TITLE: Venipuncture

PRINCIPLE / PURPOSE: The standardized collection procedure of a blood specimen is necessary for the accurate diagnosis and care of a patient. Many variables contribute to accuracy of laboratory testing results. There are many physiological factors that influence results, such as age, activity, food intake, gender, etc. But there are also many non-analytical factors such as specimen collection, handling, and transport that can influence laboratory results, as well as non-biological factors. Non-biological factors include patient misidentification, patient posture, and the time a specimen is drawn. Knowledge of these variables and standardization of laboratory testing procedures are essential for correct interpretation and optimal use of the data.

The collection procedures must be followed in an effort to reduce/eliminate the non-analytical and non-biological factors. All tubes must be labeled immediately *after* the blood specimen has been drawn in the presence of the patient.

SCOPE: This procedure applies to all specimen collection obtained by venipuncture method.

SAFETY:

The required personal protective equipment for this procedure:

* Gloves

SPECIMEN:

Patient Preparation:

The patient must be lying down, or seated in a chair with arm-rests for support in case the patient looses consciousness for this procedure.

If the patient is in bed, have him lie flat on their back, if possible, in a comfortable position.

If the patient is seated, use the chair arm to support the arm. (The outpatient area is equipped with chairs suitable for venipuncture.) Take care to position the patient so he/she is protected against falling from the chair in case of fainting.

Have the patient extend the arm to form a straight line from the shoulder to the wrist.

NEVER ATTEMPT A VENIPUNCTURE ON A STANDING PATIENT.

Type: Venous blood.

Acceptable containers: Refer to specific test.

Volume required: Refer to specific test.

Stability and storage: Refer to specific test for specimen storage and stability. Tubes are stored at room temperature.

Unacceptable: Refert to specific test.

Handling conditions: Refert to specific test.

EQUIPMENT AND MATERIALS:

Test order meeting order criteria

Gloves

Sterile Needles and Holders

Sterile Syringes

Venous Blood Collection Tubes

Tourniquets

Antiseptics

Gauze Pads

Puncture-Resistant Disposal (Sharps) Container

Adhesive Bandages

Labels

PROCEDURE: The venipuncture procedure is complex and requires knowledge and

skill. Once an order is obtained to draw a blood specimen, the following steps must be followed:

Preparation

1. Introduce yourself to patient and explains blood tests have been ordered by physician.
2. Correctly identify the patient by following the Patient Identification Policy.
   * If the patient is coherent, ask the patient to state his/her full name and date of birth.
   * The caregiver (Sitter, Nurse Tech,Nurse, Physician, etc.), relative, or friend must identify unconscious or patient otherwise unable to verify themselves.
   * Document the name of the verifier in the lab computer system. Always include your initials, date and time to all comments.
     + Exceptions may be considered for ICU and SCN.
   * Compare patient ID information with barcode label and armband.
3. Check testing requirements.
4. Prepare supplies and tube selection.
5. Wash hand, dons gloves.

Getting Started

1. Position Patient and apply tourniquet (Refer to Tourniquet Placement below).
2. Palpate area to select venipuncture site (Refer to Vein Selection below).
3. Properly cleanse venipuncture site.

Sample Collection

1. Stabilize vein.
2. Inserts needle, bevel up.
3. Smoothly push tube(s) into holder without changing needle position.
4. Adjust needle, if necessary, to obtain flow then stabilize vacutainer.
5. Release tourniquet as blood begins to flow.
6. Change tubes without changing needle position.
7. Fill tubes in correct order.
8. Mix anticoagulated tubes properly.
9. Remove last tube from needle before withdrawing needle.
10. Withdraw needle from arm smoothly.
11. Applies pressure to site after withdrawing needle.
12. Dispose of needle properly and safely, Discards tourniquet.

Handling & Processing

1. Label tubes immediately (ie at bedside).
2. Label tube(s).
3. Observe special handling requirements.
4. Check puncture site to ascertain bleeding has stopped. Apply bandage.
5. Place tubes into biohazard bag.
6. Remove gloves and practice hand hygiene.
7. Transport specimens to lab via porter or pneumatic tube system. STATs are sent immediately.

