

JUVENILE COURT HEALTH SERVICES LABORATORY PROCEDURES

Subject: SPECIMEN COLLECTION - VENIPUNCTURE	Original Issue Date: 1/31/01	Policy # B-001
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Departments Consulted: Administration Laboratory	Approved By: (Signature on File) Laboratory Supervisor (Signature on File) Laboratory Director	Approved by: (Signature on File) Health Services Administrator

PURPOSE

To describe proper specimen procurement and handling in order to obtain valid and timely laboratory results.

POLICY

Specimens must be obtained in the proper tube or container, correctly labeled, collection date/time and initialed by the Phlebotomist/Nurse and promptly transported to the laboratory. Patients are to be instructed in the proper specimen collection procedures by the laboratory staff or a health care provider who has been oriented to the procedure.

The laboratory staff may be contacted for assistance in specimen collection requirements.

The laboratory provides phlebotomy service during the day shift in the juvenile halls. If there is no phlebotomy service available (e.g., at the Camps or Juvenile Halls), phlebotomy is performed by the nurses assigned to do specimen collection.

The laboratory provides phlebotomy service in the medical module clinic areas and in the Medical Housing Unit as needed. If necessary and conditions are safe, phlebotomy services may be provided in the "Compound" units of Barry J. Nidorf Juvenile Hall.

Blood and body fluids from all patients should be considered infectious and universal precautions should be used when handling any specimens.

PROCEDURE

MATERIALS REQUIRED

The following equipment should be assembled before proceeding with the venipuncture procedure:

1. Blood Drawing Site: Patient privacy must be available at the blood drawing site. A chair with a wide, flat, clean surface for the arms will suffice. The area should be wide enough for the patient's arm to rest comfortably. The patient's elbow should be supported so that it remains straight. Some patients may prefer lying down, in which case an examination table may be used.

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2. Blood Collection Needles: Disposable sterile needles in sizes from 21-gauge to 23-gauge, 1 inch to 1.5 inches are available. Multi-sample needles with the rubber shut-off valve are available for multiple tube draws.
3. Plastic Tube/Needle Holders: The plastic holders are used to hold the needle on one end, and the vacuum tube for collection on the other. Regular and pediatric sizes are available.
4. Blood Collection Vacuum Tubes: The vacuum tubes are designed to draw a predetermined volume of blood. Regular and pediatric tubes are available in a variety of sizes. Tubes with different additives are used for collecting blood specimens for specific types of tests. The color of the rubber stopper capping the tube is used to identify these additives, which in turn, dictate the function of the tube. The following tube types are available:
 - a. Stopper Color: Red
Additive: None
Use: Chemistry/Blood Bank
(These are the "plain tubes" normally used to prepare serum.)
 - b. Stopper Color: Red Swirl / Gold
Additive: Serum separator gel
Use: Chemistry
(The serum separator gel forms a barrier between the serum and the clotted red blood cells to keep them from contaminating the serum.)
 - c. Stopper Color: Royal Blue
Additive: None
Use: Drug Testing
(These tubes are cleaner than the "plain" red stopper tubes. They are used for certain drug testing procedures.)
 - d. Stopper color: Lavender
Additive: EDTA
Use: Hematology
(The tubes contain EDTA anticoagulant in liquid form.)
 - e. Stopper color: Light Blue
Additive: Sodium Citrate
Use: Coagulation studies
(These tubes must be completely filled to ensure proper ratio between blood and coagulant sodium citrate.)

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f. Stopper Color: Green

Additive: Heparin

Use: Stat Chemistry

(These tubes can be used to prepare plasma specimens quickly.)

g. Stopper Color: Grey

Additive: Oxalate/Fluoride

Use: Plasma Glucose Testing

(The potassium oxalate and sodium fluoride additives inhibit glycolysis.)

h. Quantiferon specialty tubes

Use: 4 tubes specific for Quantiferon TB-Gold Plus procedure

5. Tourniquets: Tourniquets are used to distend the veins for ease in venipuncture. Tourniquets are available in adult and pediatric sizes.

