Department of Pathology & Clinical Laboratories

SUBJECT: Collection Manual

TITLE: Laboratory Collection Manual

EFFECTIVE DATE: January 10, 2010

Purpose:
To provide a standard procedure for the collection of blood, body fluids, urine, stool, respiratory, cytology and tissue specimens.

Laboratory tests contribute vital information about a patient’s health. Seventy percent of correct diagnostic and therapeutic decisions rely on accuracy of test results and adequate patient preparation, specimen collection, and specimen handling are essential prerequisites for accurate test results. The accuracy of test results is dependent on the quality and integrity of specimens.

Scope:
This policy applies to all phlebotomists and clinical staff collecting specimens for diagnostic purpose with specific instruction for blood and urine collection. Procedure followed for collection of other specimen types are found in the specific department procedure manuals. In this manual the term phlebotomist will be used for any staff member who is drawing blood or body fluid.

Responsibility:

Task: Review, approval and update
Ensure all procedures are followed
Comply with Procedure

Responsibility of: Director of Clinical Laboratory / VP Nursing
Clinical Nurse Managers/ Medical Staff/ Clinical Laboratory
Patient Care Associate, RNs, LPNs, MD’s, PA’s.
Phlebotomists
REQUIRED SAFETY AND PERSONAL PROTECTIVE EQUIPMENT:

Personal Protective Equipment (PPE):
  • Uniform Scrubs or Buttoned lab coat – Street clothes should never be worn while collecting specimens.
  • Approved (Latex/Vinyl/Nitrile) Gloves – Assure gloves are a proper fit.
  • Respirators, masks and/or shields – Provided as needed
  • Extra PPE should be worn if required for drawing potentially Infectious patients as designated by the Infection Control Department or patient’s clinical diagnosis

Safety Equipment:
  • Needle device –
    • **Single Use** BD Vacationer®”Push Button” Blood collection Set: 21 gauge needle will reduce hemolysis. Use 23 or 25 gauge for neonate or pediatrics

Key Venipuncture Safety Guidelines:
There are three steps involved in obtaining a good quality specimen for testing:
  • Preparation of the patient.
  • Collection of the specimen.
  • Storing and/or transporting the specimen.

Phlebotomy Procedure:
Step

1.0 Greet and identify the patient.
   1.1 Ask patient for his/ her full name
   1.2 Introduce yourself
   1.3 Confirm patient’s first and last name. Use 2nd identifier (i.e. medical record number on hospital supplied ID bracelet) Out- patient can supply second identifier such as date of birth. Ensure that the name on the bar-coded label or requisition EXACTLY matches the patient’s name on the insurance card / or Hospital Identification bracelet. Ask the patient to spell his or her name if necessary. Do not stick in-house patient if no ID bracelet is present.

2.0 Reassure the patient if needed. Ask the patient if they have had a blood drawn before, or ask how you might be able to make the procedure more comfortable for him or her.

3.0 Position the patient. It is important that the patient be positioned in such a way that it facilitates a safe, comfortable and efficient venipuncture.
   3.1 Have the patient lie flat on bed, an exam table or sit securely in phlebotomy chair (not on edge).
   3.2 Arrange the patient’s draw-site arm in a comfortable, secure and accessible position.

4.0 Select gloves. Assure proper fit. Wash hands, put on gloves (wear until entire collection process is complete. DO NOT re-use gloves.
   4.1 Ask patient about latex sensitivity and use latex-free tourniquet when required.

5.0 Assemble supplies:
   - Select and set up all necessary supplies for the draw checking all expiration dates:
     a) Alcohol swabs
     b) Evacuator tubes
     c) Push Button Blood Collection Set
     d) 2" x 2" square gauze
     e) Tourniquet (latex-free, if required)
     f) Bandage (i.e., Band-Aid™, micropore tape and gauze)
     g) Sharps container (labeled with site name and address)
   5.1 Open the package in front of the patient.
   5.2 Select all required tubes.
   5.3 Engage 1st tube in holder without puncturing stopper.
   5.4 Assemble gauze pads and open alcohol prep pad.

6.0 The tourniquet should be applied 2-3" above the draw site.
   CAUTION: The tourniquet should never be left on for more than 2 minutes.
7.0 **Select the venipuncture site.**
Specimens will be collected from arm and hand vein only.
Certain areas are to be avoided when choosing a site:

1. Extensive scars from burns and surgery - it is difficult to puncture the scar tissue and obtain a specimen.
2. The upper extremity on the side of a previous mastectomy - test results may be affected because of lymphedema.
3. Hematoma - may cause erroneous test results. If another site is not available, collect the specimen distal to the hematoma.
4. Intravenous therapy (IV) / blood transfusions - fluid may dilute the specimen, so collect from the opposite arm if possible. Otherwise, satisfactory samples may be drawn below the IV by following these procedures:
   a. Turn off the IV for at least 2 minutes before venipuncture.
   b. Apply the tourniquet below the IV site. Select a vein other than the one with the IV.
   c. Perform the venipuncture. Draw 5 ml of blood and discard before drawing the specimen tubes for testing.
5. Lines - Drawing from an intravenous line may avoid a difficult venipuncture, but introduces problems. The line must be flushed first. When using a syringe inserted into the line, blood must be withdrawn slowly to avoid hemolysis.
6. Cannula/fistula/heparin lock - hospitals have special policies regarding these devices. In general, blood should not be drawn from an arm with a fistula or cannula without consulting the attending physician.
7. Edematous extremities - tissue fluid accumulation alters test results.
   7.1 Instruct patient to refrain from vigorous pumping of the hand.
   7.2 Choose the vein that feels the fullest; with the most elasticity.
   7.3 Select from the median antecubital (center of arm) first.
   7.4 Specimen will not be collected from the arm on the same side as a previous mastectomy.
   7.5 Specimen may be collected below an IV site only if necessary

8.0 **Ask your patient to relax their arm.**
8.1 Extend the draw site arm (aim it downward) and support securely.
8.2 After the tourniquet has been properly applied and the best vein has been selected for the draw, ask the patient to keep the arm relaxed with a closed fist.
8.3 Ask the patient to remain still with no sudden moves.

9.0 **Prepare the site for the draw.**
9.1 Cleanse the site with 70% alcohol prep pad in concentric circles from the inside out.
9.2 **Allow alcohol to dry.** Do not wipe site to dry.
9.3 Discard the alcohol prep pad.
9.4 If you must touch the site again after preparation for any reason Re-cleanse the site with 70% alcohol.

10.0 **Perform the venipuncture.**
10.1 Remove cap from needle, inspect for defects such as needle burr or defective attachment of the safety device.
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10.2 Anchor the vein by holding the skin taut with thumb or index finger directly below the draw site. Do not stretch skin surrounding puncture site with two fingers as this increases risk of needlestick injury.

10.3 With the bevel side up, enter the vein at a 15-degree angle. Proper access to the vein will be indicated by the presence of a “flash” of blood directly behind and below the button.

10.4 Push tube into end of holder, puncturing stopper.

10.5 When blood flow is achieved, instruct patient to open fist.

10.6 If blood flow decreases during phlebotomy or is not achieved confirm correct positioning of the needle, replace Vacutainer tube with new tube. If unsuccessful, remove tourniquet, place gauze over site, engage safety device while needle is still in arm and discard, bandage site. Repeat procedure at new site. Do not attempt more than two times. Request assistance from a more experienced phlebotomist. An additional attempt may be made by a second phlebotomist when confident of success. “Blind sticks” are not permitted.