OTHER:

Diet Restrictions and Allergies

Some testing requires the patient to fast or eliminate certain food from their diet. Time of draw and diet restrictions vary according to test. Restrictions are necessary for accurate test results and notes should be made accordingly.

Gloves and tourniquets are non-latex at Cone Health, but there are still some bandages that contain latex. Ask the patient prior to using the product. Iodine sensitivity is also important to know prior to cleansing a puncture site with iodine products.

# Supplies:

Inspect supplies for visible defects and applicable expiration dates.

The appropriate needle gauge should be selected based on the physical characteristics of the vein, the location of the vein, and the volume of blood to be drawn. The correct types and sizes of collection tubes must also be selected. Blood collection tubes must be stored per manufacturer’s instructions. The tubes are kept in the storeroom at room temperature. All tubes must be labeled immediately *after* the blood specimen has been drawn. A blood collection system that collects the blood directly into the tubes is recommended. In general, use of a syringe and needle should be avoided for safety reasons.

# Tourniquet Placement

The tourniquet increases venous filling, but application should not exceed one minute. After a minute, localized stasis with hemoconcentration and infiltration of blood into tissue can occur. This may result in erroneously high values for protein-based analytes, packed cell volume, and other cellular elements. Leaving the tourniquet on too long could cause hemolysis.

If the patient has skin problems, place the tourniquet over the gown or clothing, or a piece of gauze in order to protect the skin.

Wrap the tourniquet around the arm 3 to 4 inches above the venipuncture site. The tourniquet must be applied with enough tension to compress the vein, but not the artery. The artery carries blood into the area, and if the tourniquet is too tight the blood flow will slow or stop.

If a blood pressure cuff is being utilized as a tourniquet, inflate to 44mm Hg.

Have the patient form a fist, with no vigorous hand pumping. (Vigorous hand pumping can cause changes in the concentration of certain analytes in the blood.)

# Vein Selection

# Draws to the median cubital veins are preferred because they are typically close to the surface of the skin, more stationary, less painful upon needle insertion, and less likely to injure nerves if needle placement is not accurate.

Attempt to locate the median cubital vein on either arm before considering alternate veins. Although the median cubital and cephalic veins are used most frequently, veins on the back of the hand are also acceptable.

The basilic vein should only be considered if no other vein is more prominent due to the proximity to the brachial artery and the median nerve.

Alternative sites such as ankles or lower extremities must not be used without a

physician order because of the potential for medical complications (e.g., phlebitis,

thrombosis, tissue necrosis, etc.). Veins on the underside of the wrist must NOT be

used.

To locate veins, palpate and trace the path of veins several times with the index

finger. Arteries will be more elastic, pulsate and have a thick wall. A thrombosed

vein lacks resilience, feels cord-like, rolls easily, and should not be used.

FACTORS TO CONSIDER IN SITE SELECTION:

# Extensive scarring – Healed burn areas are to be avoided.

# Mastectomy - Whenever possible, do not stick an arm on the side where a patient has had a mastectomy. Patients that have had a history of chronic lymphedema should not be drawn from the adjacent arm. If the patient does not have a history of chronic lymphedema, there is no sign of lymphedema and the mastectomy surgery is more than 2 months ago, then the adjacent arm may be used with physician approval. In these cases, the tourniquet should be applied lightly and briefly. If the patient has had a mastectomy on both sides, try to determine the oldest site and use this arm.

# Hematoma – Specimens collected through a hematoma area may cause erroneous test results. Phlebotomy must not be performed on any size hematoma. If another vein site is not available, collect distal (below) to the hematoma.

# Intravenous therapy – Skin puncture is recommended when venous access is not readily available.

When an IV fluid (including transfused blood products) is being administered in a patient’s arm, blood should not be drawn from that arm if at all possible. Results may be erroneous and misleading.

