

Non-Blood Specimens

A. Introduction

1. A wide variety of non-blood specimens are analyzed in the clinical laboratory.
2. Most non-blood specimens are NOT collected by the phlebotomist. Some are collected by the patient (examples: urine, feces) or by doctors and other trained health care professionals (examples: Cerebral Spinal Fluid (CSF), throat/nasopharyngeal swabs).

B. Phlebotomist Responsibilities

1. Phlebotomists are often responsible for transporting non-blood specimens. Non-blood specimens should be handled with care as they are often difficult to collect.
2. Always follow Standard Precautions when handling any lab specimen. In addition to being potentially infectious, any non-blood specimen may contain blood and should be treated as a possible blood borne pathogen sample.
3. Always wear gloves when handling containers of non-blood specimens. The specimen may have been in contact with the outside of the container during the collection process. Wear additional PPE as required by infection control policies.
4. Verify that the specimen is correctly labeled before transport.
 - a. All labels must be attached to the container, not the lid.
 - b. Labeling must include the following information:
 - 1) Patient's last name, first name
 - 2) Patient's date of birth (DOB) and/or other identification information
 - 3) Date and time of collection
 - 4) Name or initials of person who collected the sample
 - 5) Type of sample (See section C for list of Types of Samples)
 - 6) Other information as required by facility policy
5. Specimen containers may be placed in zip-lock biohazard bags for transport.
6. Transport specimens quickly using the appropriate storage conditions. Non-blood specimens may require storage or transport at room temperature, 37° C, chilled, or protected from light. Some must be tested shortly after collection.

7. In general, non-blood specimens are to be transported and tested STAT. The patient may be in critical condition, or the specimen quality may decline rapidly after collection.

C. Types of non-blood specimens

1. Body Fluids

- a. Urine
- b. Cerebrospinal fluid (CSF)
- c. Synovial fluid – include which joint it is from (Example: right knee)
- d. Serous Fluid - Fluid aspirated from body cavities
 - 1) Pleural – lung
 - 2) Pericardial – heart
 - 3) Peritoneal – abdominal cavity
- e. Amniotic fluid
- f. Seminal fluid (Semen)
- g. Gastric secretions

2. Other non-blood specimens

- a. Feces
- b. Skin scrapings
- c. Buccal (Cheek/mouth) Swabs
- d. Breath samples

3. Culture specimens

- a. Sputum
- b. Throat cultures
- c. Nasopharyngeal cultures
- d. Wound cultures
- e. Ear or eye cultures

f. Vaginal or urethral cultures

D. Urine Specimens

1. Urine is the fluid produced by the kidneys as they filter waste from the bloodstream. It is the most common non-blood specimen tested in the clinical lab.
2. Review the objectives, Notes and Study Questions from the Urine and Pregnancy Testing Labs.

E. Fecal Specimens

1. Feces is the residual waste from the digestive system. It is sometimes referred to as a stool specimen.
2. Fecal specimens always contain bacteria from the digestive tract.
3. Fecal specimens are most commonly tested in the microbiology department.
 - a. ***Ova and Parasite (O&P)*** test is ordered to confirm the presence of parasites in a stool specimen. ie: *Giardia*, amoebas, and tapeworms.
 - b. Cultures may be ordered to identify enteric disease organisms such as Salmonella, Shigella, or Staphylococcus aureus.
 - c. Stool specimens may also be tested for viruses.
 - d. ***Occult blood*** testing is used to determine the presence of “hidden” blood in a patient’s stool which may be indicative of gastrointestinal (GI) bleeding or colorectal cancer.
 - 1). Review the Objectives, Notes and Study Questions from the Fecal Occult Blood lab.
4. Phlebotomists may need to instruct patients on collection of fecal specimens.
 - a. Laboratories will provide a wide-mouth container with a tight fitting lid.
 - b. Caution the patient not to contaminate the specimen with urine.
 - c. Instruct the patient to properly seal the container after collection and then wash the outside of the container after it has been sealed.
 - d. Patients should be instructed to wash their hands thoroughly after collecting.
 - e. Provide the patient with both written and verbal instructions.

- f. ***Specimens should be transported to the lab immediately and be maintained at body temperature, 37 °C, for testing.***

F. Other Non-Blood Specimens

1. Cerebrospinal Fluid (CSF) is the liquid that surrounds the brain and spinal cord.
 - a. CSF is normally clear and colorless; it is chemically similar to plasma.
 - b. Obtained by the physician through a spinal tap or lumbar puncture.
 - c. CSF is tested for a variety of conditions, including meningitis.
 - d. Ideally, three tubes are collected; testing is usually performed in Chemistry/Immunology, Microbiology and Hematology.
 - e. Tests commonly performed on CSF: total protein level, glucose level, cell count, microbiological analysis, and cryptococcal antigen determinations.
2. Seminal Fluid is composed of products from the male reproductive system.
 - a. Semen is normally yellowish white and viscous (thick).
 - b. Semen is examined in the laboratory for a variety of reasons:
 - 1) Determine the effectiveness of vasectomy
 - 2) Fertility assessment
 - 3) Investigate the possibility of sexual criminal charges
 - b. The patient must be given specific instructions on collection in a tactful, discreet manner.
 - c. Containers must be clean and free of detergents; condoms can be used but must be washed free of spermicidal substances.
 - d. ***Seminal fluid must be kept warm (37°C) and delivered to the lab and tested within 2 hours of collection.***
3. Amniotic Fluid is the liquid that surrounds the fetus during pregnancy.
 - a. Amniotic fluid is contained within the amniotic sac inside the uterus and is produced by the fetal membranes and the fetus.
 - b. The doctor collects a sample by amniocentesis to test for genetic disorders or to assess fetal development by testing for alpha-fetoprotein (AFP).

