Name of student: …… **Stage: First**

Lecture Name: Samples collection and test tubes **Number: 4**

Date: 14 / 4 / 2025 **Time: 8:30 AM** **Place: BC 208**

Sample collection:

Good clinical laboratory practice is an international ethical and scientific standard for designing, conducting, recording and reporting medical tests,

the main objectives of good laboratory practice are:

a) to obtain excellent biological specimens for pathology testing while Ensuring the comfort and safety of the patient and the technician.

b) To preserve the integrity of the specimen to ensure optimum results by:

• Collecting the specimen into the correct container (size, medium, expiry etc.).

• Storing the specimen at the correct temperature.

c) To ensure that the specimen is transported to the laboratory in a safe and timely manner.

Standard Precautions to prevent contamination of specimen and technician

• Always wash hands before and after the collection of specimens.

• Wear gloves when necessary.

• Disposal of needles, syringes and sharps must be into sharps containers.

Sample Collection

• Always identify the patient.

• Select the right equipment required to collect the specimens (blood tubes, swabs, container).

• Once the sample is collected, dispose of any sharps objects immediately.

Specimen identification and labeling:

- every individual blood test tubes, containers, specimen sent to the laboratory must have a label applied to it (not loose in the bag).
- All labels & requisitions must be examined to determine if all information necessary is present & correct.
- For any specimen, there are necessary items that need to be present on the label and they must all be correct or the specimen will be rejected. Adults items include: last name, first name, date of birth, collection date, collection time, collector's initials

Storage of specimens:

- To ensure the quality of results, specimens should be transported to the laboratory as soon as possible. However, if there is a delay, to minimize deterioration we recommend these guidelines be followed.
- Microbiology Specimens: Specimens that should be stored at refrigerator temperature until transport to the laboratory are swabs, Urine, Faeces, Body fluids / aspirates and Tissue samples**.**
- some specimens should be stored at room temperature such as Blood Cultures and Mycology skin scraping.
- Seminal Fluids for infertility Keep at body temperature (to lab within 1 hr.).
- Chemistry / Hematology / Immunology It is preferable and ideal to have all blood specimens sent to the lab as soon as possible.
- Histology Specimens fixed in Formalin at Room temperature.
- Cytology Smears Fixed slides are transported to Lab in slide holders after fixing and air-drying.

Specimen types:

Specimen type	Examples
Blood samples	**Blood, plasma, serum, red blood cells**
Urine samples	**Random, 24 hours**
Stool samples	**Random, 24 hours**
Microbiology specimen	**Swab, urine, sputum, blood, stool**
Microbiology organism	**Actively growing pure culture of microorganism (slant, broth).**
Specials collections	**Cerebrospinal fluid (CSF), Coagulation studies, stones, saliva metal (serum, blood, urine), pathological (nerve, muscle)**

Importance of Proper Sample Collection

1- Accurate Diagnosis

Accurate and reliable test results depend on correctly collected samples. This ensures that the laboratory analysis is conducted on the appropriate material and yields meaningful results.

2- Effective Treatment

Proper sample collection helps to identify the causative agent or underlying condition, guiding the selection of effective treatment strategies and improving patient outcomes.

3- Patient Safety

Following standardized procedures ensures the safety of both the patient and the healthcare professional. Proper collection minimizes the risk of contamination or injury.

4- Research and Development

Reliable samples are crucial for research studies and clinical trials, contributing to advancements in medical knowledge and the development of new diagnostic tests and treatments.

1- Blood samples

Blood: is the red fluid in the body that delivers necessary substances such as nutrients and oxygen to the cells and transport metabolic waste products away from those cells. **It consists of 55% fluid and 45% blood cells.**

Types of blood specimens

- **Whole blood:** A venous, arterial or capillary blood sample collected in anticoagulant tube.
- **Serum:** blood collected without any anticoagulant and centrifuged. Clear supernatant fluid devoid of any fibrin products (clotting factor).
- **Plasma:** blood collected and mixed with anticoagulant and centrifuged. Clear supernatant fluid with thrombosis inhibited. No changes occur in blood.

Blood collection techniques the process of collecting a blood sample is called as phlebotomy.

- Capillary blood collection: capillary blood is a mixture of blood originating from artery, vein and capillary used to obtain blood for rapid analysis.
- Arterial blood collection: used for blood gas analysis, required special training and must be performed by skilled physician
- Venous blood collection: is the most commonly used and it is used for clinical chemistry and serology.

