Specimen Collection

Lab results are only as good as the specimen provided. Patient preparation, venipuncture technique, specimen handling, and transportation can all affect the quantity of results.

Health and Safety Precautions

Use Standard Care Practices (Universal Precautions) when collecting, handling, and transporting specimens. Standard Care Practices assume that any specimen is potentially infective.

When collecting specimens:

- Wear gloves and a liquid resistant lab coat whenever collecting specimens.
- Change gloves, tourniquet, and wash hands between patients.
- Avoid splashing of specimens. Wear a mask or face shield if necessary.
- Dispose of sharp objects in a solid puncture-resistant container.
- Use only approved safety needles. Do not remove, recap, bend, or cut needles.

Patient Preparation

Unique patient preparation requirements are listed under each test in the Test Directory.

Fasting: Unless stated differently under the individual tests, fasting refers to nothing by mouth except water for a period of 6-12 hours before specimen collection. Fasting longer than 12 hours or less than 6 hours may affect some test results.

Timing: Many tests require the specimen be collected at a certain time of day or at a certain time in relation to medications being given. These requirements are listed in the Test Directory under the individual test.

Collection Container Requirements

The specific collection container is listed under “collection container” in the Test Directory. Additional acceptable containers are listed under “Alternate specimens” for some tests.

Any of the listed collection containers may be obtained by contacting the Laboratory at 732-5063.

Vacutainer Collection Order: Fill tubes in the designated order to avoid contamination with the additives from the other tubes. Immediately following collection, gently invert all tubes 8-10 times to ensure proper mixing.

Designated Order

1. Tubes for sterile samples
2. Tubes without additives or clot activators
3. Tubes for coagulation studies (e.g. citrate)
4. Tubes with additives (e.g. heparin, EDTA)
**Blue top tubes:**
Under filling or over filling the tube can adversely affect coagulation assays. Tubes must be within 90% of the tubes are marked by a fill line on the label. Watch the level carefully when filling with a syringe.

**Lavender top tubes**
Filling the lavender top tube before the red, SST, PST, tubes can result in elevated potassium and decreased calcium values. Under filling tubes may affect cell morphology.

**Specimen Labeling Requirements**
Incomplete specimen labeling is the largest single cause of delayed testing, specimen rejection, and potential errors.

The Laboratory will only accept specimens labeled with the CLIA mandated minimum labeling requirements listed below:

1. Complete legal name; last, first
2. Date of birth
3. Date and time of collection
4. Name of the test requested
5. Initials of the individual who collected the original container or aliquotted the specimen
6. The specimen must be accompanied with a completed test requisition form

**Transfusion Service labeling:** in addition to the above requirement, specimens submitted for transfusion testing must include:

1. Patient’s Social Security number or unique hospital identification number.
2. Patient’s date of birth
3. Last name and first initial of collector

**24-hour urine collections**
Because proper collection and preservation of 24-hour urine specimens are essential for accurate test results, patients must be carefully instructed in the correct procedure. Printed instructions for the patient are available from the Laboratory.

**24 hour Urine Collections:** Many 24-hour urine collections require a preservative to be added to the container before the collection is started. These are listed under the “specimen collection” section for each test. If the container needs a preservative, send the patient to the Laboratory to pick up the container.

**Preparation of the container:**

1. Label the container with the patient’s name and test being collected.
2. The collection period is utilized in the calculation of the analyte value. Please write the collection period on the outside of the container.

**24 hour urine collection patient instructions:**

1. Unless the physician indicates otherwise, instruct the patient to maintain the usual amount of liquid intake but to consume no alcoholic beverages.
2. Place the 24-hour urine container provided by the Laboratory in a refrigerator
or on ice to prevent growth of microorganisms and possible decomposition of urine constituents.
3. Have the patient empty his/her bladder at the start of the collection into the toilet. Record the time.
4. Instruct the patient to collect the next voiding and add it as soon as possible to the 24-hour container.
5. Add all subsequent voidings to the container as in step 4.
6. When the 24-hour period or other designated collection period is over, instruct the patient to empty his/her bladder and add this voiding to the collection container.
7. Instruct the patient to notify the Laboratory if he/she fails to save some of the specimen.
8. Have the patient return the container to the Laboratory as soon as possible.