10.7 If drawing multiple tubes The following order of draw has been established by Clinical and Laboratory Standards Institute (formerly known as NCCLS) :
1. Blood culture tubes or sterile vials (See Blood Culture collection SOP for proper collection)
2. Coagulation/ Citrate tubes (Blue top).
3. Serum (red top) – non additives clotting tube
4. Serum tube, with activator or gel separator (Gold or Black/Red speckled).
5. Heparin tube (Green top)
6. EDTA tube (Lavender top)
7. Fluoride tube (Gray top)
8. Heavy metals (Royal blue)

   NOTE: Order of draw is the same if using a syringe or vacutainer.

11.0 Release the tourniquet.

12.0 Remove the tube from the holder and gently invert 2-5 times. Cover the puncture site with a gauze pad and activate the Push Button retractable safety feature while needle is still in patient’s arm. Caution: DO NOT use an alcohol prep pad to apply pressure after the needle is removed (it may sting the patient).

13.0 Immediate dispose of the entire assembly (needle with holder attached) in a sharps container.

14.0 Keep pressure on the site for about 2-3 minutes. Ask your patient to apply pressure if they are capable of doing so. It is not recommended to have them bend their elbow.

15.0 Clearly label all tube in front of the patient as per labeling policy. DO NOT pre-label tubes. In the event a manual requisition has been generated, first and last name and a second numerical identifier, such as patient MR # must be handwritten on the tube, the preprinted EPIC label may also be used.
16.0 Inspect the puncture site to ensure the bleeding has stopped. Apply bandage to the site. Do not leave patients side or release patient until bleeding has ceased and bandage has been applied. See Precautions for procedure to follow for prolonged bleeding.

17.0 Remove gloves and discard all used materials. Always check to make sure nothing is left at the collection site.

18.0 Cleanse hands.

Blood Culture:
Blood cultures should be collected directly into the blood culture bottles using a safety collection set.
1. Swab the culture tops with Chlora-Prep. Allow to air dry.
2. Using a circular motion (starting at the site and moving outward 3 inches in circumference), cleanse twice with 70% alcohol prep or until prep shows no sign of dirt. Allow to air dry. Using same circular motion as directed above clean with Chlora-Prep. Allow to air dry.
   i. Thorough cleansing prevents skin organisms from contaminating the specimen and also prevents bacteria from entering the blood stream
3. Blood cultures should be drawn before the use of systemic antimicrobials.
4. Collections of specimen should be as soon after a fever spikes
5. At least two venipunctures should be performed, but all necessary specimens can be collected at one time (10 minutes apart).
6. There is nothing to gain by collecting specimens after initiating antimicrobial therapy, but if clinical conditions change, additional specimens are indicated
7. Acquire anaerobic or fungal blood culture bottles from Microbiology.
8. Do not send blood culture bottles through the pneumatic tube.
9. It is the responsibility of the clinician to identify the most appropriate culture
10. Vacuum in bottles will stop blood flow at the required amount

Types of Blood Culture Bottles
It is the responsibility of the clinician to order the appropriate culture tube:
Blue Bottle (Aerobic) 8-10 mL - Aerobic organisms are recovered in this bottle.
Purple Bottle (Anaerobic) 8-10 mL - Anaerobic organisms are recovered in this bottle.
Red Bottle (Fungal/ Mycobacterium) 1 -5 mL - Blood cultures for fungi and mycobacteria should be ordered only in appropriate clinical situations when these organisms are suspected.
Pink Bottle (Pediatric) 1-3 mL - Bottles to yield both anaerobic and aerobic microbes using a smaller volume of blood (1 to 3 ml per bottle).

See Nursing Department Policy and Procedure, File “B” Blood Culture Samples.
Considerations for Single and Multiple Sample Collection:
If only a single collection tube is required, when the vacuum is exhausted and the tube completely filled, release the tourniquet, and remove the tube from the needle assembly. Place a piece of dry gauze over the needle and withdraw the needle carefully.

When drawing a Pt/PTT (Coagulation/ Citrate tubes {Blue top}) and no blood culture tube precedes it, always draw 2 to 3 mL waste in a red top tube. This will to discard the air in the collection set tubing.

*Blood lactate levels will be drawn either without the use of a tourniquet or with a tourniquet that is not released during the blood draw. Tourniquet use and release and clenching of the fist can increase lactate levels in the blood sample.*

When multiple specimens are required, remove the first collection tube from the holder as soon as blood flow ceases or when you reached the desired tube volume, invert the first tube to prevent clotting, and gently insert the second tube into the holder. Puncture the diaphragm of the stopper by pushing the tube forward and initiating vacuum suction. Remove and invert each successive tube after it is filled.

**Note:** Never combine two under filled tubes together.

If the blood has to be mixed with an additive (invert the tube 4 to 10 times depending on the specimen tube being used), this must be done immediately after collection. Mix blood with anticoagulant thoroughly, using a rolling wrist motion and by inverting the tube gently 4 or 10 times. As soon as possible after collection, set the blood upright in a test tube rack.
Tips for difficult situations/ draws
If patient is extremely agitated or combative and the safety of the patient and/or employee is in jeopardy discontinue attempt to obtain specimen and notify nurse assigned to that patient or ordering physician

If patient refuses, attempt to explain the importance of obtaining the specimen. If patient continues to refuse, nurse assigned to that patient or contact physician. Specimen cannot be drawn unless patient willingly submits to procedure or appropriate parent or guardian authorizes continuance of procedure.

Patient communicates a tendency to faint draw patient from a prone position. Talk to the patient to divert their attention from the procedure.

Patient feels faint during venipuncture procedure or actually faints:
- Immediately discontinue procedure.
- Lower the patient’s upper body over the arm of the drawing chair. Lower their head between their legs or gently lower the patient to a prone position on the floor.
- Call for assistance.
- DO NOT LEAVE THE PATIENT.
- Apply a wet towel or clot to the forehead and the back of the neck.
- Provide a receptacle such as a basin or trash can if they feel they may vomit.
- If the patient responds, keep the patient in the area for at least 15 minutes before you release them.
- If the patient does not respond or exhibits any sign of seizure, and call CNM, nurse assigned to that patient or your supervisor/ manager.
- Fill out an incident report and send it to your supervisor/manager
- **Note: Ammonia Inhalants are not to be used**

If patient is on anticoagulant therapy use additional caution when inspect site for bleeding from venipuncture site and assure there is no bleeding occurring under the skin (this is apparent when swelling is observed under the skin around the site of puncture).

If prolonged bleeding from venipuncture site is noted, apply direct pressure to the venipuncture site until bleeding stops. In the event bleeding continues for greater than five (5) minutes, the following process needs to be followed:
- Call physician to inform of prolonged bleeding and request direction.
- Continue to apply direct pressure.
- Document the incident and report to your supervisor/ manager.
Blood Withdrawal/Aspiration from Hickman Catheter*:
The Registered Nurse in the critical care areas (MICU, SICU, CCU, ER and PACU) can draw blood from the Hickman Catheter for laboratory evaluation, which eliminates the need for peripheral vein punctures. In all other areas of the hospital, a physician can only draw blood from the Hickman catheter. Blood aspiration should be done to verify placement prior to administering hypertonic or vesicant solutions.