6. Antiseptics: Individually packaged 70% isopropyl alcohol wipes may be used to clean the venipuncture site for most specimens. Povidone-iodine wipes should be used when collecting specimens for blood cultures.

7. Gauze: 2 X 2-inch sterile gauze squares can be folded and taped to the puncture site to control the bleeding after the blood specimen is collected.

8. Sharps Disposal Container: An OSHA-acceptable puncture-proof red container marked "Biohazard" must be used for needle disposal, or for partially filled capillary tubes.

9. Contaminated Disposal Container: An OSHA-acceptable red container marked "Biohazard" will be used for the disposal of gauze pads, gloves, and other contaminated non-sharps.

10. Disinfectant: All lab surfaces are cleaned with 10% bleach wipes. Regarding laboratory instruments, follow the recommended cleaning/maintenance procedures.

11. Adhesive Labels: Labels and a permanent marking pen should be available for labeling the specimens.

SPECIMEN COLLECTION PROCEDURE

ROUTINE VENIPUNCTURE

1. Assemble necessary equipment described in the Materials and Equipment section of this procedure.
2. Wash hands and put on gloves.

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3. Ask patient to identify himself or herself with name and date of birth. Information must match that in the collection list and specimen label.
4. Check patient preparation. Certain specimens may require fasting or other patient preparation. If special preparations were necessary, verify and note that the patient followed the instructions. Review the printed specimen labels if it matches the order printed in the collection list.
5. Select the appropriate tubes and needles for the specimens to be collected. Any tubes containing additives should be tapped to dislodge additives from the walls of the tube and the stopper.
6. Establish specimen collection order. The following order should be used:
 1. Sterile, clean (or blood culture tubes first.)
 2. Citrate tubes (light blue)
 3. SST Gel tubes (Gold Top)
 4. Glass Plastic serum tube
 5. EDTA Tubes (lavender)
 6. Oxalate/fluoride tube(grey)

In Coagulation Studies, it is necessary to prevent tissue fluid contamination, which occurs at the beginning of sample draw. To accomplish this, always draw coagulation tube after drawing an initial tube, even if this means simply discarding the initial tube.

7. Position the patient. Ask the patient which arm is best for drawing blood. The patient should be comfortably position with the sleeve rolled up and the arm extended and supported by the blood-drawing chair.
8. Apply the tourniquet 3 to 4 inches above the puncture site. It should be restrictive enough to assist in identifying vein for venipuncture.
9. Ask the patient to make a loose fist. Any vigorous hand exercise like "pumping" must be avoided because it can affect test results.
10. Select good venipuncture site. Avoid scarred or bruised areas. Recent IV sites and the arm on the side on which a mastectomy was performed should also be avoided. The median cephalic vein should be used, if possible. If a good vein cannot be located, the following techniques may help:
 - a. Sharply tapping the inner elbow skin with the index and second finger may cause the vein to dilate.
 - b. Massaging the arm from wrist to elbow to force blood into the vein and cause it to distend.
 - c. Applying a warm wet towel to the arm for 5 minutes may cause the vein to dilate.
 - d. Have the patient dangle the arm for 5 minutes to distend the veins.

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NOTE: It is important that the tourniquet is not left on for more than one minute as some test results may be affected.