Specimens *can* be drawn distal (below) to the IV site. If you must draw from the arm with the IV, draw below the IV site. Before drawing the blood, ask the nurse to stop the IV for minimum of 2 minutes to allow for the circulation to clear the IV fluid away from the area. Apply the tourniquet between the IV site and the intended venipuncture site. Discard the first 5mL of blood, then complete the collection. Document that the venipuncture was performed distal to an infusion site. If the IV or heparin lock can be used, follow the same procedure. Specimens collected with IV contamination are rejected by the laboratory

Do NOT draw above an IV.

Laboratory personnel do not tamper with IV lines because of the risk of thrombosis, the possibility of introducing bacteria, and the immediate need to flush the line with a heparin solution after collection of the sample.

It is best not to obtain blood while a patient is receiving a transfusion of blood or blood components. It is best to wait until the transfusion is complete, but in some cases the doctor will specifically request that the sample be drawn at that time. If in doubt, check with the nurse.

1. Fistulas or Shunts - Never apply a tourniquet to or stick an arm that has a shunt or fistula. Applying a tourniquet to an arm with a fistula or shunt may cause it to leak or rupture. Venipuncture may cause infection or leakage.

The fistula is an artificial shunt connection done surgically to fuse the vein

and artery together. Specimens should be drawn from the opposite arm. Care

must be taken of the fistula, as it is permanent.

1. Locating a vein difficult to identify –

* Massage the forearm from the wrist up to the elbow.
* Tap the antecubital space sharply with the index and second fingers two or three times. This will cause the veins to dilate.
* The arm in which the vein is located may be hung over the side of the bed for a while without a tourniquet.
* Apply a warm, wet washcloth to the area for 5 - 10 minutes. Make sure the washcloth is not hot enough to burn the patient.
* Consider the other arm.
* If the patient has had prior venipunctures, he may tell you where a vein can be found.

NOTE:

If the tourniquet has been applied for more than a minute while you search for a vein, release it for two minutes, reapply and relocate the vein. Prolonged obstruction of blood flow by the tourniquet changes some test results.

Always select the best vein. Examine both forearms to locate the best antecubital vein. Avoid superficial veins and try to locate deeper veins if possible.

Only two attempts will be made by the Laboratory Personnel. Notify the

patient’s nurse if a venous sample cannot be obtained. Consider a fingerstick

collection if small quantities are acceptable for testing.

1. Lower extremity phlebotomy may result in severe complications for the patient

and may only be performed with an order from the attending physician.

1. DO NOT draw from a patient’s arm that has a pink “NO-NO Sleeve” on it.
2. Vein Finder lights may be used in locations where available.

# Preparation

Always wash your hands and wear new, properly fitting gloves.

All new needles are sterile. When the protective cover is removed from the needle, it must not touch anything until it punctures the skin. If it should touch anything, discard it and use a new needle.

Alcohol gauze is used to disinfect the site of puncture. Alcohol itself may destroy some of the bacteria present, but it is the rubbing of the area that removes many organisms that is important.

Scrub the area with the 70% alcohol gauze using a circular motion from the point of intended puncture outward. *Allow site to air dry*. If the alcohol is left on the area, it may sting when the needle is introduced or cause hemolysis of the sample.

Alcohol may NOT be used as a cleaning agent when drawing a blood alcohol level. Instead, use an iodine or betadine applicator. Do not touch the prepared site.

Blood Culture collection requires a carefully disinfected site. Refer to the Blood Culture Collection procedure for details on proper cleansing techniques for blood culture specimens.

If the venipuncture is difficult, and the vein must be touched again, the site should be cleansed again. Special marker pens are available to mark the vein when necessary.