*See Nursing Department Policy and Procedure, File “H” Hickman Catheter for procedure.

Procedure for Blood Withdrawal from Hickman Catheter, Heparin Lock/ Med Lock, Double, Triple or Quad Lumem, or infusaport:
Drawing from the port is discouraged, but if that is the only alternative:

1. Hold drip for at least 5 minutes before drawing the specimens.
2. Drawing off 5 mL of waste blood before the labs are collected.
3. Follow the order for draw
Timed Specimens:
There are two types of timed blood specimens: One is for a single blood specimen ordered to be drawn at a specific time. The other is for a test that requires multiple blood specimens to be collected at several specific times. Instances in which timed multiple specimen tests may be ordered:

- The most common timed procedure is a glucose tolerance test. First, a blood specimen is drawn from a fasting patient. Then, the patient is given glucose orally and blood specimens are drawn at fixed intervals.
  **Note:** The American Diabetes Association and the World Health Organization (WHO) have specific recommendations for glucose tolerance testing.
- To test the effect of a certain medication, a physician may order the same tests to be obtained on consecutive days, before, during and after the patient has received a medication.
- Collection of an acute and convalescent serum to aid in the diagnosis of a viral infection when culturing is not feasible. This requires a longer period of time between draws.
- Other examples include such tests as occult blood, ova and parasites, and blood cultures.
- Sputum for TB

Peak and Trough specimens are serum samples collected to determine the level of an antibiotic or other pharmacologic agent in the blood. Peak specimens, which represent the highest level, are generally collected ½ hour after the dose is given intravenously or 1 hour after it is given intramuscularly. Trough specimens, representing the lowest level, are generally collected approximately ½ hour before the next dose.

**Vancomycin Peak:** Collect Peak sample 1 hour after the completion of the drug infusion. Samples collected in serum separator tubes (gel) will be rejected.  
**Vancomycin Trough:** Collect a trough just before the next dose.

**Gentamicin Peak:** Collect Peak at the end of a 60 minute IV infusion, 30 minutes after the end of a 30-minute IV infusion, or 60 minutes after the IM dose. Hemolysis, lipemia or samples collected in a serum separator (gel) tube are not acceptable for this test.  
**Gentamicin Trough:** Collect a trough just before the next dose. Hemolysed, lipemic or samples collected in a serum separator (gel) tube are not acceptable for this test.
Drawing Specimens from Potentially Infectious Patients (e.g. Ebola Virus Disease)
Procedures for collection, handling and testing of specimens for potentially Infectious patients following recommendations from NY/NYC laboratories. The following guidance is provided for additional testing on specimens for such cases

- Laboratory testing should be limited to testing essential to patient care
- Whenever possible, testing should be performed inside the patient’s isolation room using Point-of-Care (POC) instruments and testing methods, approved by the Department of Pathology.
- Testing that requires transport of samples to laboratories outside the patient’s isolation room should be kept to a minimum
- Appropriate PPE must be worn while collecting specimens including
  1. Impermeable gown with back closure (front button or front snap-closing laboratory coats are not acceptable)
  2. Double glove
  3. Mask to cover nose and mouth
  4. eye protection such as safety goggles
- Specimens should be double-bagged and placed in a biohazard transportation container
  1. The container should be wiped down with 10% bleach
  2. Hand-carried to the laboratory (DO NOT use pneumatic tube system)
- Defer to the laboratory’s Ebola Policy and Procedure for instructions not covered in this manual

Since information related to any of these areas may change as clinical laboratory technology changes, please refer to the most current edition of this Specimen Collection Manual

- **Adequate draw site and patient preparation** is essential to ensuring a safe venipuncture:
  - The phlebotomy basket or draw station should be neat and organized to ensure all supplies and Sharp’s Needle Disposal Containers are *easily accessible* to the Phlebotomist.
  - Phlebotomists should review the venipuncture procedure with the patient if needed (and supporting people) to ensure that expectations for the patient_helpers are understood and followed.
- It is the responsibility of the drawing phlebotomist to select and use the proper venipuncture needle based on their assessment of specific circumstances of each draw.
- **Timely activation of the retractable needle is critical in the prevention of needle sticks.** Activation should be initiated upon completion of draw.
- **Used needles must be promptly discarded** into an easily accessible compliant Sharps Container.
Avoiding Common Problems:
Careful attention to routine procedures can eliminate most of the problems outlined in this section. Materials approved by the laboratory can maintain the quality of the specimen only when they are used in strict accordance with the instructions provided to ensure a sufficient quantity of each type of specimen needed for the procedures performed. It is the responsibility of the phlebotomist or clinician to ensure all tubes, containers and/or transport media are used within the expiration date.

General Specimen Collection: Some of the common considerations affecting all types of specimens that may cause a delay because of redraw or resubmission include:

- Failure to label a specimen correctly. Use two unique identifiers.
- If a request form is needed, failure to provide all pertinent information required on the test request form.
- Insufficient quantity of specimen to perform test / QNS (quantity not sufficient).
- Failure to use the correct container/tube for appropriate specimen preservation.
- Inaccurate and incomplete patient instructions prior to collection.
- Failure to tighten specimen container lids, resulting in leakage and/or contamination of specimens.
- Failure to maintain the specimen at the appropriate temperature requirement.
Serum Preparation: The most common plasma preparation considerations include:
- Hemolysis: red blood cells broken down and components spilled into serum. Causes and prevention are discussed under the section on hemolysis.
- Lipemia: cloudy or milky serum sometimes due to the patient’s diet (discussed under the section on lipemia)

Plasma Preparation: The most common plasma preparation considerations include:
- Failure to collect specimen in correct additive.
- Failure to mix specimen with additive immediately after collection.
- Hemolysis or red blood cell breakdown.
- Incomplete filling of the tube, thereby creating a dilution factor excessive for total specimen volume (QNS).

Hemolysis:
In general, grossly or even moderately hemolyzed blood specimens may not be acceptable for testing. Hemolysis occurs when the red cells rupture and hemoglobin and other intracellular components spill into the serum. Hemolyzed serum or plasma is pink or red, rather than the normal clear straw or pale yellow color.

Most cases of hemolysis can be avoided by observing the steps listed:
1. For routine collections, use a 21 to 22-gauge needle. On occasion, however, it may be necessary to use a 23-gauge needle for patients from elderly and pediatric populations with small or difficult veins.
2. If there is air leakage around the needle or loss of vacuum in the tube, replace the vacuum tube.
3. When there is difficulty accessing a vein or when a vacuum tube fills too slowly due to a difficult venipuncture, damage to the red blood cells may result. Correct by collecting a fresh tube when blood flow is established or select another puncture site and, using sterile/unused equipment, collect a second specimen. Also, a blood pressure cuff will reduce trauma to fragile red blood cells.
4. Do not remove the needle from the vein with the vacuum tube engaged. This applies to both the last tube collected during a routine venipuncture and to tubes collected during a difficult procedure.
5. Premature removal of the tube causes a rush of air to enter the tube, which may result in damage to the red cells.
6. If using a syringe be as gentle as possible, drawing the blood evenly. Too much pressure in drawing blood into a syringe or forcefully ejecting blood into a collection tube from a syringe may damage red cells.
7. Allow collection site to dry after cleaning. Alcohol used to clean the puncture site may cause contamination in a tube.
8. Do not collect a specimen in a hematoma
9. Clinic and out-patient draw stations:
   - Allow specimen to clot completely before centrifuging.
   - Do not centrifuge the specimen for a prolonged period of time.
Vacuum Tubes Containing Additives (i.e., anticoagulants, preservatives, clot activators)

To ensure accurate test results, all tubes containing an anticoagulant or preservative **must** be allowed to fill up to the required level. Attempts to force more blood into the tube by exerting pressure, as in collection with a syringe, will result in damage to the red cells (hemolysis). If the vacuum tube is not filling properly, and you are certain that you have entered the vein properly, substitute another tube. Occasionally, vacuum tubes lose their vacuum. If the specimen cannot be properly collected, select another site and using new, sterile collection equipment, collect the specimen.