11. Clean the puncture site. Use the alcohol or povidone-iodine wipe and make a smooth circular pass of the puncture site moving in an outward spiral from the zone of penetration. Allow the skin to dry before proceeding. Do not touch the puncture site after cleaning.
12. Open the needle package. Do not remove the needle cap. Screw the needle into the plastic holder and insert the tube into the holder. Do not pierce the tube as this will result in a loss of vacuum pressure.
13. Perform the venipuncture:
 - a. Holding the needle/tube assembly in your dominant hand, remove the needle cap. Position the needle with the bevel up. (Your right hand is "dominant" if you are right-handed).
 - b. Grasp the patient's arm just below the puncture site with your non-dominant arm and pull the skin tight with your thumb.
 - c. Align the needle/tube assembly with a 15-degree angle to the skin. Use a quick, but small thrust to penetrate the skin and enter the vein in one motion, if possible.
 - d. Holding the plastic-tube holder's flange with the tube below the puncture site, push the tube onto the needle and puncture the stopper. Blood should flow when the needle punctures the stopper. If it does not, then the needle is either too far in the vein or not in the vein. Backing the needle up a bit will work if the needle is too far in the vein. If it is not in the vein, shifting it should work. If you feel that the needle is in the vein and the blood still does not flow, use another tube.
 - e. After blood starts to flow, release the tourniquet and ask the patient to open his or her hand.
 - f. Constant forward pressure on the tube is necessary to keep the shut-off valve from closing.
 - g. Remove the tube when blood flow stops. The shut-off valve will close to prevent leakage. If multiple tubes are needed, they should be inserted in the order determined in step 6.
 - h. Each tube containing an additive should be gently inverted 10 times immediately after being removed from the patient to mix the specimen.
 - i. Repeat steps d, f, g, and h for each tube to be collected.
14. Remove the needle. A gauze pad should be held just above the puncture site. Remove the needle quickly to minimize pain and immediately apply the gauze. Ask the patient to apply pressure to the gauze for at least 2 minutes. When the bleeding stops, apply a fresh bandaid, or gauze and tape. The patient should be instructed not to remove it for at least 15 minutes.
15. Push the needle protective cover and dispose the vacutainer holder and needle as a unit in the sharps disposal container.

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16. Make sure the patient has no complaint. Confirm bleeding has stopped.

VENIPUNCTURE USING A SYRINGE

A disposable syringe with a 21 to 23-gauge needle should be used for venipuncture on children less than 2 years old and patients with difficult veins (fragile, thready, or rolling veins). It is helpful to have assistance in emptying the drawn blood into tubes when performing venipuncture with a syringe.

Venipuncture using a syringe is performed the same as routine venipuncture with the following procedural changes:

1. When assembling the equipment, place a sterile, sheathed needle on the syringe.
2. Proceed as in routine venipuncture.
3. After sufficient blood has been drawn, remove the needle from patients arm and immediately place a gauze pad on arm and apply pressure to stop the bleeding.
4. Transfer blood drawn into appropriate tubes as soon as possible. Delay may result in improper coagulation.
 - a. Tubes containing anticoagulants should be filled first.
 - b. Insert the needle into the tube stopper and the tube vacuum will draw the blood out.
5. After the patient is cared for, dispose of the syringe and needle as a unit in the biohazardous sharps disposal container. Apply the needle safety mechanism and avoid re-capping of needle.

Protocol for labeling specimens: Check the printed specimen label as to the patient's name, PDJ number, date of birth and the test name.

VENIPUNCTURE USING THE BUTTERFLY METHOD

This method is employed to collect blood from patients with smaller veins, drawing from hand or wrist sites, for pediatric patients, or patients that are difficult to draw by the routine venipuncture method.

Venipuncture using the butterfly method is performed the same method as routine venipuncture with the following procedural changes:

1. Assemble equipment, setting out a winged infusion set or a butterfly needle.
2. Select an appropriate size needle. Sizes range from gauge 21 to 25-gauge in diameter.
3. Always use a Luer adapter with the butterfly technique. Proceed in selecting a puncture site, cleansing the site, and performing the venipuncture as in the routine procedure.

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SPECIAL CIRCUMSTANCES - ADVERSE REACTIONS TO VENIPUNCTURE PROCEDURE**FAINTING**

1. If the patient is sitting, lower head and arms. If the patient is lying down, elevate feet.
2. Loosen any tight clothing.
3. Record blood pressure, pulse, and respiration rate.
4. Apply cold compresses to the patient's forehead and back of neck.
5. Call the physician if there is no response.