# Performing the Venipuncture

1. If not preassembled (such as the winged infusion set), thread the appropriate needle into the holder until it is secure.
2. After the venipuncture site has been properly prepared, place your thumb about an inch or two below where the needle is to enter and press down on the arm; at the same pull the skin toward the patient’s hand. This technique stretches the skin and holds the vein taut for easier needle entry.
3. To prepare the patient, inform them that the venipuncture is about to occur. NOTE: From this point on, be prepared to react to sudden movements or unexpected loss of consciousness.
4. With the bevel up, quickly puncture the vein with the needle at an angle of insertion of 30 degrees or less. Never enter the skin or vein with the needle vertical or perpendicular to the skin surface. Venipuncture discomfort is mainly due to slow skin penetration; rapid entry is less painful.
5. With the needle well into the lumen of the vein, push the vacutainer tube onto the sleeved needle to initiate the vacuum suction. If you have entered the vein properly, blood will flow immediately.
6. Release the tourniquet as soon as possible after blood flow begins. Do not change the position of the tube until it is removed from the needle. During collection, do not allow the contents of the tube to contact the closure. Movement of the blood back and forth in the tube can cause reflux of blood into the venous system and possible adverse patient reaction.
7. Allow the tube to fill until the vacuum is exhausted. For additive tubes, this will ensure there is a correct ratio of blood to additive.
8. When the blood ceases to flow, remove the tube from the needle/holder. (The sleeve re-covers the needlepoint that pierces the tube closure, stopping blood flow until the next tube is inserted.) To obtain additional specimens, insert the next tube to the needle/holder and repeat the collection procedure until all tubes are collected. Always remove the last tube collected from the needle/holder prior to withdrawing the needle from the vein. Draw only the amount of blood needed to run the ordered laboratory tests. Hold tubes only should be considered on patient’s with difficult veins.
9. Immediately after drawing each tubes with additives, mix the blood gently and thoroughly by inverting five to ten times. (Do not mix vigorously in order to avoid hemolysis.)

If a syringe is used (not recommended for safety reasons), the puncture is made in the same manner after you make certain that there is no air in the syringe. Pull the plunger straight back to start the flow of blood and continue until the desired amount is drawn.

The same order of draw is used when transferring the blood from the syringe to the tubes. (The stopper is pierced and the tube fills until the flow ceases.)

## Order Of Draw

* Blood culture tube BLOOD CULTURE
* Coagulation tube BLUE TOP
* Serum tube with or without RED TOP/GOLD

clot activator, with or without gel

* Heparin tube with or without gel plasma separator GREEN TOP
* EDTA PURPLE TOP
* Glycolytic inhibitor GRAY TOP

\*When using a winged blood infusion set and a coagulation tube is the first (or only) to be drawn, a discard tube should be collected first to eliminate the dead space air volume and ensure correct blood/additive ratio.

1. Withdraw the needle carefully while placing a piece of dry gauze over the venipuncture site. After the needle is completely out, apply pressure to the puncture site. Engage and firmly lock the needle safety shield over the needle per manufacturer’s instructions. Maintain pressure until bleeding stops. Once pressure is released, observe the site for five to ten seconds. Perform a two point check for bleeding – one for superficial bleeding from the skin, and a second for hematoma formation. Re-apply pressure as needed until bleeding has stopped.
2. Apply an adhesive bandage to puncture site. If the patient is taking an anticoagulant, always re-inspect the puncture site for leakage. It may be necessary to apply pressure longer in these cases.

FACTORS TO CONSIDER WITH DIFFICULTY OBTAINING BLOOD:

If blood fails to enter the tube, try the following:

* Change the position of the needle.

The needle may not have been introduced far enough. Advance it a little more.

You may have gone completely through the vein. Withdraw the needle slowly.

Attempt to relocate on the medial or cephalic veins if the needle appears to have

gone to the side by partially withdrawing the needle and attempt to enter again.

*Never* relocate the needle if the basilic vein is missed.

* Sometimes the vacutainer tubes lose their vacuum, and blood will not be drawn into the tube. Try another tube.
* Manipulation other than that listed above is considered probing. Probing is not recommended. It is painful to the patient.

If these techniques do not work, release the tourniquet and withdraw the needle. Give both the patient and yourself a rest.

Reapply the tourniquet on the other arm and look for another vein. If you think you have found an adequate vein, get a new needle and repeat the puncture.

If you still do not get blood, do not try again. Do not attempt more than two venipunctures on a patient. The patient will appreciate a new start with someone else, even though you may have succeeded on the next attempt. Notify the nurse in charge of the patient that the blood has not been collected. Communicate to another phlebotomist of the situation to have them look at the patient.