When using vacuum tubes containing an additive:

1. Tap the tube gently at a point just below the top to release any additive adhering to the tube or top.
2. Permit the tube to fill completely to ensure the proper ratio of blood to additive. There will be some dead space at the top of the tube.
3. To ensure adequate mixing of blood with the anticoagulant or preservative, use a slow rolling wrist motion to invert the tube gently four to eight times. Failure to invert tubes may lead to the formation of microscopic clots.
4. Rapid wrist motion or vigorous shaking may contribute to hemolysis.
5. Check to see that all the preservative or anticoagulant is dissolved. If any preservative powder is visible, continue inverting the tube slowly until the powder is dissolved.
6. If multiple samples are being drawn, invert each specimen as soon as it is drawn. Do **not** delay. Place the tube upright in a rack as quickly as possible after collection.

**Note:** The gel-barrier tube is an additive tube and should be inverted five to six times after collection. Allow the tube to stand for a minimum of 15 to 30 minutes for complete clotting to occur prior to centrifugation.

Vacuum Tubes without Anticoagulants: When using vacuum tubes containing no additives:

1. Permit the tube to fill completely.
2. Let the specimen stand for a minimum of 15 to 30 minutes and (preferably) not longer than 60 minutes prior to centrifugation. This allows time for the clot to form. If the specimen is allowed to stand for longer than 60 minutes, chemical activity and degeneration of the cells within the tube will take place, and test results may be affected.
Quantity Not Sufficient / QNS:
One of the most common problems in specimen collection is the submission of an insufficient volume of specimen for testing. The laboratory sends out a report marked QNS (quantity not sufficient), and the patient has to be redrawn at an inconvenience to the patient and to the physician. To ensure an adequate specimen volume:

1. Always draw whole blood in an amount 2½ times the required volume of serum required for a particular test to ensure proper amount of serum after centrifuging.
2. For example, if 2 mL serum is required, draw at least 5 mL whole blood. If there is difficulty in performing venipuncture, minimum volume may be submitted. For most profile testing, draw at least two 8.5 mL gel-barrier tubes. If pediatric tubes are used, be sure to collect an adequate volume of specimen to perform the test.
3. Provide patients with adequate containers and instructions for 24-hour urine and stool collections.
4. It is critical, especially for any specimen collection tube containing an additive, to allow the tube to fill with the required amount of specimen. This requirement is important in order to achieve the proper blood-to-additive ratio; otherwise, the specimen may be found to be QNS.

Specimen Collection for Coagulation Testing:
1. Collection tube: Blood should be collected in a blue-top tube containing 3.2% buffered sodium citrate.
2. Fill volume: Evacuated collection tubes must be filled to completion to ensure that a 9:1 blood-to-anticoagulant ratio is achieved. Underfilling of citrate collection tubes results in an increased anticoagulant-to-blood ratio and can extend clot-based coagulation assays.
   
   Note: Never combine two underfilled tubes together.
3. Mixing: The sample should be mixed immediately by gentle inversion three to four times to ensure adequate mixing of the anticoagulant with the blood.
Specimen Rejection / Inability to Perform Testing:
Causes for rejection. These are based on particular limitations of each test.

In addition to the specific Causes for Rejection noted for each test, testing will not be performed on specimens received under the following circumstances:

- Expired collection device
- Inappropriate collection device/specimen type
- Unlabeled specimens
- Mislabeled specimens
- Leaking/broken specimen container
- Gross bacterial contamination of specimen
- Quantity of specimen not sufficient for test
- Specimen subjected to extensive delay or extreme temperatures.

Should testing not be possible due to any of these causes for rejection the staff would be advised prior to the cancelling with the reason, time and date along with documentation in electronic chart.
**Specimen Containers:**

<table>
<thead>
<tr>
<th>Tube</th>
<th>Description</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red-top tube</td>
<td>Contains no anticoagulant or preservative.</td>
<td>Serum or clotted whole blood. Serum must be separated from cells within 60 minutes of venipuncture.</td>
</tr>
<tr>
<td>Mottled red/gray or gold (gel-barrier) tube</td>
<td>Contains clot activator and gel for separating serum from cells, but not anticoagulant. Do not use gel-barrier tubes to submit specimens for therapeutic drug monitoring. Always check the test description to determine whether a gel-barrier tube is acceptable.</td>
<td>Serum. Separate serum from cells within 15 to 30 minutes of venipuncture. If specimen is centrifuged before clotting is complete, a fibrin clot will form on the top of the cell. Also, the gel barrier may not be intact and could cause improper separation of serum and cells, possibly affecting test results.</td>
</tr>
<tr>
<td>Lavender-top tube</td>
<td>Contains K₂ EDTA.</td>
<td>EDTA whole blood or plasma. Send whole blood in a lavender-top tube.</td>
</tr>
<tr>
<td>Pink-top tube</td>
<td>Contains K₂ EDTA</td>
<td>Used for Blood Bank testing.</td>
</tr>
<tr>
<td>Gray-top tube</td>
<td>Contains sodium fluoride (a preservative) and potassium oxalate (an anticoagulant).</td>
<td>Sodium fluoride whole blood or plasma.</td>
</tr>
<tr>
<td>Blue-top tube</td>
<td>Contains sodium citrate. Be sure to use only tubes with a 3.2% sodium citrate concentration. These are easily identified by the yellow diagonal stripes on the label.</td>
<td>Sodium citrate plasma.</td>
</tr>
<tr>
<td>Green-top tube</td>
<td>Contains sodium heparin or lithium heparin.</td>
<td>Heparinized whole blood or plasma. Send whole blood in a green-top tube.</td>
</tr>
<tr>
<td>Yellow-top tube</td>
<td>Contains acid citrate dextrose (ACD) solution.</td>
<td>ACD whole blood. Send whole blood in a yellow-top tube.</td>
</tr>
<tr>
<td>Royal blue-top tube</td>
<td>Contains sodium EDTA for trace metal studies.</td>
<td>EDTA whole blood or plasma. Send whole blood in a royal blue-top tube.</td>
</tr>
</tbody>
</table>
URINE COLLECTION

Nursing personnel must instruct the patient in proper urine collection technique using the Blue Capped Urine Cup with Attached Cannula. After patient is positively identified and cup filled label only the blue cap.

If more than one tube is requested, tubes should be filled in the following order:

1st: **gray top (Urine C&S-shake vigorously)**
   Microbiology C&S Cultures only. The preservatives are a combination of sodium formate, sodium borate and boric acid which helps to preserve and protect the level of bacteria present in collection.

