Medical Laboratory

NTQF **Level III**

Learning Guide 28

Unit of Competence: Collect and Process Medical Samples

Module Title: Collect and Process Medical Samples

LG Code: HLT MLT3 LO7-LG28

TTLM Code: HLT MLT3TTLM 0919v1

LO7. Prepare sample for testing.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 5 to 11.
3. Read the information written in all Information Sheets. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish all Self-check according to learning session separately
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to next Information Sheet. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to pervious Learning Activity.
7. Submit your accomplished Self-check. This will form part of your training portfolio.
8. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
9. Accomplish the all Self-checks.
10. After you accomplish self check proceed to operation sheet if available.
11. If you perform operation procedure correctly proceeds to LAP. test if available

Learning out comes (objectives): At the end of this module the trainee will be able to:-

- Separation of the samples Physically
- Separation of the samples Chemically
- Preparing Sub-samples and back-up sub-samples that are representative
- Labeling of all sub-samples to ensure traceability and stored in accordance with SOPs.
- Distributing Sub-samples to defined work stations maintaining sample integrity and traceability requirements.
- Sample conditions are monitored and controlled before, during and after processing.
- Defining the preparation and safety procedures are followed to limit hazard or contamination to samples, self, work area and environment.

Information sheet-1	Separation of the samples Physically

7. 1. Separation of the samples physically

Types of Clinical Samples

Clinical samples are mainly distinguished into two types: solid or liquid. Solid samples include pieces of tissues harvested during biopsies or surgery and can be either fresh or fixed in afixative. Liquid samples include bodily fluids such as blood or urine. Depending on the type of downstream processing required, different additives may be added to liquid samples. This section briefly describes each category and provides information on the types of cells typically found in each category.

Information sheet-2	Separation of the samples chemically

7.2. Separation of the samples chemically

Wide variety of specimen type may be collected for store:-

- Blood and blood product/Fractions (Plasma, serum, Buffy coat and red cell)
- Tissue (from surgery Autopsy and transplant)
- Urine, saliva/buccal specimen

Information sheet-3	Preparing Sub-samples and back-up sub-samples that are representative

7.3. Preparing Sub-samples and back-up sub-samples that are representative

If repeat or confirmatory tests cannot be performed, the report will indicate that the specimen quantity submitted was “QNS” (Quantity Not Sufficient) for additional testing. When serum or plasma is to be submitted for analysis, it is good practice to collect a volume of blood that is 2 to2.5 times the volume of serum or plasma needed for the test. As an example, if 4 ml of serum or plasma is needed for a test, collect 8 to 10 ml of blood. If you have confirmed that the specimen collected has no feature of specimen rejection criteria and believed that integrity of the specimen is maintained correctly, it will be recorded on specimen accession list record format.

Information sheet-4	Labeling of all sub-samples to ensure traceability and stored in accordance with SOPs.

7.4. Labeling of all sub-samples to ensure traceability and stored in accordance with SOPs.

A backup sample is one that is taken and stored in case the sample is needed. The backup sample may be an aliquot of the primary sample or may be a second sample taken at the same time.

Step-1 Prepare subsample as a backup

- Preparing a subsample as a backup requires that:
  - ✓ The subsample is representative of the original sample
  - ✓ Neither the subsample nor the original sample are contaminated in any way
  - ✓ Contamination to self, the work area or the environment is avoided
  - ✓ The subsample is clearly labelled to indicate its origin and relationship to the original sample
  - ✓ The subsample is stored correctly to maintain its integrity
  - ✓ The subsample is of the appropriate weight or volume to allow it to be used for backup testing if required
  - ✓ The subsample is stored in such a way as to be readily identifiable and retrievable.

- Step 2.Label backup sample(s) and record information to maintain chain laboratory.

  - ✓ You will remember that when you collected the samples from collection site (Task 2, Step 4) you followed the Chain of laboratory protocol, and that Lab has a Chain of SOP and a Chain of log Sheet.
  - ✓ Review the Chain of laboratory Requirements in the SOP: Chain of laboratory Requirements (in the Methods Manual), to identify the special labels and recording of information a backup sample will require.

Information sheet-5	Distributing Sub-samples to defined work stations maintaining sample integrity and traceability requirements.

7.5. Distributing Sub-samples to defined work stations maintaining sample integrity and traceability requirements.

When organizing laboratory work space, divide the laboratory into areas with different access control in order to separate patients from biological samples. Where samples are actually processed, plan for spatial organization that ensures the best service.

- For optimal organization of the laboratory, consider.

✓ Delineation of laboratory activities—Care should be taken to either group related activities in a single room, or to clearly delineate bench space for specific activities. Measures must be taken to prevent cross-contamination of samples.

✓ Location of service rooms—Service rooms to accommodate autoclaves, sinks for cleaning glassware, preparation and sterilization of culture media, and others, should be located in a central area to minimize distances and facilitate circulation paths of materials, samples, and goods. A responsible staff member should be designated to oversee cleaning and maintenance of the service rooms.