NAUSEA

1. Situate the patient comfortably with his or her head lowered.
2. Instruct the patient to breathe deeply and slowly.

VOMITING

1. Roll prone patients onto side.
2. Give patient a basin.
3. When vomiting ceases, assist the patient with water and towels.
4. Inform the physician.

EXCESSIVE BLEEDING

1. Apply direct pressure to the venipuncture site while bleeding continues.
2. Record the time.
3. If the bleeding persists more than 5 minutes, call the physician.

CONVULSIONS

1. Guard the patient from self-injury without completely restraining.
2. Call a nurse and physician immediately.

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SERUM PREPARATION

1. Obtain a venous blood specimen in a red, "plain" or, red swirl / Gold serum separator tube.
2. Allow specimen to fully clot. Place a specimen vertically in a test tube rack as this will speed up the clotting action. When the clotting has completed, the blood will no longer "flow". The clotting should be complete after 15-30 minutes depending on the type of tube used and patient condition
3. Centrifuge the specimen according to centrifuge manufacturer's recommendations.
4. Serum should be separated from the red cells to avoid test interference. This should take place within one hour of collection. Always avoid red cell contamination.

HANDLING CONSIDERATIONS

Universal Precautions apply to all body fluid specimens. Any specimen of any type which contains visible traces of blood should be handled using Universal Precautions.

Serum and plasma are the most commonly used specimens in chemistry procedures. Serum is the intercellular fluid in blood without the clotting factors. Serum is the specimen of choice because clotting factors interfere with certain chemistry procedures. Serum is prepared by centrifuging clotted blood. This means that whole blood specimens must be allowed to clot before the serum can be separated. Twenty to thirty minutes is usually required before centrifugation.

1. Serum and plasma should always be kept covered to minimize evaporation and contamination.
2. Keep the specimen tubes capped. This should be done for safety reasons as well as for specimen preservation.
3. Specimens should be stored (e.g., room temperature vs. refrigerated vs. frozen) as per the individual tests' specimen stability guidelines.
4. Avoid specimen agitation. Hemolysis (the breakdown of red blood cells) will occur when the specimen is agitated. A certain amount of hemolysis is unavoidable, but it should be minimal. Badly hemolyzed specimens are unacceptable for most chemistry and hematology procedures. Avoid shaking the specimen and always use gentle inversion to mix specimens. Always handle specimens with care.
5. Adhere to specimen time constraints. Timing is critical in most chemistry and hematology procedures. Follow manufacturer's recommendations for minimum and maximum times which specimens may be left in the tube. Be aware that most hematology procedures require that the specimen remain in the tube for a minimum period of time to stabilize the anticoagulants. In general, hematology procedures

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involving an automated WBC differential are among the most time sensitive. Serum specimen should be separated from whole blood within 2 hours of specimen collection.

6. Refrigerate specimens not tested immediately. Anticoagulant venous specimens should be stored at 2-8 degrees Celsius. If they will not be tested within 4 hours. Heat may cause hemolysis. Serum specimens should be separated from whole blood before being refrigerated.

Protocol for storage of a specimen not tested immediately:

Refrigerate all specimens (except for lavender top tubes (e.g., CBC) until tested or until the specimen can be sent to the reference laboratory, based on the respective routing schedule.

SOURCES OF ERROR

1. Diet influences certain tests which require fasting prior to specimen collection. Prolonged fasting will influence certain test results as well. Blood drawn immediately after a meal will probably have different levels of potassium, phosphorus, glucose, triglycerides, and alkaline phosphatase than specimens taken 4 hours after eating.
2. Tourniquets left on for more than 1 minute or vigorous hand exercise will elevate potassium and lactic acid levels and decrease blood pH.
3. Anticoagulated specimens containing clots should be discarded.
4. Hemolysis causes increased levels of acid phosphatase, bilirubin, CPK, LDH, magnesium, potassium, SGOT, and SGPT.
5. Serum in prolonged contact with the clot will result in changes in glucose, iron, LDH.

REVIEW DATES

September 29, 2014; June 22, 2018; February 17, 2019; June 2, 2021