2nd: **speckled top (UA-invert 8-10x)**
   Urinalysis only. It cannot be used for U-HCG. The speckled top tube has preservatives that include chlorhexidine, ethyl paraben and sodium propionate which may produce false results if used for Urine HCG testing.

3rd: **clear top**
   (Urine Tox, Urine Chem, U-HCG and all other tests)
   Clear top tube “no additives” is for Urine Toxicology, Urine Routine Chemistry and U-HCG. Each test should have a separate label.

**NOTE:** Discard the labeled Blue Caps (with Attached Cannula) in “Sharps” containers. Cups should have no patient identification. They are emptied then discarded in regular trash.

Procedure for Psychiatry, Pediatric and Neo-natal Patients is to collect urine in standard screw on lid cup. Nursing staff should remove lid and submerge tip of transfer straw with integrated transfer port into urine cup.

**URINE CONTAINERS WITH VACUTAINER NEEDLES SHOULD NOT BE USED FOR CYTOLOGY OR PATHOLOGY SPECIMENS.**
Routine 24-Hour Urine Collection:
Recommended Patient Instructions for 24-hour Urine Collections:

**Patient:** Follow these given instructions in collecting your 24-hour urine specimen:

Do **not** add anything but urine to the container and do **not** pour out any liquid, tablets, or powder that may already be in the larger collection container. These substances may cause burns if touched. The collection container should be kept tightly closed and refrigerated throughout the collection period.

1. **Upon arising in the morning,** urinate into the toilet, emptying your bladder completely. Do **not** collect this sample. Note the exact time and print it on the container label.
2. **After this time,** collect all urine voided for 24 hours in the container provided by the physician. All urine passed during the 24-hour time period (day and night) must be saved. Urine passed during bowel movements must also be collected.
3. Refrigerate the collected urine between all voidings or keep it in a cool place.
4. **At exactly the same time the following morning,** void completely again (first time after awakening), and add this sample to the collection container. This completes your 24-hour collection.
5. Take the 24-hour specimen to the clinic's laboratory as soon as possible, maintaining the cool temperature in transit by placing the specimen in a portable cooler or insulated bag.

Two Consecutive 24-hour Urine Collections: Patient Instructions

Follow the directions below to collect urine for analysis. Remember to store all urine in the refrigerator from the time collection begins until you take the containers to your physician. **Important:** Do **not** allow the urine from one container to mix with the urine in the other container. The urine container may contain a preservative of acetic acid, boric acid or hydrochloric acid, which may cause burns if touched. If ingested, a physician should be contacted immediately.

First 24-hour Urine Collection (Hydrochloric Acid “HCl” Preservative):

1. Urinate in the usual manner on awaking, making sure to empty your bladder completely. Do **not** save this urine, but you must record the date and time of this first urination. **Example:** 03/12/01, 7:30 a.m.
2. All urine passed during the remaining 24-hour period must be collected in this first container, labeled “HCl Preservative.” Urine passed during bowel movements must also be collected.
3. Urine may be collected in another clean container and then carefully poured into the first 24-hour collection container.
4. The next morning, urinate on awakening, but this time, include the urine in the HCl preservative container. Record the date and time of this urination. **Example:** 3/14/01, 7:30 a.m. This is the last sample to be included in the container marked “HCl Preservative.”

Second 24-hour Urine Collection (No Preservative):

1. Record the date and time of the first urine of the day. The time is the same as the last entry of the HCl preservative container (See number 4 above).
2. From now on, all urine passed for the next 24-hour period must be included in the second container, labeled “No Preservative.” Urine passed during bowel movements must also be collected.
3. Urine may be collected in another clean container and then carefully poured into the second container.
4. On the following morning, the first urine of the day must be included in this second container. Record the date and time of this urination. **Example:** 03/15/01, 7:30 a.m. This is the last sample to be included in the container labeled “No Preservative.”
The most common urine collection considerations include:

- Failure to obtain a clean-catch, midstream specimen.
- Failure to provide a complete 24-hour collection/aliquot or other timed specimen.
- Failure to refrigerate unpreserved specimen or store in a cool place during collection period (i.e., 24 hours).
- Failure to add the proper preservative to the urine collection container prior to collection of the specimen.
- Failure to provide proper mixing of specimen with urine preservative.
- Failure to provide patients with adequate instructions for 24-hour urine collection.
- Failure to use proper tube requirements.
- Failure to provide a 24-hour urine volume when an aliquot from the 24-hour collection is submitted.

INSTRUCTIONS FOR SUBMISSION OF SPECIMENS TO MICROBIOLOGY LABORATORY

- Specimens for viral cultures are sent to the Laboratory in a Viral Transport Medium that can be obtained from the Microbiology Lab or CPA.
- Sputum and urine specimens are submitted in a sterile, tightly lidded plastic container. No blue capped urine cup with attached cannula will be accepted.
- Nose, eye and superficial wounds are submitted in a swab.
- Throat, hold the tongue down, take the specimen directly from the back of the throat, being careful not to touch the teeth, cheeks, gums, or tongue when inserting or removing the swab.
- Deep wounds (tissue or aspirate) submitted in a sterile, tightly lidded plastic container.
- Stool should be submitted in a red, leak-proof container or PVA, depending on the test.
- Fingernails, hair, ticks, scrapings are submitted in a sterile, tightly lidded container.
- Tissue is submitted in a sterile, tightly lidded container, with a small amount of saline to prevent drying.
Pleural Fluids/ Ascitic Fluids/ Peritoneal Fluid/ Pericardial Fluid/ Synovial Fluid:

Tube #1  BD 6 mL No Additive (Z) Plus Tube with Clear Hemogard: Culture (includes gram stain), fungal culture, AFB culture

Tube #2:  BD 6 mL No Additive (Z) Plus Tube with Clear Hemogard: Chemistry (ALP, Glucose, Bilirubin Total, BUN, Calcium, CPK, Creatinine, Potassium, Magnesium, Sodium, Phosphorous, Uric Acid, LDH, Total Protein, Albumin, Amylase)

Tube #3  BD 4mL EDTA Vacutainer with Lavender Hemogard: Cell count and differential

Tube #4:  Extra BD 6 mL No Additive (Z) Plus Tube with Clear Hemogard

Synovial Fluid for Crystal Analysis:

Tube #1  BD 6 mL No Additive (Z) Plus Tube with Clear Hemogard
Or Red topped tube

Nasopharyngeal Fluid for RSV and Influenza

Tube #1  BD 6 mL No Additive (Z) Plus Tube with Clear Hemogard

CSF:
Cerebral Spinal Fluids to be collected in the four Clear Numbered Specimen Tubes supplied with the MEDLINE Disposable Lumbar Puncture Tray.

Tube #1:  Gram stain and culture

Tube #2:  Chemistry (Glucose, Total Protein, Albumin)

Tube #3:  Cell count and differential

Tube #4:  Bacterial antigen (S. pneumonia, I. influenza, N. meningitides

Tube #5:  Extra Fluid (In BD No Additive (Z) Plus Tube or sterile specimen cup) collect for extra tests such as fungal culture, AFB culture. E. coli antigen, Streptococcus antigen, VDRL, Cryptococcal antigen by India Ink Stain, Toxoplasma antigen, etc., if needed
Pediatric GC/ Chlamydia
For all suspected abuse cases <13yrs and under send a swab culturette for gonorrhea and a VCM Medium for chlamydia culture*.