✓ Location of activities with specific requirements, such as: o molecular biology—needs to be located in a separate space, with at least two rooms, so that preparation of DNA extracts is not performed in the same room as where the subsequent steps (preparation of reagent mixes and DNA amplification) are performed; o fluorescence microscopy—requires a dark room with proper ventilation; it must not be used for storage of stock materials and other chemicals; o UV illumination systems for DNA gel photography—requires a dark room and appropriate eye protection equipment.

✓

Information sheet-6	Sample conditions are monitored and controlled before, during and after processing.

7.6. Sample conditions are monitored and controlled before, during and after processing.

- Sample management components

Written policies for sample management must be established and reflected in the Laboratory Handbook. Components to be addressed include:

- ✓ Information needed on requisitions or forms
- ✓ handling urgent requests
- ✓ Collection, Labeling, preservation and transport
- ✓ Safety practices (leaking or broken containers, contaminated forms, other biohazards)
- ✓ Evaluating, processing, and tracking samples
- ✓ storage, retention, and disposal.

Information sheet-7	Defining the preparation and safety procedures are followed to limit hazard or contamination to samples, self, work area and environment.

7.7. Defining the preparation and safety procedures are followed to limit hazard or contamination to samples, self, work area and environment.

- Safety management programme

Often, the responsibility for developing a safety programme and organizing appropriate safety measures for the laboratory is assigned to a laboratory safety officer. In smaller laboratories, the responsibility for laboratory safety may fall to the laboratory manager or even to the quality officer. The steps for designing a safety management programme include:

- ✓ Developing a manual to provide written procedures for safety and biosafety in the laboratory;
- ✓ Organizing safety training and exercises that teach staff to be aware of potential hazards and how to apply safety practices and techniques—training should include information about universal precautions, infection control, chemical and radiation safety, how to use personal protective equipment (PPE), how to dispose of hazardous waste, and what to do in case of emergencies;

- ✓ Setting up a process to conduct risk assessments—this process should include initial risk assessments, as well as ongoing laboratory safety audits to look for potential safety problems.

- General safety equipment

The safety officer should be assigned responsibility for ensuring that there is an adequate supply of appropriate equipment for safety and biosafety, such as:

- ✓ PPE
- ✓ Fire extinguishers and fi re blankets
- ✓ Appropriate storage and cabinets for flammable and toxic chemicals
- ✓ Eye washers and emergency shower
- ✓ Waste disposal supplies and equipment
- ✓ First aid equipment.

- Standard safety practices

Policies should be put in place that outline the safety practices to be followed in the laboratory.
Standard laboratory safety practices include:

- ✓ Limiting or restricting access to the laboratory
- ✓ Washing hands after handling infectious or hazardous materials and animals, after removing gloves, and before leaving the laboratory
- ✓ Prohibiting eating, drinking, smoking, handling contact lenses, and applying cosmetics in work areas;
- ✓ Prohibiting mouth pipetting
- ✓ Using techniques that minimize aerosol or splash production when performing procedures—biosafety cabinets should be used whenever there is a potential for aerosol or splash creation, or when high concentrations or large volumes of infectious agents are used
- ✓ Preventing inhalation exposure by using chemical fume hoods or other containment devices for vapours, gases, aerosols, fumes, dusts or powders
- ✓ Properly storing chemicals according to recognized compatibilities—chemicals posing special hazards or risks should be limited to the minimum quantities required to meet short-term needs and stored under appropriately safe conditions (i.e. flammables in flammable storage cabinets)—chemicals should not be stored on the floor or in chemical fume hoods
- ✓ Securing compressed gas cylinders at all times
- ✓ Decontaminating work surfaces daily

- ✓ Decontaminating all cultures, stocks and other regulated wastes before disposal via autoclave, chemical disinfection, incinerator or other approved method
- ✓ Implementing and maintaining an insect and rodent control programme
- ✓ Using PPE such as gloves, masks, goggles, face shields and laboratory coats when working in the laboratory
- ✓ Prohibiting sandals and open-toed shoes to be worn while working in the laboratory

- Waste management

- ✓ Laboratory waste management is a critical issue. All potentially harmful and dangerous materials (including liquids and radioactive materials) must be treated in a specific way before disposing. Separate waste containers should be used depending on the nature of the waste, and must be clearly identified by a colour code. Specific attention should be given to the management of potentially harmful contaminated waste such as sharps, needles or broken glassware. Sharps containers must be available on work benches so they are conveniently accessible to staff. Disposing of chemical, biological and other wastes according to laboratory policies.

Self-Check 1	Written Test

Answer the Following Questions (2 point each):

1. Which of the following is/are blood and blood product/Fractions
   A. Plasma
   B. Serum
   C. Buffy coat and red cell)
   D. All

2. What are the two main types of specimen?
3. List at least five Standard laboratory safety practices in laboratory.

Note: **Satisfactory rating - 6 points Unsatisfactory - below -6points**

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

3._____

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4._____

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