- c. In a problem pregnancy, it may be tested during the last trimester to determine fetal lung maturity by determining the L/S ratio.
- d. ***The specimen must be protected from light during transport.***

4. Gastric Analysis and Hollander Test

- a. The purpose of these tests is to determine gastric function in terms of gastric (stomach) acid production.
- b. The two methods differ in the substance used for stimulation.
 - 1) Gastric analysis uses histamine or pentagastrin.
 - 2) Hollander uses insulin to stimulate gastric secretions.
- c. Phlebotomist's role is to assist in labeling and transport of specimens and collect blood specimens as required.
- d. Under no circumstances should the phlebotomist perform the procedure; responsible only for labeling gastric specimens and blood samples.

5. Sweat Chloride by Iontophoresis

- a. This test is used to diagnose Cystic Fibrosis (CF).
 - 1) Cystic Fibrosis (CF) is a disorder of the exocrine glands which cause changes in mucous production glands.
 - 2) Primarily affect lungs, upper respiratory tract, liver and pancreas.
 - 3) Patients with cystic fibrosis produce 2-5 times the normal amount of chloride in sweat.
- b. Traditional Test – Pilocarpine Hydrochloride - Iontophoresis
 - 1) Sweat is stimulated by applying pilocarpine hydrochloride to the skin and a very mild electric current to the site, usually the forearm or leg.
 - 2) Sweat is collected on preweighed gauze pads, and then weighed after sweat collection.
 - 3) Gauze is put in cups with deionized water and allowed to equilibrate for 2-3 hours or overnight.
 - 4) Chloride in the solution is measured.

- c. Molecular diagnostic tests are replacing sweat testing. DNA samples from blood or saliva can be checked for specific defects on the gene responsible for cystic fibrosis.

6. *Helicobacter pylori*

- a. *Helicobacter pylori* has been identified to be a bacterium which may cause peptic ulcers and cancer.
- b. The breath test is used to detect *H. pylori* infections.
- c. Breath Test Procedure
 - 1) Four weeks before the test patients must not take antibiotics or Pepto Bismol. Two weeks before the test, other medications are prohibited.
 - 2) No eating or drinking, including water, one hour before the test.
 - 3) Patient exhales into bag for baseline sample.
 - 4) Patient swallows a solution with a urea labeled with an isotope.
 - 5) After 10-30 minute's patient exhales into another bag which is tested for an increase in carbon dioxide with the isotope.
- d. Phlebotomist may be required to provide instructions and assist in this test.

G. Sputum, Throat and Nasopharyngeal Culture Collections

- 1. Sputum is fluid from the lungs, bronchi and trachea and may contain pus, mucus, microorganisms or blood. Sputum is used to diagnose respiratory infections, such as pneumonia or Tuberculosis (TB). TB is caused by an acid-fast bacillus.
- 2. Sputum collection procedure:
 - a. Sputum is best collected early in the morning, when the patient first wakes up. Collections from this time of day are usually more concentrated.
 - b. The patient should take a deep breath and then expectorate (cough deeply and spit the thick material from the lungs) into a sterile container. The patient should avoid spitting saliva into the sterile container.
 - c. A volume of approximately 5 ml (1-2 teaspoons) should be collected. The container is closed and labeled correctly prior to transport to the lab.

3. Since children and infants can't produce sputum, throat and nasopharyngeal cultures are used to diagnose bacterial infections or detect carrier status.
4. Throat cultures are done primarily for diagnosis of Strep Throat.
 - a. Phlebotomists can be trained in collection.
5. Nasopharyngeal swab may be used to diagnose whooping cough, croup and pneumonia.
6. Throat culture procedure:
 - a. Open the package the sterile swab is in. Just loosen the swab but don't remove it from the container until you are ready to swab the back of the throat.
 - b. Have a flashlight or well-lit room to look at the back of the patient's throat.
 - c. Have the patient open wide. Look at the back of the throat for red areas with white patches or blood. (Wiki)



- d. Swab area of throat with reddened areas and patches; place the swab back in the plastic sleeve; squeeze end of sleeve with swab to release media. (BD)



- e. Label with patient information and deliver ASAP to the microbiology department.
- 7. Nasopharyngeal swabs are inoculated by passing a special swab through the nose, into the nasopharynx, carefully rotated, and then removed.
- 8. Nasopharyngeal collections are performed by medical staff with training in this procedure. (CDC)
- H. Skin Tests
 - 1. Skin tests are performed to determine if the patient has been exposed to a specific antigen and has made antibodies to that antigen.
 - 2. Used to aid in the diagnosis of allergies, tuberculosis (TB) and fungal infections.



- 3. Wide range of diseases may stimulate antibody production.



- 4. At some clinics, phlebotomists may be trained to perform skin tests.