Collection: Females:
Cervix
1. Remove mucus and secretions from the cervix with a swab and discard.
2. With a new sterile swab packaged with VCM Medium, firmly sample the endocervical canal.
3. Place in swab culturette or directly inoculate plates.

Vagina
1. Wipe away excessive amount of secretion or discharge.
2. Obtain secretions from mucosal membrane of the vaginal vault with a sterile swab.
3. If smear is also requested, collect a second swab.
4. Place swab in culturette.

Collection: Males:
Urethra
1. Insert a urethrogenital swab 2 to 4 cm into the urethral lumen, rotate swab.
2. Leave in place for at least 2 seconds to facilitate absorption.
3. Place swab in culturette or directly inoculate plates.

*Under no circumstances will urine be accepted
POINT OF CARE TESTING (POCT)
POCT is done only in clinical areas approved by the Department of Pathology. The type of POCT performed by personnel from clinical areas may vary as authorized by the Department of Pathology. Each Point of Care test has its own Policy and Procedure that should be referred to for detailed instructions. POCT is a catch-all phrase which covers a variety of settings, users, and products.
INSTRUCTIONS FOR SUBMISSION OF SPECIMENS TO CYTOLOGY LABORATORY:
The lab is open for submitting specimens Monday to Friday, 9 a.m. to 5 p.m, or to the Central Processing Area after hours.

GYN Specimens:
The detection of cervical cancer and its precursors as well as other gynecologic abnormalities is the primary purpose of obtaining a cervical cell sample. The following guidelines are referenced from NCCLS Document GP15-A1 and are recommended in the collection process for obtaining a Thin Prep Pap Test (TPPT) specimen. In general, the guidelines state that it is important to obtain a specimen that is not obscured by blood, mucus, inflammatory exudate or lubricant

1. Cytology Requisition Form will generate from EPIC if request is ordered properly (i.e., name of patient, MR#, source of specimen, clinical history, age, LMP). Indicate if it is Thin Prep or Thin Prep Reflex.
2. For Thin Prep, the vial must have a label affixed indicating the patient’s name and medical record number. The cap should be closed tightly. The vial is submitted to Cytology Lab with the EPIC requisition form.

Patient Information:
- The patient should be tested 2 weeks after the first day of her last menstrual period and definitely not when she is menstruating.
- Even though the TPPT reduces obscuring blood, clinical studies have demonstrated that excessive amounts of blood may still compromise the test and possibly lead to an unsatisfactory result.
- The patient should not use vaginal medication, vaginal contraceptives, or douches during the 48 hours before the exam.

Specimen Collection Preparation:
- Lubricant jellies should not be used to lubricate the speculum, even though lubricant jellies are water soluble, excessive amounts of jelly may compromise the test and possibly lead to an unsatisfactory result.
- Remove excess mucus or other discharge present before taking the sample. This should be gently removed with ring forceps holding a folded gauze pad. The excess cervical mucus is essentially devoid of meaningful cellular material and when present in the sample vial may yield a slide with little or no diagnostic material present.
- Remove inflammatory exudate from the cervical canal before taking the sample. Remove by placing a dry 2 x 2 inch (5 x 5 cm) piece of gauze over the cervix and peeling it away after it absorbs the exudate or by using a dry proctoswab or scopette. The excess inflammatory exudate is essentially devoid of diagnostic cellular material, and when present in the sample, vial may yield a slide with little or no diagnostic material present.
- The cervix should not be cleaned by washing with saline or it may result in a relatively acellular specimen.
- The sample should be obtained before the application of acetic acid.
3. Brush/Spatula Protocol
   - Obtain an adequate sampling from the ectocervix using a plastic spatula. If desired, use lukewarm water to warm and lubricate the speculum. Water-soluble gel lubricant sparingly applied to the posterior blade of the speculum can be used if necessary.1 Select contoured end of plastic spatula and rotate it 360 degrees around the entire exocervix while maintaining tight contact with exocervical surface.
   - Rinse the spatula as quickly as possible into the PreservCyt solution vial by swirling the spatula vigorously in the vial 10 times. Discard the spatula.
• Obtain an adequate sampling from the endocervix using an endocervical brush device. Insert the brush into the cervix until only the bottommost fibers are exposed. Slowly rotate 1/4 or 1/2 turn in one direction. DO NOT OVER-ROTATE.
• Rinse the brush as quickly as possible in the PreservCyt solution by rotating the device in the solution 10 times while pushing against the PreservCyt vial wall. Swirl the brush vigorously to further release material. Discard the brush.
• Tighten the cap so that the torque line on the cap passes the torque line on the vial.
• Record the patient's name and ID number on the vial, and the patient information and medical history on the cytology requisition form.
• Place the vial and requisition in a specimen bag for transport to the laboratory

4. Broom-Like Devices Protocol
• Obtain an adequate sampling from the cervix using a broom-like device. If desired, use lukewarm water to warm and lubricate the speculum. Water-soluble gel lubricant sparingly applied to the posterior blade of the speculum can be used if necessary. Insert the central bristles of the broom into the endocervical canal deep enough to allow the shorter bristles to fully contact the ectocervix. Push gently, and rotate the broom in a clockwise direction five times.
• Rinse the broom as quickly as possible into the PreservCyt solution vial by pushing the broom into the bottom of the vial 10 times, forcing the bristles apart. As a final step, swirl the brooms vigorously to further release material. Discard the collection device.
• Tighten the cap so that the torque line on the cap passes the torque line on the vial.
• Record the patient's name and ID number on the vial, and the patient information and medical history on the cytology requisition form.
• Place the vial and requisition in a specimen bag for transport to the laboratory

NON-GYN Specimens:
1. Cytology Requisition Form will generate from EPIC if request is ordered properly (i.e., name of patient, MR#, source of specimen, clinical history, and age). Attach patient's identification label to specimen container.
2. During lab hours, bring the specimen to the Cytology lab; if after hours, bring the specimen to the Central Processing Area.

Clinical Method of Obtaining Cytologic Specimens from the Respiratory Tract:
1. The cellular material from the respiratory tract may be either the result of a spontaneous expectoration or may be obtained artificially.
2. The sputum is the result of a spontaneous "deep" cough bringing up material from the small bronchi and the alveoli. The cough reflex may be stimulated artificially by means of inhalation or cough stimulating substance.
3. Spontaneous expectorations must be either processed immediately, or collected in fixative (50-70% alcohol).
Collection of Sputum:
1. One third of a wide-mouth glass bottle is filled with fixative and the patient is instructed to expectorate directly into the container the following morning.
2. An early specimen of sputum should be chosen for cytological examination. The patient must be specifically instructed not to eat anything before producing the specimen. Tea with milk must also be avoided.
3. Some patients cannot produce a sputum specimen without something to drink. In this case, water or tea without milk will do no harm.
4. Tooth powder or the remains of toothpaste in the specimen complicate the analysis. The teeth should not be brushed before the sputum is produced. True sputum contains histiocytes and may contain many bronchial epithelial cells. Three specimens on three successive days should be collected to insure a maximum of diagnostic accuracy.