**Clean catch urine, patient instructions:**

**Female**
1. Spread the labia of vagina with one hand. Cleanse the area twice with sterile towelette.
2. With the labia still spread, begin urinating into the toilet.
3. Place the cup under the stream.
4. When the cup is about one half to two thirds full, remove it and finish emptying the bladder into the toilet.

**Male**
1. If a foreskin is present, pull it back.
2. Clean the head of penis with a sterile towelette.
3. Begin urinating into the toilet.
4. Place the cup under the stream.
5. When the cup is about one half to two thirds full, remove it and finish emptying the bladder into the toilet.

**Microbiology Specimen Collections**

The following guidelines will help us give the best possible results for your patient. Please see the individual test requirements for specific collection instructions for each site and culture type.

1. The clinical specimen must be material from the actual site of disease and must be collected with a minimum of contamination from adjacent tissue, organs, or secretions.
2. A sufficient quantity of specimen must be obtained to perform the culture techniques requested.
3. Appropriate collection devices and specimen containers must be used to ensure optimal recovery of microorganisms.
   a. Sterile containers must be used when specified in the collection instructions.
   b. Containers must have tight fitting caps or lids to prevent leakage or contamination during transport.
   c. Swabs should only be used when sampling a localized area of inflammation in a large contaminated field (e.g. throat cultures) or when only small amounts of material are available (e.g. superficial wound cultures). It is always preferable to transport larger amounts of specimen in a sterile screw capped container or a capped syringe.
Putting aspirated fluids in a culturette swab offers no transport advantages and makes processing more difficult and prone to contamination.

4. Obtain a culture prior to the administration of antibiotics whenever possible.
5. Clinical information including date of onset of illness, clinical diagnosis and intended or current antibiotic therapy should be included on the requisition form.

If the desired culture or test cannot be found in the Test Directory, contact the Laboratory about collection requirements before the specimen is collected. Unusual test requests often require special handling.

Artificially Elevated Potassium Levels

Spurious high potassium levels can occur because of leakage of cell potassium into the serum or plasma, caused by:
1. Clenching and relaxing the fist during phlebotomy.
2. Hemolysis.
3. Release of potassium from platelets during clotting (Using plasma will usually circumvent this.).
4. Refrigerating blood specimens before centrifugation.
5. Release of potassium from red or white cells during storage. Aliquoting the serum/plasma into separate tubes or collecting in specimens in gel separator tubes can prevent this.

Contamination of Specimen

1. Contamination can occur when EDTA (lavender) tubes are filled prior to the SST, PST, or red tubes.
2. Mixing of blood with intravenous fluids containing potassium may adversely affect test results.

Hemolysis

Hemolysis occurs when the membrane surrounding red blood cells is disrupted and hemoglobin and other intracellular components escape into the serum or plasma. Hemolyzed specimens vary in color from faint pink to bright red. Hemolyzed specimens may adversely affect test results and may need to be re-collected. When there is moderate hemolysis, the serum/plasma is visibly red.

See individual procedures to identify the amount of hemolysis that can be present without interfering with the assay.

To minimize hemolysis:

a. Use at least a 21 gauge needle for the venipuncture; avoid using 25 gauge needles.
b. Make sure the alcohol on the site is dry before beginning the venipuncture.
c. When drawing with a syringe, pull back gently on the plunger.
d. Remove the tourniquet ASAP.
e. Keep the specimen away from extremes of temperature.
Lack of Proper Mixing of Tubes

Lack of proper mixing of the blood sample with the anticoagulant in the tube may allow a clot to form. Clotting invalidates hematology, coagulation, and some chemistry tests that require whole blood.

Lipemia

After eating, fatty acids in the plasma may give the serum/plasma a milky or cloudy appearance. Bacterial contamination may also cause cloudy serum. Moderately or grossly lipemic specimens may interfere with some test results. Ultracentrifuge can frequently remove lipemia. *The ultracentrifuge requires a minimum of 2.5 mLs of serum/plasma.*

Radioisotope Interference

Diagnostic procedures or therapy involving radioactive compounds may invalidate radioimmunoassays (RIA). Please obtain specimens for anticipated RIA tests before administering isotopes to the patient.

Over and Under Filling Vacutainer Tubes

Over filling or under filling vacutainer tubes results in an incorrect ratio of blood to anticoagulant. This can invalidate coagulation test, change cell morphology, and allow partial clotting of plasma specimens.