for approximately 5 minutes and/or lower the extremity to allow the veins to fill.

Vein Selection:



Areas to avoid when selecting a site for a blood draw include:

- Swollen (edematous) sites
- Areas with scarring
- Fistulas and grafts
- Hematomas
- From an IV site
- Sites above a running IV in the same vein
- Limbs with a blood clot
- Arm on the side of a mastectomy
- Arm with blood being transfused

Gather the Appropriate Blood Drawing Supplies:

- Evacuated collection tubes appropriate for the testing ordered
- Personal Protective Equipment (PPE) such as gloves
- Needles
- Single use tourniquet
- Hand sanitizer
- Venipuncture site disinfectant (70% alcohol swabs, Chlorhexadine for blood cultures)
- Sterile Gauze
- Adhesive bandage, tape, or Coban
- Specimen labels
- Requisition form(s)
- Biohazard transport bag
- Sharps container

Tube Selection:

Choose the appropriate tube types, checking the expiration dates. Discard if expired.
Place the containers in an accessible location near the patient.
Tubes MUST be drawn in a specific order to prevent contamination of additives from one tube to another. For example, EDTA contamination in a green or red top tube may falsely increase the potassium result, clot activators from a red top or SST into a blue top may cause falsely shortened PT or PTT results, and if blood cultures are not collected first, bacteria from non-sterile stoppers could contaminate the bottles.

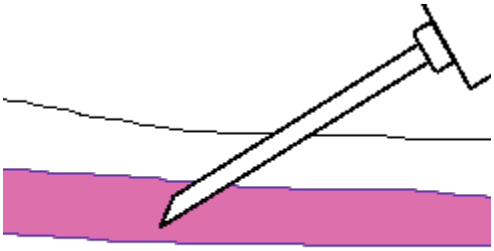
Order of Draw	Tube / Color	Additive General Use	Mix by Gentle Inversion
1		Blood Cultures	8 – 10 times

2		No Additive Discard tube Chemistry	5 – 10 times
3		3.2% Sodium Citrate Coagulation	4 times
4		Clot Activator Chemistry	5 – 10 times
5		Clot Activator w/ Gel Chemistry	5 – 10 times
6		Lithium Heparin w/ Gel Chemistry	5 – 10 times
7		K2EDTA Hematology	8 – 10 times

8		K2EDTA Immunohematology	8 – 10 times

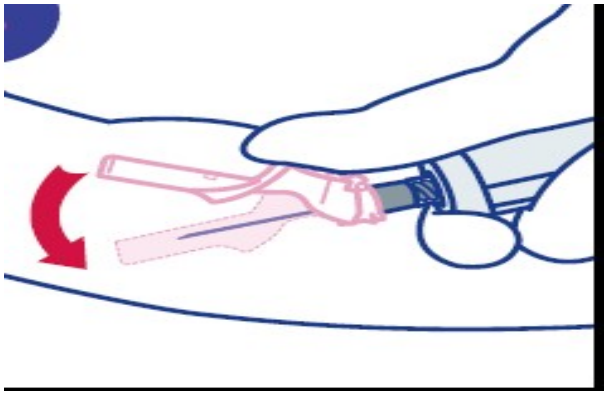
Phlebotomy:

- Apply the tourniquet 3-4 inches above the selected puncture site. Do not place too tightly or leave on more than 1 minute.
- The patient should make a fist without pumping the hand.
- Select the venipuncture site.
- Prepare the patient's arm using an alcohol prep. Cleanse in a circular fashion, beginning at the site, and working outward. Allow to air dry. Inform the patient that they may feel slight pain or “a pinch”.
- Grasp the patient's arm firmly using your thumb to draw the skin taut and anchor the vein. The needle should form a 15 to 30-degree angle with the surface of the arm. Swiftly insert the needle through the skin and into the lumen of the vein. Avoid trauma and excessive probing.

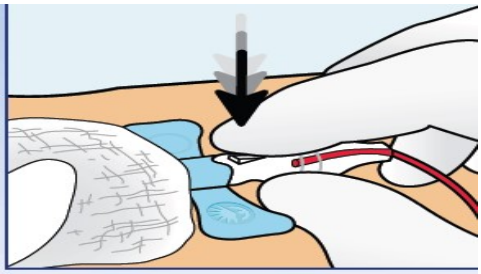


- Collect the tubes in the proper order (see Notes section). Gently mix each tube 5-8 times after drawing.
- When the last tube to be drawn is filling, remove the tourniquet.
- Remove the needle from the patient's arm using a swift backward motion.
- Press down on the gauze once the needle is out of the arm, applying adequate pressure to avoid formation of a hematoma. Instruct the patient to continue to apply pressure to the gauze for at least 5 minutes to prevent bruising. This is especially important with patients on anticoagulant therapy, as they may be more prone to bleeding and subsequent bruising.