An Aerosol Method of Sputum Induction:
- The method of inducing deep-cough sputum by aerosol inhalation (techniques developed by Dr. M.S. Bickerman and his associates at Columbia Presbyterian Medical Center, New York City).
- A hypertonic saline solution and propylene glycol is placed in a heated nebulizer and vaporized by means of an air pump or an oxygen cylinder. Saline 15% and propylene glycol 20% may be used for asymptomatic patients; saline 10% and propylene glycol 20% for patients with evidence of heavy bronchial irritation or pulmonary emphysema.
- Vapors from these solution are non-toxic. The only known aftereffect may be bronchospasms in persons with asthma or severe emphysema. A solution of propylene glycol 5% in normal saline is advised for such cases. The patient should use a bronchodilator a few minutes before inhalation and after, if necessary.

Contra-Indication:
After bronchoscopy, the sputum becomes filled with eosinophilic cell debris and inflammatory cells. It is easy to confuse this appearance with the debris of squamous cell carcinoma. It is better to postpone cytological examination of the sputum for ten days after bronchoscopy.

Bronchial Aspirates and Washings
Bronchial aspirates are obtained by suction during bronchoscopic procedures. Bronchial washings are obtained in the following manner:
- With the bronchoscope in position, the patient is placed on the table in such a manner that the suspicious lung is dependent. The tip of the bronchoscope is placed as close as possible to the area to be investigated. About 10 ml of normal saline is instilled in small portions of 2-3 ml at a time and reaspirated while the patient is asked to cough. The flexible tube of the aspirator may be placed also in the opening in some of the smaller bronchi and the procedure repeated. All of the cellular material is collected in a Clerf collector. It is mandatory that all of the material collected be placed in fixative without delay (50-70% alcohol). Additional material may be obtained by rinsing the bronchoscope after withdrawal. The procedure has to be performed very carefully if good results are to be achieved.

In order to localize the tumor to a lung or a specific lobe, separate bronchoscopes should be used for each area of investigation, otherwise, contamination of the specimen will occur.
Advantages of Bronchial Aspirates and Washings:
This procedure allows for localization of a cancer to a specific lung or a portion thereof. The specimens are easier to screen because of lesser cellularity than those in sputum.

Bronchial Brushings:
1. Brushing slides made by clinicians must be fixed immediately with Spraycyte and submitted with patient’s name, medical record number, DOB and source of specimen indicated on the slide.
2. Place brushing in the cardboard holder, and submit to the Cytology Lab with printed Cytology Request Form from EPIC.

Collection of Body Fluids
Pleural, pericardial or ascitic fluids may be collected in tubes or syringes which may be either plain or heparinized to prevent coagulation. Cells in such fluids do not deteriorate very rapidly.

The advantages of processing unfixed fluids are:
- Layering of many cancer cells in the buffy coat of the centrifuged sample may be achieved. The cells adhere better to the slides if the fluid cannot be processed within 12 hours after collection. The addition of 50% ethyl alcohol is beneficiary. The size of the sample need not exceed 200 ml with an equal amount of fixation added. Large amounts of fluid for cytologic examination is not recommended.

Refer to the Body Fluid collection in another section of this manual.

Colon
The preparation of the patient is the same as that of barium enema. A cathartic by mouth, 1 ounce of mineral or castor oil taken 12 hours prior to collection of the material is necessary. On the morning of the procedure, cleansing enemas must be administered until the returns are clear. Actual collection of the cytologic material may take place 1-2 hours later. From 500 to 1000 cc of warm Ringer’s solution is instilled with the patient in the decubitus position. A massage of the colon and rotation of the patient is very helpful in obtaining better cytologic material. The fluid is collected after 3 to 5 minutes. The addition of alcohol to the sample is optional.

Spjut, et al., suggested a silicone-foam enema for cytologist examination of the colon. The material solidifies shortly after injection and is expelled by the patient in the form of a cast, faithfully reproducing contours of the colon. The cast may be washed off and the fluid is spun down and the sediment is examined microscopically.
FINE NEEDLE ASPIRATION (FNA):
FNA biopsy is performed to obtain diagnostic material from many body sites. Lesions are aspirated by the radiologist or other clinician using small caliber needles under the guidance of various imaging techniques. The Rapid assessment of specimen adequacy is done on-site by the cytotechnologist and pathologist before the procedure is completed, then the Cytology Department should be notified of a planned FNA biopsy 24 hours prior to the procedure with patient’s name, MR Number, body site, time and location. The Cytology Department will prepare the aspiration cart and slides as per Cytology protocol.

If no adequacy assessment is requested, the clinician must follow the following procedure:
1. FNA slide has to be identified with patient’s name, DOB, source of the specimen, fixed immediately with SprayCyte and submitted to the Cytology Lab with completed EPIC printed Cytology Request Form.
2. Slides for Pap stain should be fixed immediately using SprayCyte.
3. If it is a fluid aspirate, then it is placed in a plastic tube with no additives that is labeled with patient’s name, DOB and source of specimen.
4. If it is a syringe, it has to be washed with saline; after doing so, fluid is put in the tube that is labeled with patient’s name, DOB and source of specimen.
5. All are submitted to Cytology Lab with completed printed EPIC Cytology Request Form.

For further information or assistance, please call the Cytology Laboratory at Ext. 6610 or 6613
INSTRUCTIONS FOR SUBMISSION OF SPECIMENS TO HISTOLOGY LABORATORY

Procedure:
1. Each specimen submitted to the Histopathology Laboratory must be accompanied with printed EPIC Pathology Requisition Form, clearly labeled with patient's name, date, medical record #, billing number, age, brief history, tissue source and patient location.

2. All specimens except those mentioned below are submitted in a container with 10% neutral buffered formalin (NBF) preferably 10-20 times their volume:
   - **Frozen Sections:**
     Submit fresh without fixative, with request form, clearly labeled with patient’s name, date, billing number, age, brief history and tissue source identification. For after hours and weekends call or page pathologist on call.
   
   - **Lymph Nodes for Lymphoma Diagnosis:**
     Upon removal of lymph node (weekdays 8am to 5pm), notify the Pathology Department at Ext. 6601 or 6612. Submit the lymph node in container without fixative along with the printed EPIC request form. Pathologist will immediately examine the lymph node. Afterhours, weekends, and holidays submit in formalin.
     
     Frozen section is performed only if requested. Imprints are made prior to fixation. A portion of the lymph node is placed into RPMI* solution and the remaining portion is put into 10% NBF. Imprints are made upon request, or at the discretion of the Pathologist.
     
     *RPMI is a commercially prepared transport media obtained from the reference laboratory.
   
   - **Bone Marrow (Biopsy and Clot):**
     Submit bone marrow specimen in 10% Neutral Buffered Formalin that can be obtained from the Histology Department.
   
   - **Muscle Biopsies for Suspected Myopathy:**
     It is the policy of the Department of Pathology to send all muscle biopsies performed for suspected myopathy to the Neuropathology Department of Montefiore Hospital for processing. The Department of Pathology must have 72 hours notice for all muscle biopsies.
     1. Skeletal muscle biopsy specimen must be properly excised in order to prevent distortion and contraction artifacts.
     2. Select tissue that is only moderately involved by the disease process.
     3. Muscle selected should not be allowed to contract, but rather maintained in an isometric state.
     4. Recommended methods of handling are as follows:
       a. Use a surgical muscle clamp; or
       b. Tie or pin the muscle on a tongue blade or corkboard.
     5. Place specimen in a small amount of normal saline or on wet gauze, and immediately deliver to the Histology Lab.
     6. All specimens should be accompanied by a properly completed (including patient’s clinical history) Surgical Pathology Requisition form.
Specimens exempt from microscopic examination:
1. The following specimens may receive a gross examination only:
   • Toenails and fingernails which are grossly unremarkable
   • Bunions and hammertoes
   • Nasal bones and cartilage from rhino/septoplasty
   • Prosthetic breast implants
   • Foreign bodies
2. Microscopic examination will be performed when requested by the attending physician or at the discretion of the pathologist.

