

**STANDARD OPERATING
PROCEDURE (SOP)
FOR
BIOMEDICAL
&
HAZARDOUS WASTE
MANAGEMENT**

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INTRODUCTION

The University has defined different types of wastes separately and has designed schemes for proper management from their places of generation to the place of final disposal.

1. What is Waste?

“Waste” means materials, that are not products or by-products, for which the generator has no further use for the purposes of production, transformation or consumption.

2. Biomedical Waste:

Bio Medical Waste by definition is **any waste generated in the diagnosis, treatment or immunization of human beings or animals and /or in research**. In practical sense, it would encompass all the activities related to patient-care, which generated any waste is “Medical waste”.

3. Biomedical - Hazardous Waste:

Any substance, whether in solid, liquid or gaseous form, which has no foreseeable use and which by reasons of any physical, chemical, reactive, toxic, flammable, explosive, corrosive, radioactive or infectious characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or environment, is a hazardous waste. When such type of waste is generated as a result of causes mentioned in point number 2 herein above, it becomes a biomedical-hazardous waste. However, there is a little difference between Biomedical and Biomedical-Hazardous Waste because the Biomedical waste is generally hazardous.

4. Non-Biomedical – Hazardous waste

The non-biomedical hazardous waste can be generated in various science laboratories of the University and workshops.

5. Hazardous Wastes can also be classified into-

- (i) Solid wastes (ii) Liquid wastes (iii) Gaseous wastes (iv) Sludge wastes.

6. Identification of Hazardous Waste Generation:

Identification of waste as hazardous is a first and foremost aspect in hazardous waste management. A team of the experts may be consulted from time to time to update the present level of information and knowledge.

WASTE MANAGEMENT

There is a growing concern all over the world for the safe disposal of Biomedical & Hazardous Wastes generated from anthropogenic & other sources.

A. Biomedical Waste Management:

The Biomedical Hazardous/non-hazardous Waste needs to be disposed off in a secured manner in view of their characteristic properties. There are different steps achieving the aim of proper disposal of the Biomedical & Hazardous Waste.

Correct handling of the biomedical waste at the stages of segregation, collection, transport and ultimate disposal is essential for the health and well-being of patients, hospital staff, community and environment. It is an important aspect of overall Infection

control program as most hospital waste is potentially hazardous, when not segregated and disposed of correctly.

(I) SEGREGATION OF WASTE:

To streamline over all handling of hospital waste, it has been classified into 4 categories. The waste segregation with an ultimate aim of safe handling and disposal has been classified into categories by giving colour coding for collection. Segregation at the point of generation of waste must be in accordance with this colour coding. Category wise waste segregation and collection is of utmost importance.

BIOMEDICAL WASTE SEGREGATION

CATEGORY & TREATMENT OPTION	TYPE OF WASTE	STORAGE
<p>YELLOW (Non- chlorinated Bag)</p> <p>❖</p> <p>INCINERATION</p>	<ul style="list-style-type: none"> ❖ Bandage: soiled & unsoiled ❖ Gauze : soiled & unsoiled ❖ Swabs: soiled & unsoiled ❖ Linen: soiled & unsoiled ❖ Disposable cap(non-plastic) ❖ Apron (non-plastic) ❖ Face mask(non-plastic) ❖ Disposable shoe covers(non-plastic) ❖ Disposable bed sheets ❖ Beddings, Mattresses ❖ Human & animal anatomical waste: Body parts/Dead fetus/ Placenta/Histopathology tissue ❖ Specimen paraffin wax ❖ Discarded medicine ❖ Expired antibiotics ❖ Cytotoxic drugs including the items with cytotoxic drugs along with glass or plastic ampoules, vials ❖ Diapers/Napkins ❖ Cotton balls ❖ Chemicals ❖ Laboratory stocks used for culture ❖ Microbiology Culture, other clinical Lab waste, Blood bag, Live / attenuated vaccines (Autoclave safe plastic bag) 	<p>48 hrs or 3/4th filled whichever is earlier (Bags are collected and deposited in Central waste collection facility from where it is handed over to Synergy)</p> <p>Pre-treat to sterilize in Lab as per NACO/WHO guidelines</p>

CATEGORY & TREATMENT OPTION	TYPE OF WASTE	STORAGE
<p style="text-align: center;">RED (Non- chlorinated Bag)</p> <p style="text-align: center;">❖ AUTOCLAVE ❖ MICROWAVE ❖ SHREDDING</p>	<p>Contaminated waste (Recyclable)</p> <ul style="list-style-type: none"> ❖ IV sets/ Plastic IV bottles ❖ Urobags /Catheters ❖ All plastic tubings ❖ Nebulization mask ❖ Syringes (without needles &fixed needle syringes) ❖ Plastic test tube ❖ Pipettes/ Disposable tips ❖ Plastic vacutainer ❖ Ryles tube ❖ Nasogastric tubes ❖ Suction catheter ❖ Cardiac cannulas ❖ Foleys catheter ❖ ICD tubes /ET tube ❖ Blood set/Drains ❖ Needle cap ❖ Empty alcohol rub &alcohol wash bottle ❖ Gloves- soiled /unsoiled ❖ Disposable cap(plastic) ❖ Apron(plastic) ❖ Face mask(plastic) ❖ Disposable shoe covers (plastic) ❖ Plastic culture bottles ❖ Sample containers plastic 	<p>48 hrs or 3/4th filled whichever is earlier(Bags are collected and deposited in Central waste collection facility from where it is handed over to Synergy)</p>