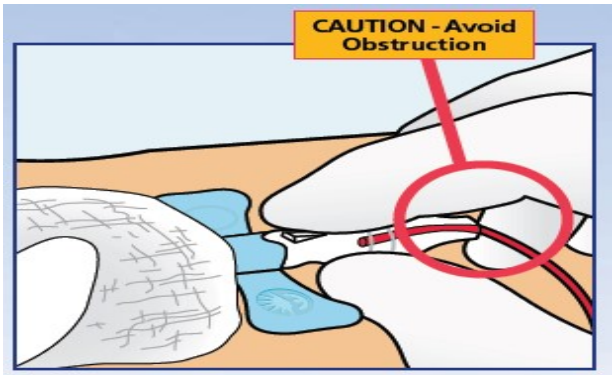
- Immediately after removing needle from vein, position thumb squarely on pink safety shield thumb pad and push pink safety shield forward to cover needle. An audible click may be heard. Lock shield into place and inspect. DO NOT attempt to engage safety shield by pressing against a hard surface.



- For butterfly needles, activate the push button safety mechanism prior to withdrawing from the vein. Detailed instructions are outlined below.



The device is designed to be activated while the needle is still in the patient's vein. Place your gauze pad or cotton ball on the venipuncture site. Allow gauze pad or cotton ball to cover nose of front barrel. Following the collection procedure, **and while the needle is still in the vein,** grasp the body with the thumb and middle finger. Activate the button with the tip of the index finger.



To ensure complete and immediate retraction of device, make sure to keep fingers and hands away from the end of the blood collection set during retraction. Do not impede retraction.

- Dispose of contaminated materials/supplies in designated containers.

Specimen Labeling

- Involve the patient in the labeling process. Always label the specimen(s) in the presence of the patient immediately after collection. This assures the patient that it is their specimen. Label all tubes at the patient bedside. Under no circumstances should samples be labeled later or when the phlebotomist or patient has left the room.
- Pre-labeling of sample collection containers is discouraged to prevent labeling errors.

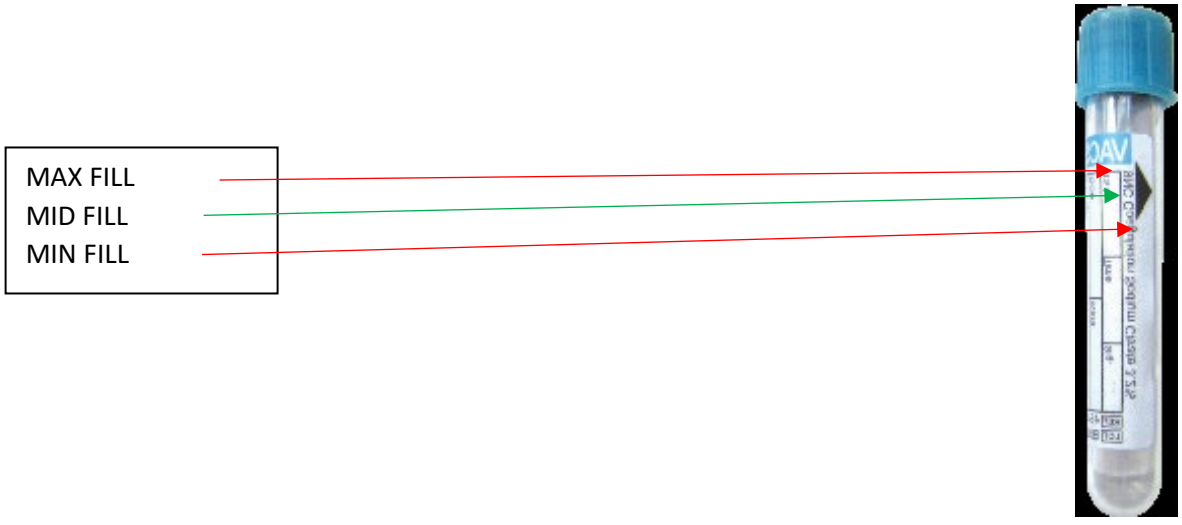
  Blood specimens collected for pretransfusion testing must be positively and completely identified and labeled before leaving the patient and must include the patient's first and last name, date of birth, date and time of collection, and the initials or employee number of the individual collecting the specimen.