Specimens exempt from pathology examination:
1. The physician may choose not to submit the following specimens:
   • Cataracts
   • Muscle from eye
   • Dental appliances
   • Fat removed by liposuction
   • Foreign bodies including medical devices, with the exception of broken or defective devices or those which must be secured for legal purposes
   • Foreskin (newborn circumcision)
   • Intrauterine contraceptive devices
   • Placentas, unless grossly abnormal or associated with an abnormal delivery/newborn or stillborn
   • Teeth

Therapeutic radioactive sources
2. If the physician chooses to submit any of the above specimens, a pathology report will be generated.
CYTOGENETIC SPECIMENS:
Successful cytogenetic studies depend on specimen sterility and cellular viability. Considerations for submitting blood, bone marrow, tissue and amniotic fluid are provided as follows:

Bone Marrow: If submitting blood, bone marrow or tissue for testing, follow these guidelines:
1. Submit bone marrow specimen in green topped Sodium Heparin tube.
2. Submit tissue, skin or other biopsies in transport medium. Do not expose specimen to formalin or other fixatives.
3. Only refrigerate specimens when sterility is questioned.

Amniotic Fluid: When submitting amniotic fluid for testing, please follow these guidelines:
1. Submit specimens in sterile amber plastic tubes. Do not transport amniotic fluid in a syringe due to risk of loss of specimen if plunger is depressed.
2. Maintain at ambient temperature. Do not freeze or refrigerate.
3. Do not use the following containers for amniotic fluid:
   a. Glass tubes with rubber stoppers. Rubber is toxic to amniocytes.
   b. Wide-mouth urine containers that are prone to leak and become contaminated.
INTERFERENCE OF MEDICATIONS AND OTHER SUBSTANCES
Many common prescriptions and non-prescriptions (over-the-counter) medications can interfere with chemical determinations or alter levels of substances measured. Drug interference is method-dependent that only general recommendations can be stated here. Precautions to be observed must be determined by the physician, and the patient must then be told to avoid specified medications for the necessary periods of time prior to specimen collection.

If the patient cannot be taken off the medication in question, its presence should be noted. For practical purposes, unless drug interference can be avoided by ordering an alternate test method, drug therapy under supervision of the clinician may be discontinued for a period of two to three days and tests repeated, especially in cases where false abnormal (and occasionally false normal) findings are suspected.

Summary: Interference of Medications and Other Substances:
1. Drugs or their metabolites are frequently concentrated in the urine in sufficient amounts to interfere significantly with urine assays.
2. Drug interference of notable clinical significance has been well-documented in the following instances:
   - Thiazide diuretic therapy. The pharmacologic or toxic effect is hyperuricemia and hyperglycemia.
   - Catecholamine assay. If a “24-hour drug abstinence period” for a patient is not possible, VMA or metanephrines should be ordered.
   - Oral contraceptives cause a decrease in serum vitamin B₁₂ levels that is, in many cases, indistinguishable from vitamin B₁₂ deficiency of any cause. They also cause an increase in total serum thyroxine-binding globulin. This results in an increase in both total serum thyroxine and unsaturated thyroxine-binding globulin, but with no significant change in unbound (free) thyroxine.
3. Many medications have been shown to have long-term residual effects that interfere with testing.
HAZARDOUS SUBSTANCES INFORMATION

Hazardous Chemicals used to transport or preserve specimens:

- Acetic acid (30%) solution
- Boric acid tablet
- Citrate buffered acetone solution
- Ethyl alcohol (ethanol) solution
- Ethyl alcohol and polyethylene glycol solution
- Formalin (formaldehyde) – 10% neutral buffered formalin solution
- Hydrochloric acid solution
- Isopropyl alcohol solution
- Methyl alcohol (methanol) solution
- Perchloric acid (8%) solution

Laboratory will provide Material Safety Data Sheets (SDS) of a product containing these substances, if needed.

- *Chlamydia Culture Transport*
- Cytyc® ThinPrep® Vials
- Ova & Parasites Kits
- Para Pak Zn-PVA Fixative
- Acetic Acid
- Boric Acid Tablet
- HCl
SPECIMEN TRANSPORT

Labeling Specimens and Packaging:
Each specimen submitted to the Laboratory must have a requisition label. This label must include order number, medical record number and the patient’s name.
1. Collect the specimen(s) in proper transport container. (Refer to this collection Manual for more information)
2. Use of appropriate containers and packaging for specimens is important, as leaking packages may pose a health hazard
3. Ensure that all specimen container caps and lids are tightened properly to prevent leakage
4. Use one label per specimen
5. When using an electronically generated label, place the label lengthwise on the tube
6. Submit all patient specimens within a series together in one biohazard zip-locked specimen bag.

Temperature of Specimens:
Maintain specimens at room temperature, unless otherwise requested in this manual.

Inter-hospital transporting:
1. Specimens must be properly labeled and packaged as noted above. When delivering specimens to the Laboratory, place in zip-locked specimen bag/s into a plastic basket and carry to the Laboratory as soon after collection as possible
2. Specimens generating from the Emergency Department will be transported through the Pneumatic Tube system. Exception is blood culture tubes.
3. Non-conforming Specimens will be sent back to the unit of origin or discarded in the Central Processing Lab after contacting the unit of origin.

Clinic to Hospital transporting:
1. Specimens must be properly labeled and packaged as noted above. When delivering specimens to the Laboratory, place in zip-locked specimen bag/s into a red plastic biohazard bag.
2. Red plastic biohazard bag will be placed in totes with hardliners for transit.
3. The Department of transporting will transport the padded tote bags from the satellite Clinics to the laboratory.
4. Starting in 2003, both DOT and IATA changed their rules for classifying specimens for transport. Under the new rules, only certain specimens with a higher potential to transmit severe, disabling or fetal diseases must be declared and packaged as “infectious substances.”
   - Diagnostic specimens are exempt form “infectious substances” regulations.

Needles and Sharps:
The Department of Pathology will not accept any needles or breakable medical equipment.
1. Properly discard used needles or other sharps prior to transport at collection site.
2. Please note that for tests requiring the submission of syringes, the needle must be removed from the syringe and discarded. The syringe must be capped before sending to the laboratory.
SUBJECT: Collection Manual
TITLE: Laboratory Collection Manual

References:
1. Phlebotomy Today, Post-Venipuncture Procedure Comfort Hold protocol, Garza, Diana.
4. CLSI (NCCLS) Document M29-Protection of Laboratory Workers from occupationally Acquired Infections.
8. OSHA Blood Borne Pathogen (BBP standard) packaging marking or labeling requirement: 49 CFR 173.134 (b) (11)
14. CDC Interim Laboratory Guidelines for Handling Specimens from Cases or Suspected Cases of Ebola Virus Disease
15. CDC Guidance for US Laboratories for Managing and Testing Routine Clinical Specimens When There is a Concern About Ebola Virus Disease
16. NYC DOH Interim Laboratory Guidelines for Handling Specimens from Cases or Suspected Cases of Ebola Virus

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