



**Liaqat International Medical University**

**Faculty of Pharmacy**

**Management of Laboratory Wastes (GUIDANCE)**

**PharmD**

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**Definition:**

It is the clear responsibility of all workers to ensure the safe and correct disposal of all wastes produced in their course work.

**Objective:**

This procedure provides information on the collection, storage and disposal of laboratories waste to:

- Ensure that the collection, storage and disposal of wastes are conducted in an environmentally sound manner.
- Ensure the compliance with environmental and workplace health and safety legislative requirements.
- Minimize the risks to health, safety and the environmental pollution.

**Classification:**

The wastes in the laboratories are categorized hierarchically according to its hazardous properties from high to low into:

1- Radioactive

2-Cytotoxic

3-Clinical

4-Chemical

5-General/Maintenance Recyclable/Green

This guide provides a useful summary of the correct disposal procedure for common wastes in Faculty (university) laboratories:

**I- Chemical Waste:** defined as any waste that is generated from the use of chemicals in laboratory procedures that has the potential to pose a chemical threat to health, safety and/or the environment, or is chemically hazardous. This procedure is responsibility to all staff and students involved.

### **Chemical wastes are divided to:**

#### 1. Liquid Chemical Waste WHICH COULD BE:

A: Sewerable substances could be disposed into the sink and these **MUST BE:**

- (soluble) with water
- Waste **must not** be TOXIC
- Waste **must not** be FLAMMABLE
- Waste solutions must be within a pH range of 6 to 10.

B. Non- Sewerable substances could not be disposed into the sinks and divided broadly into two containers

- Halogenated chemical waste illustrated in **Figure 1**
- Non-Halogenated chemical waste illustrated in **Figure 2**

2. **Solid wastes:** to be treated as chemical waste, they must be sealed in an appropriate and compatible container. Should be sent to a facility that specializes in collection and reprocessing illustrated in **Figure 3**

3. **Oily wastes:** to be treated as chemical waste must be sealed in an appropriate and compatible container. Used oil to be sent to a facility that specializes in used oil collection and reprocessing.

**II- Clinical wastes:** refers to any samples (e.g. tissue, blood, serum, and swabs) that have been in contact with, or used in experiments with a pathological substance and includes pathological waste. They are divided into: illustrated in **Figure 4**

**1-Clinically Contaminated Wastes :** Refers to any material in direct contact with clinical wastes, or in such a manner as to have come into contact with and/or been contaminated with clinical wastes, and is to be disposed of.

**2-Pathological Waste** : Refers to waste of a viral, infectious or contaminated nature. Pathological substances are substances that act as a source, host or carrier of disease. This includes tissue samples, blood samples, faeces, and contaminated equipment such as containers, bags or surgical equipment.

**3-Perceived Clinical Waste** : Is any waste that is typical of a clinical environment and may be confused by waste handlers as being of a clinical nature (e.g. syringes, rubber gloves, face masks, laboratory coats, etc.)

**4-Pharmaceuticals** : Refers to drugs used for the prevention, diagnosis, care or alleviation of a disease, ailment, injury or defect in human or animal.

### **General Waste disposal procedure:**

1-Wash down drains with excess water to dispose:

- Concentrated and dilute acids and alkalis.
- Harmless soluble inorganic salts (including all drying agents such as  $\text{CaCl}_2$ ,  $\text{MgSO}_4$ ,  $\text{Na}_2\text{SO}_4$ ,  $\text{P}_2\text{O}_5$ ).
- Alcohols containing salts (e.g. from destroying sodium).
- Hypochlorite solutions from destroying cyanides, phosphines, etc.
- Fine (TLC grade) silica and alumina.

**It should be noted that the following materials should never be washed down a drain.:**

- Compounds of the following elements: antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, tellurium, thallium, tin, titanium, uranium, vanadium and zinc.
- Organo-halogen, organophosphorus or organo-nitrogen pesticides, thiazine herbicides, any other biocides.
- Cyanides.
- Mineral oils and hydrocarbons.
- Poisonous organosilicon compounds, metal phosphides and phosphorus element.
- Fluorides and nitrites.

2-Solvent Waste collection:

All solvents are collected in small containers during lab time then, transfer all in large bottle to be disposed, this includes:

- All organic solvents including water miscible ones.
- Soluble organic waste including most organic solids.
- Paraffin and mineral oil.

### 3-Laboratory waste bins:

Controlled waste' items which includes dirty paper, plastic, tissues, rubber and wood, should generally be placed in the waste bins available in each laboratory and will be collected by the cleaners. However, each laboratory must also have a container for certain items which are not allowed to be put in the normal waste bins. All broken laboratory glassware, any sharp objects of metal or glass, all fine powders (preferably inside a bottle or jar) and dirty sample tubes or other items lightly contaminated with chemicals (but not any syringes or needles) **SHOULD BE DISPOSED** In these special controlled waste containers.

Laboratory controlled waste containers must be emptied regularly and never allowed to overflow. Under no circumstances must any item of glass, sharp metal or fine powder ever be put in a normal laboratory waste bin. The tops must be removed from all bottles put out for disposal and there should be no detectable smell of chemicals from any bottle put for disposal.

### 4-Glass recycling:

For environmental reasons the recycling of glass is encouraged, but only certain items of waste glass produced within laboratories are acceptable for recycling. Each laboratory should have a bin for recyclable glass. Only clean glass bottles such as those in which chemicals are received, and broken or waste plate glass are allowed. All broken laboratory glassware, items significantly contaminated by chemicals, sample tubes, droppers and glass wool must be disposed of as controlled waste. illustrated in **Figure 5**

### 4-Biohazard/Sharps Disposal - Syringes and Needles:

"Sharps" contaminated with biologically hazardous materials must be collected in special containers. No syringes or needles must ever be put in a laboratory waste bin or controlled waste container illustrated in **Figure 6**

Appendix :

❖ Figures :

- Figure 1: halogenated chemical liquid waste
- Figure 2: Non- halogenated chemical liquid waste
- Figure 3: Solid chemical waste
- Figure 4: Clinical waste
- Figure 5: Classes waste
- Figure 6: Sharps waste



ical liquid

Figure 2: Non- halogenated chemical liquid waste



Figure 4: Clinical waste

waste



Figure 6: Sharps waste



❖ References :

1. <https://www.standrews.ac.uk/staff/policy/healthandsafety/publications/waste/waste-disposaloflaboratorywastesguidance/>
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