- The collector's initials, signature, or employee number, date, and time should be written on the tube, the order sheet/requisition, and recorded in the LIS.
- Inform the patient that Lab results will be made available to their provider. Based on the tests ordered, provide the patient with an estimate for when the results will be available to the provider. Patients are encouraged to contact their provider directly. Alternatively, patients may obtain copies of their medical record through Health Information Management.
- Deliver specimens promptly to the laboratory

NOTES:

Vacutainers have a vacuum which draws the blood into the tube through the stopper. When the vacuum is broken, the only way the tube can be used is to take off the stopper and fill it. Laboratory personnel will be glad to demonstrate how to use the system.

For coagulation studies, ensure that the correct blood to additive ratio is met by checking that the draw volume is within the black triangle marking on the side of the tube label. If the tube is not filled completely the specimen is <u>unacceptable</u> for coagulation testing.



Special Safety Precautions

Standard Precautions will be used during sample collections and when handling open specimens. This includes the use of gloves when performing phlebotomy.

Laboratory personnel will adhere to all NMC Isolation/Precautions protocols.

Clean up any blood spills with current approved disinfectant.

Hand hygiene is performed in view of the patient prior to phlebotomy, after removing gloves, and at the completion of the phlebotomy process.

Quality Control

Blood tubes are QC'd by the manufacturer during production.

Visually inspect that the tube tops are secure to ensure that the vacuum is intact.

Review the expiration date. Do not use if the tube has expired.

Any concerns about the integrity of tubes should be documented (including lot number and expiration date) and brought to the attention of supervisory staff.

To prevent a hematoma:

Puncture only the uppermost wall of the vein

Remove the tourniquet before removing the needle

Use the major superficial veins

Make sure the needle fully penetrates the upper most wall of the vein. (Partial penetration may allow blood to leak into the soft tissue surrounding the vein by way of the needle bevel)

Apply pressure to the venipuncture site

To prevent hemolysis (which can interfere with many tests):

Mix tubes with anticoagulant additives gently 5-10 times

Avoid drawing blood from a hematoma

Avoid drawing the plunger back too forcefully, if using a needle and syringe, and avoid frothing of the sample

Make sure the venipuncture site is dry

Avoid a probing, traumatic venipuncture

Avoid drawing blood through IV lines, ports, or catheters

Indwelling Lines or Catheters:

Potential source of test error

Most lines are flushed with a solution of heparin to reduce the risk of thrombosis

Discard a sample at least three times the volume of the line before a specimen is obtained for analysis

Hemoconcentration:

An increased concentration of larger molecules and formed elements in the blood may be due to several factors:

Prolonged tourniquet application (no more than 2 minutes)

Massaging, squeezing, or probing the site

Long-term IV therapy

Sclerosed or occluded veins

Prolonged Tourniquet Application:

Primary effect is hemoconcentration of non-filterable elements (i.e. proteins). The hydrostatic pressure causes some water and filterable elements to leave the extracellular space.

Significant increases can be found in total protein, aspartate aminotransferase (AST), total lipids, cholesterol, iron

Affects packed cell volume and other cellular elements

Patient Preparation Factors:

Therapeutic Drug Monitoring: different pharmacologic agents have patterns of administration, body distribution, metabolism, and elimination that affect the drug concentration as measured in the blood. Many drugs will have "peak" and "trough" levels that vary according to dosage levels and intervals. Check for timing instructions for drawing the appropriate samples.

Effects of Exercise: Muscular activity has both transient and longer lasting effects. The creatine kinase (CK), aspartate aminotransferase (AST), lactate dehydrogenase (LDH), and platelet count may increase.

Stress: May cause transient elevation in white blood cells (WBC's) and elevated adrenal hormone values (cortisol and catecholamines). Anxiety that results in hyperventilation may cause acid-base imbalances, and increased lactate.

Diurnal Rhythms: Diurnal rhythms are body fluid and analyte fluctuations during the day. For example, serum cortisol levels are highest in early morning but are decreased in the afternoon. Serum iron levels tend to drop during the day. You must check the timing of these variations for the desired collection point.

Posture: Postural changes (supine to sitting etc.) are known to vary lab results of some analytes. Certain larger molecules are not filterable into the tissue; therefore, they are more concentrated in the blood. Enzymes, proteins, lipids, iron, and calcium are significantly increased with changes in position.

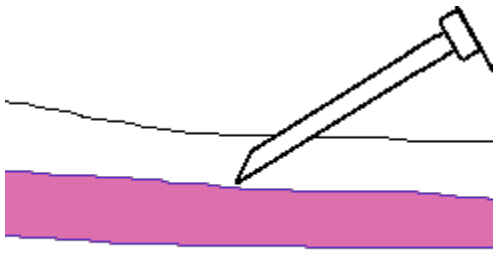
Other Factors: Age, gender, and pregnancy have an influence on laboratory testing. Normal reference ranges are often noted according to age.