Types of Blood Collection samples: Color- code Tube

2- Urine sample:

Urine analysis consists the following measurement:

A- macroscopic examination or physical examination

B- Chemical examination

C- microscopic examination for sedimentation of urine

physical examination of urine samples involves assessing its **appearance, color, odor, clarity, and specific gravity** to detect possible health conditions. It is the first step in a **urinalysis**

Macroscopic examination

1. **Color:**
2. **Clarity (Transparency):**
3. **Odor:**
4. **Specific Gravity (Density):**

Chemical examination of urine the examination the following substances:

1-Proteins

2-Glucose

3-Ketone bodies

4-Bilirubin

5-Blood

Blood in the urine (hematuria) can be a sign of various medical conditions, ranging from minor to serious. It may appear as **visible red or brown discoloration** (**gross hematuria**) or be detectable only under a microscope (microscopic hematuria) the causes **Urinary Tract Infections and Kidney Stones** and **Bladder or Kidney Infections**.

Microscopic Examination

A sample of well-mixed urine (**10-15 ml**) is centrifuged in a test tube at relatively low speed (**about 2000-3,000 rpm) for 5-10 minutes** which produces a concentration of sediment (cellular matter) at the bottom of the tube. A drop of sediment is poured onto a glass slide, a thin slice of glass (a coverslip) is place

over it and observed under microscope **the observation (red blood cells, white blood cells and epithelial cells and bacteria, yeast, crystals substance).**

3- Stool samples:

Collect it into wide mouth, clean, sterile container

• Min 5 gms is needed if solid stool

• And 2 ml if liquid stool

• It should not be contaminated with urine

• If not possible to collect it as in children, elderly, debilitated patients collect rectal swab

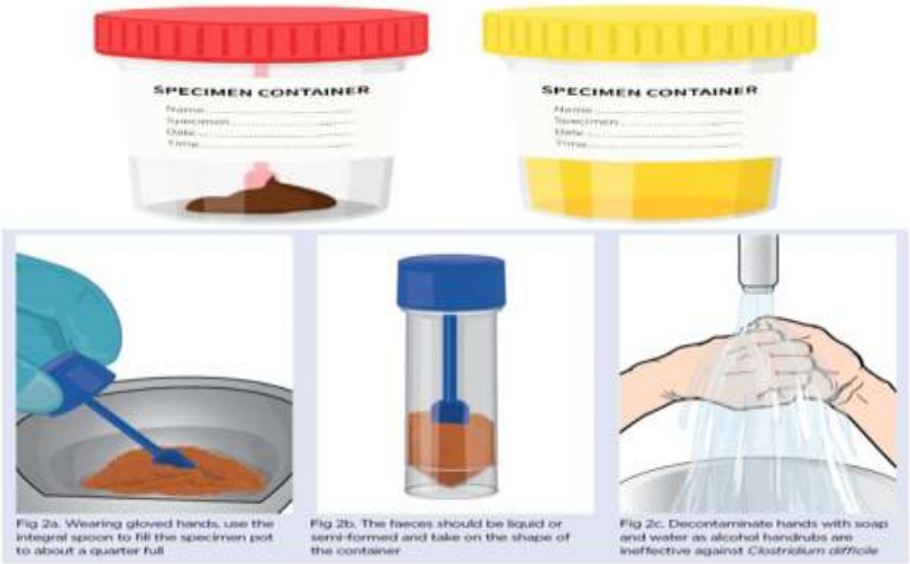
•Do not refrigerate stool samples

•If delay in transport preserve it into 10% formalin, buffered glycerol saline

Normal: The stool appears brown, soft, and well-formed in consistency.

Stool samples are used for various medical tests to diagnose and monitor different conditions affecting the digestive system. Some common uses include:

- **Bacterial Infections**: Identifies bacteria like *Salmonella*
- **Viral Infections**: Detects viruses such as rotavirus
- **Parasitic Infections**: Finds parasites like *Giardia*



4- Swab collection:

is used to collect samples from various body sites for diagnostic testing. The type of swab and collection method depend on the test being performed.

Sterile Swab Selection

Choose a swab appropriate for the collection site and specimen type.

Proper Collection Technique Collect the swab by gently rubbing the site and avoid touching any other surfaces.

Sample Transport

Transport the swab in a sterile container and label it appropriately.

The swabs used to collection of samples:

1- oral and throat swabs: Collected from the throat for bacterial or viral infections.

2- nasal swabs: Used for respiratory virus detection (e.g., COVID-19, influenza).

3- Wound Swabs: Used to detect infections in open wounds.

4- Vaginal Swabs: Used to detect infections in reproductive system.

Sterile Swab for collection samples