Note: 25g safety needles are used with pediatric venipuncture; 23g may also be used if the vein is large enough.

# Label and Transport the Specimen

Label and transport the specimen according to the Specimen Labeling and Transport Procedure.

# Patient Reactions / Complications/Adverse Reactions

Be vigilant in watching for signs and symptoms of complications. Such signs include pallor, perspiration, hyperventilation and a patient who goes from talkative to silent.

Refer to Patient Reactions/Complications/Adverse Reactions to Blood Draw procedure for response to:

Bruising / Hematoma Pain

Nerve Damage Vasovagal reaction (Syncope / Fainting)

Nausea Vomiting

Convulsion/Seizures Arterial Puncture

Excessive Bleeding / Re-Bleed Allergy

Phlebitis Anxiety / Fear

Nurse Notification Reasons

Psychiatric Unit - Psychiatric patients may not be in their rooms. Always

check in at the Nurse’s station and find out the location of the patient. The nurse may accompany you if the patient is uncooperative. Be sure to take all of your equipment with you when you leave the patient’s room or area where you collected the sample.

Isolation Patient - Patients are placed in isolation for two reasons:

1. To prevent transmitting disease to other patients or employees.
2. To prevent transmission of disease to the patient, for example, immunocompromised patients or infants. This technique is called reverse isolation.

If you have, or have been exposed to, a contagious disease, you should not enter the room where a patient is in isolation or other patient areas. Have co-worker collect the patient.

When a patient is in isolation, an information card usually is placed on the door. This card describes the type of isolation and also lists the precautions to be taken by those entering the room. These precautions must be observed.

The necessary clothing and personal protective equipment should be available at the door. It must be removed upon leaving the room and placed in the appropriate hamper.

Intrauterine Fetal Death - It is recognized that perinatal death is a

devastating event for the parents and for the members of a health care team. In such cases, a white rose is placed on the patient’s door to signify the baby’s death, and to alert health care workers to the patient’s loss. Do not ask the patient about their loss.

Missing Patient - If you cannot find a patient, check with the nurse’s

station for help. If the patient has been taken somewhere, write on the collection list or labels as to where the patient is and when to follow up.

If the test is timed, see if it is possible to go to the hospital department where the patient is and draw the sample there. If there is a problem finding the patient or collecting the specimen, notify the patient’s nurse as soon as possible.

Deceased patients – Patients that have passed away that are still in the room will be designated by nursing with the use of the Fallen Leaf Card. The Resolve Through Sharing falling leaf card will be placed on the patient’s door.

Do not try to do a venipuncture on a deceased patient.

This act can be legally taken as desecration of a dead body. Any requests to obtain blood from a deceased patient must be immediately referred to a pathologist.

Arterial Blood - Do not collect blood from an artery. If you should stick an artery by mistake, finish your sample collection, then hold pressure on the site for 5 full minutes. Do this yourself; do not allow the patient to do it.

Venous Blood Gas

Notify Respiratory Therapy (RT) of the venous blood gas order. The RT will meet you at the patient’s room with the appropriate collection device. Perform a venipuncture as you normally would using a butterfly. Using the syringe collect at least 0.5 – 1.0 mL of blood. Once the venipuncture is complete, the syringe is handled and processed by the RT.

Infants and Children - Laboratory personnel must be approved for pediatric

phlebotomy and heel sticks prior to collecting a baby. Only one attempt per phlebotomist, maximum of two phlebotomists is permitted to obtain a venous sample. Notify the pediatric/ nursery nurses when these attempts are unsuccessful.

Confused Patients - Sometimes a patient will be unable to understand your

instructions due to a confused mental state. This may be caused by medication or disease processes typical of geriatric patients. Do your best to soothe the patient - obtain assistance from the lab or nursing staff if needed. If there is a possibility of injury to the patient, request instructions from the ordering physician.

Used Materials and Personal Protective Equipment

Dispose of used vacutainer safety systems (holders with attached needles) into a sharps container. Do not attempt to remove the needle from the holder. Small disposal containers are carried on phlebotomy trays. Large ones are located on the wall in each patient room and at the outpatient drawing station. Syringes with attached needles should be discarded in the large containers.

