

## Specimen Handling

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The quality of the test results reported by the laboratory is dependent upon proper patient preparation and collection, handling, and transport of specimens. Test specific specimen requirements are listed in the Directory of Services. The suggested specimen volumes allows for testing and repeat testing when necessary. Insufficient specimen quantities may be cause for rejection of the specimen. Specimens should be stored at refrigerator temperatures (2-8° C) unless otherwise noted. If the directions are unclear, or if you have any questions regarding proper specimen handling, please call ACL Client Services, 800.877.7016.

Adherence to the blood borne pathogen standard set by the federal Occupational Safety and Health Administration (OSHA) will reduce exposure to HIV, hepatitis, and other blood borne pathogens when collecting and transporting specimens.

In order to prevent needle stick injuries, specimens collected in syringes must **not** be transported with the needle attached. The needle must be removed with the use of a mechanical device and a cap should be placed on the syringe prior to transport to the laboratory. Alternately, the sample can be transferred to a sterile container if appropriate. Specimens should always be placed in leak proof containers and transported in sealed specimen bags to avoid exposure from leakage or breakage.

## Patient Preparation

Unless otherwise noted in the Directory of Services, no special patient preparation is necessary. If you have questions regarding patient preparation, please call Client Services.

Some tests require the patient to be **FASTING** prior to blood collection. When fasting is indicated, please have the patient refrain from taking anything by mouth except water for the period indicated in the specimen requirements. Proper fasting will minimize the chance of lipemia, which may interfere with testing.

## Identification and Labeling

The College of American Pathologists (CAP) Laboratory General Checklist (revised April 21, 2014) requires that all specimens must be labeled at the time of collection to provide unique identification. Ideally, a name-number system is desirable so there are at least two separate identifiers on each sample (CAP GEN.40491).

The ACL test requisition number is a unique number that provides positive patient identification when used on each specimen in conjunction with the full patient name.

Additionally, the specimen(s) from each patient should be labeled with:

- Date and time of collection (include start and finish times for timed collections)
- *Plasma* identification when appropriate
- Slides must include the patient's last name and first initial on the frosted end of the slide (e.g. pap smears, gram stains). In addition, the slide transport container should be identified with the requisition label.

*The specimen(s) and requisition from only one patient should be placed in a plastic transport bag and sealed. **Do not mix** specimens and requisitions from multiple patients in the same transport bag.*

## Specimen Collection

- Venipuncture using evacuated tubes is the most common method of blood collection.
- Use a 19, 20 or 21 gauge needle for collection. Use of smaller gauge needles (22 gauge or smaller) or butterfly needles may damage red cells and adversely affect lab test results.
- Do not instruct the patient to clench and/or pump his/her fist prior to or during the blood draw. The patient may be instructed to close their hand to distend veins and then open their hand.
- As a general guideline, the volume of blood drawn should equal 2 ½ times the amount of serum or plasma required for the testing.
- When drawing multiple types of tubes on a patient, the following order of collection should be followed:
  - Blood Culture Tubes
  - Coagulation Tubes (blue top)
  - Serum tube with or without clot activator, with or without gel. (red top or gold gel)
  - Heparin tube with or without gel plasma separator (light green or green top)
  - EDTA (lavender top)
  - Glycolytic Inhibitor (gray top)
- Invert tubes with anticoagulant gently 8 times. (Blue top tubes for coagulation, invert 3-4 times)

- Invert red top or gold gel tubes gently 5 times  
One complete inversion is top up, top down, top up.

## **Serum**

### Serum Separator (Gold Gel) or Plain Red Top Tubes

1. The appropriate serum separator (gold gel) or plain red top tubes should be drawn for tests requiring serum. A full 5 mL tube will yield approximately 2 mL of serum.
2. Allow the gold gel tube to clot at room temperature for 30 minutes, allow the plain red to clot for 60 minutes. Do not allow to clot longer than 2 hours before centrifuging.
3. Centrifuge for 10 minutes at 1300 g or 20 minutes if the g-force is less than 1300 g.
4. Inspect the gel barrier, no gaps should be present and the gel should have a uniform thickness (the gel will have a slant when centrifuged in a fixed angle centrifuge). If the tube has gel that is uneven or has gaps, remove an aliquot and re-spin the aliquot. Allow the centrifuge to stop without braking.
5. DO NOT combine serum from a difficult draw with serum from a separate collection to complete the sample requirements.
6. Serum from a plain red tube with no gel barrier should be placed in a properly labeled plastic transfer tube immediately after centrifuging.