TROUBLESHOOTING GUIDELINES:

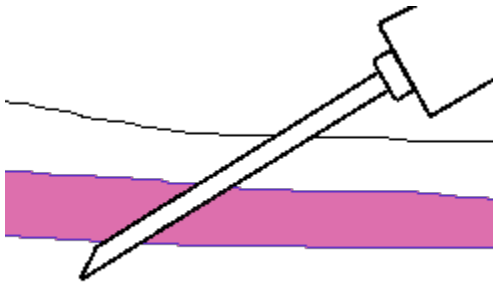
"Fishing" for a vein is strongly discouraged, however these simple techniques may be used to improve success during a difficult phlebotomy.

IF AN INCOMPLETE COLLECTION OR NO BLOOD IS OBTAINED:

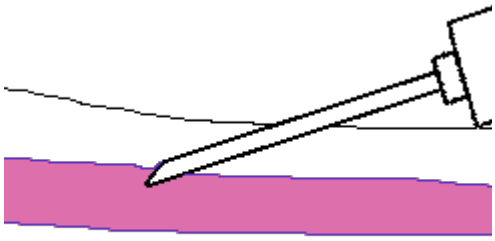
Change the position of the needle. Move it forward (it may not be in the lumen)



or move it backward (it may have penetrated too far).



Adjust the angle (the bevel may be against the vein wall).



Loosen the tourniquet. It may be obstructing blood flow.

Try another tube. There may be no vacuum in the one being used.

Re-anchor the vein. Veins sometimes roll away from the point of the needle and puncture site.

IF BLOOD STOPS FLOWING INTO THE TUBE:

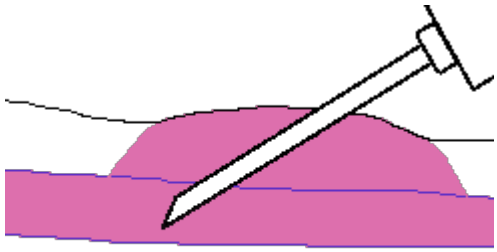
The vein may have collapsed; resecure the tourniquet to increase venous filling. If this is not successful, remove the needle, take care of the puncture site, and redraw.

The needle may have pulled out of the vein when switching tubes. Hold equipment firmly and place fingers against patient's arm, using the flange for leverage when withdrawing and inserting tubes.

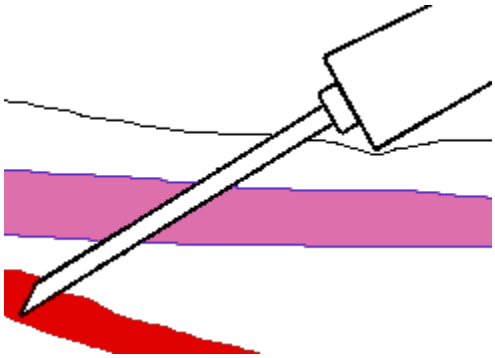
PROBLEMS OTHER THAN AN INCOMPLETE COLLECTION:

A hematoma forms under the skin adjacent to the puncture site - release the tourniquet immediately and withdraw the needle. Apply firm pressure.

Hematoma formation is a problem in older patients.



The blood is bright red (arterial) rather than venous. Apply firm pressure for more than 5 minutes.



EMLA Cream use on Pediatric Patients

EMLA cream (2.5% lidocaine, 2.5% priolocain) is a topical anesthetic that is used to reduce distress, anxiety, and pain associated with phlebotomy in pediatric outpatients. EMLA cream is applied to the venipuncture site 30 to 60 minutes prior to the phlebotomy procedure.

Providers wishing to utilize EMLA cream may apply the anesthetic in their office prior to sending the patient to the Laboratory. Providers are encouraged to assess the phlebotomy site in advance of applying the EMLA cream to avoid the need perform phlebotomy on an alternate site that has not been treated with the anesthetic.

Alternatively, providers may submit written and signed orders for the use of EMLA cream at NMC. The anesthetic will be applied by nursing staff from the Family Birthing Center.

Prior to performing phlebotomy, the phlebotomist will use sterile gauze to remove the EMLA cream from the phlebotomy site. Gloves must be worn to avoid anesthetizing the phlebotomist's fingers or hand.

Monitoring Plan:

Competency will be accessed by visual competency assessment by Client Support Supervisor or designee.

References:

Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard – Sixth Edition, H3-A6, Vol. 27 No. 26,

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