Gloves are discarded in the patient’s room and hands must be washed before proceeding with the next venipuncture.

When a patient is in isolation, place the vacutainer system and gauze in the sharps container provided for them in the patient’s room. Take only the necessary equipment into the room and only the tubes should be brought back out. Leave gowns and masks in the room in the designated container.

Needle Stick Injury

If you stick yourself with a used needle, report it immediately to your supervisor. Squeeze the area to make it bleed as much as possible. Make sure you note the patient’s name if known. You will have to fill out an accident report. Not doing so disqualifies your injury from Workman’s Compensation. AIDS, hepatitis, and syphilis can be transmitted in this manner, as well as a few other problems. The administrative coordinator on duty or the employee health nurse does the follow-up and necessary testing. It is important to know the source patient when possible. Prophylactic treatment is to be initiated within 2 hours if indicated.

Capillary Puncture: Fingersticks and Heelsticks

Refer Skin Puncture/Capillary procedure.

Drawing Coagulation Testing Specimens

Refer to Collection of Specimens for Coagulation Testing procedure.

# Line Draws

Laboratory personell do not obtain blood from a line.

PROCEDURE NOTES:

In extreme emergencies, when a patient name and/or ID# is not available, the Blood Bank ID Band may be used for positive patient identification. The band is never to be removed by anyone unless directed to do so by the blood bank tech.

It is important to minimize blood draw volume from patients when possible. Blood draw volume minimization tactics include:

1. Performing point of care testing from a fingerstick sample where appropriate instead of drawing a whole tube of blood.
2. Requesting the ability to add on testing to blood from a previous blood draw to prevent patient from needing more blood to be drawn when possible
3. Storing blood specimens in the proper environment for the maximum usage time span to increase opportunities for add-on testing so redraw need is lessened
4. Monitoring and performing corrective steps to reduce/elimiate mislabeled and unlabeled specimens to prevent redraws
5. Monitoring and performing education to reduce/eliminate rejected samples due to hemolysis, clotting, QNS, or contamination which would then require a redraws
6. Providing minimum draw requirements for tests frequently requested by nursery
7. Assuring competence of lab phlebotomy staff is current

RELATED PROCEDURES:

Portacath Blood Collection

Isolation Patients

Patient Restraints

SPCL-256-CH Patient Reactions/Complications/Adverse Reactions to Blood Draw

Skin Puncture/Capillary Procedure

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| Medical Director Approval –  ARMC Cancer Center  ARMC Main Lab |  |  |
| Medical Director Approval –  MedCenter Mebane |  |  |

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HISTORY PAGE

SOP Number: SPCL-205-CH

SOP Title: Venipuncture

Written By: Wendy Turner, Jacee Farmer

Manual in which Hard Copy of this SOP is located: Specimen Collection Manual

Distribution: none

Supersedes Procedure:

SOP CHANGE CONTROL

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| --- | --- | --- | --- | --- | --- |
|  | Approvals | |  | Action | In |
| Mgmt. | Date | Director | Date |  | Effect |
| √  JGF | 4/2/15 |  |  | Changed the storage temp from 4⁰C to 18⁰C. | 4/2/15 |
| √ JGF | 4/7/15 |  |  | Added statement “Leaving the tourniquet on too long could cause hemolysis”. Page 4 | 4/7/15 |
| √ JGF | 4/15/15 |  |  | Added statements about “no-no sleeve”, marking pens, and vein finder. | 4/15/15 |
| W Turner | 7/3/15 |  |  | Referred adverse reactions to SPCL-256; added detail in NOTES regarding steps to minimize blood volume loss due to specimen collection; and added details for fallen leaf card placement on door of deceased patients | 7/3/15 |
| Jacee Farmer | 9/7/17 |  |  | Updated format and organization. | 9/7/17 |
| W Turner | 8/19/2020 |  |  | Added additional detail for patient identification requiring second person if pt unable to communicate (Preparation section) | 8/19/2020 |
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