**Plasma**

ACD, Citrate, EDTA, Heparin, or Oxalate

| <b><u>Type of Plasma</u></b> | <b><u>Tube Size</u></b>                                                     | <b><u>Anticoagulant</u></b>                                               |
|------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------|
| ACD                          | 10 mL yellow                                                                | 1.5 mL ACD solution A                                                     |
| Citrate                      | 2.7 mL light blue                                                           | 3.2% buffered Citrate                                                     |
| EDTA                         | 3 mL lavender<br>6 mL lavender                                              | EDTA (K2)<br>EDTA (K2)                                                    |
| Heparin                      | 3 mL or 4.5 mL light green<br>2 mL or 6 mL green<br>2 mL, 4mL or 6 mL green | Lithium Heparin gel<br>Lithium Heparin no gel*<br>Sodium Heparin, no gel* |
| Heparin(Metals Use)          | 6 mL royal blue                                                             | Sodium Heparin                                                            |

**\*CAUTION: The lithium and sodium heparin (no gel) tubes look alike. Check tube label.**

1. Use the appropriate anticoagulated tube as indicated by the Directory of Services. Anticoagulated tubes must be at least one half full to ensure accurate test results, however full tubes are preferred. **Citrate (light blue) tubes must be completely filled to the indicated fill line or minimum fill line by vacuum until no additional blood enters the tube allowing the proper anticoagulant to blood ratio.**
2. Immediately after drawing, gently invert each tube 8 times to thoroughly mix the blood with the anticoagulant. One complete inversion is top up, top down, top up.
3. Centrifuge the tube for a minimum of 10 minutes.
4. Remove the plasma (clear supernatant) with a transfer pipette and place in a properly labeled plastic transfer tube. Please label the tube with the type of plasma (e.g., Citrate plasma, Heparin plasma, etc).

## **Whole Blood**

(Specimens, which are submitted without centrifugation)

1. Use the appropriate tube as indicated by the Directory of Services. Anticoagulated tubes must be at least one half full to ensure accurate test results, however full tubes are preferred. **Citrate (light blue) tubes must be filled to the indicated fill line or minimum fill line by vacuum until no additional blood enters the tube allowing the proper anticoagulant to blood ratio.**
2. Immediately after drawing, gently invert each tube 8 times to thoroughly mix the blood with the anticoagulant. Submit the entire unopened tube for testing.

## **Random Urine Collection**

The recommended random urine is an early morning midstream specimen collected in a clean container. Begin voiding, allowing the first part of the stream to escape, collect the mid-stream, allow the final part of the stream to escape. Transfer the urine into a 10 ml gray top urine preservative tube for transport to the laboratory.

Refer to the Microbiology section of the Directory of Services for instructions on urine culture collection.

## **Timed Urine Collection**

1. Obtain the appropriate collection container and preservative as indicated in the specimen requirements.
2. The patient should void at the start of the collection and this urine should be DISCARDED. Begin timing the collection. All urine from this time on must be saved during the collection period. The specimen should be refrigerated or kept on ice during the entire collection.
3. The patient should not void directly into any urine container, which has concentrated acid as a preservative. He/She should be instructed to avoid contact with any preservatives.
4. At the end of the collection period, the patient should be instructed to void and this urine must be SAVED.
5. When only a portion of the collection is sent to the lab the entire collection volume must be measured. Mix the specimen well before removing the aliquot.
6. Record the total volume, the preservative, and the time span on both the requisition and the urine container.

Note: If a clearance is ordered also indicate the patient's height and weight.

## **Specimen Transport**

1. For specimens transported by ACL couriers:
  - a. Place the primary container(s) into a plastic bag. (Only one patient per bag.)

- b. Place the appropriate request form(s) outside of the secondary plastic container. The requisition should never come in contact with the primary container.
- c. The courier will place the bag into a leak proof, temperature-controlled carrier for transport to ACL.

2. When shipping specimens by commercial courier:

- a. The specimen collection tube, plastic transfer tube, or urine container is the primary container. Primary containers must be crush proof and appropriately sealed to prevent leakage. Specimen collection tubes and transfer tubes are to be shipped in protective mailers.
- b. Each primary container must be placed in a leak proof secondary container. Plastic bags with a seal closure are provided by ACL. The secondary container should also include absorbent material to absorb the entire contents of the primary container should it break in transit.
- c. Cardboard mailing cartons are supplied by ACL. Large submissions should be packaged in cardboard boxes with enough packing material to prevent breakage. In all cases, the outer carton must be labeled with the universal biohazard symbol in accordance with Federal Regulation 42 CFR part 72.