CATEGORY & TREATMENT OPTION	TYPE OF WASTE	STORAGE
Puncture & leak proof containers with BLUE coloured marking ❖ DISINFECTION RECYCLING	❖ Glass test tubes ❖ Empty glass bottles ❖ Contaminated glass bottles ❖ Glass ampoules containing discarded/Expired medicines except chemotherapeutic medicines ❖ Metallic body implants ❖ Reusable glass slide ❖ Broken ampoules ❖ Broken slides	48 hrs or ¾th filled whichever is earlier (Bags are collected and deposited in Central waste collection facility from where it is handed over to Synergy)

CATEGORY & TREATMENT OPTION	TYPE OF WASTE	STORAGE
WHITE Translucent Puncture Proof Leak Proof Container ❖ AUTOCLAVE ❖ SHREDDING SHARP PIT	❖ Lancets, Blades, Scalpels ❖ Microtomes slides from histopathology ❖ Disposable needles ❖ Razor ❖ Venflon stilet ❖ Vacutainer needles ❖ LP needles ❖ Suture needles ❖ Syringes with fixed needles	48 hrs or ¾th filled whichever is earlier (Container are collected and deposited in Central waste collection facility from where it is handed over to Synergy)

(II) STORAGE:

The waste collected from the hospital shall be stored for not more than 48 hours in Bio-medical waste Storage room located in the premises of the hospital. The entry is restricted to only authorized staff and door closed or grilled so that it is out of reach of animals.

(III) TRANSPORTATION:

The waste shall be collected in specially designed collection vans from the storage area once a day by the contractor.

(IV) FINAL DISPOSAL:

The infectious waste collected is disposed as described in the protocol given below and as per recommendation in BMW Rule 2016 waste disposal management.

The non-infectious waste (Black) is collected by the municipal waste disposal system.

(V) PRE-TREATMENT: -

Pre-treatment will be done only for Microbiology lab waste

- (i) Chemical treatment must be done by using at least 1% hypochlorite solution or any other equivalent chemical reagent.
- (ii) There will be no chemical pre-treatment before incineration.
- (iii) Chlorinated plastics shall not be incinerated.

(VI) DEEP BURIAL

Deep Burial is available since the part of the huge premises of the University campus comes in the Village area. However, the material for deep burial material shall be disposed off only through a certified waste disposal agency/Synergy.

B. Non medical hazardous waste

This SOP will basically cover the Medical group of the University (Medical college and Hospital, Dental College, Pharmacy mainly and other college if the need be) and in the non Medical group The Faculty of Science Faculty of Engineering and Technology

(I) The Medical College and Hospital:

- (i) The College and the Associated Hospital have got several machines which emit radiation. It will be necessary for the Medical College to strictly follow the rules and regulations of the AERB regarding the installation and running of any machine which can emit radiation. The Medical College will regularly procure and update the AERB certificates for each machine.
- (ii) The Medical College will appoint a RSO to ensure the fulfilment of the AERB regulations.
- (iii) The Radiology department if uses the old fashioned process of developer and fixer for the teaching purposes of students of paramedical or medical field, will ensure that the liquid waste is necessarily disposed off in the ETP.

(II) Dental College and Hospital

- (i) If the department of Oral Medicine & Radiology uses the old fashioned process of developer and fixer for the teaching purposes of students of para-dental or dental field, the HOD will ensure that the liquid waste is necessarily disposed off in the ETP.
- (ii) The AERB protocol shall be necessarily followed before & after installation of any machine which may emit radiation. The Principal will ensure obtaining AERB certificate for each such machine.
- (iii) The hospital waste will be segregated as per biomedical waste norms.

(iv) The waste produced as a result of using the old fashioned mercury based filling technique for the purposes of teaching of students of Dental or Para-dental courses, shall be disposed of in a special plastic container which will be disposed of by burring underground through the hired agency.

(III) Pharmacy, Engineering and Technology, Science Colleges

(i) The chemical waste from these units will be of the chemical waste from the laboratories after experiments.

(ii) It will be ensured that it is not disposed off in the basins.

(iii) All such liquid will be collected and sent to the ETP Plant.

C. Collection and Transportation of Hazardous waste

(I) Collection of Hazardous Waste is performed by the specially designated van in which coloured bins are provided by the University for the Specific Type of waste.

(II) The van of the contractor/University visits each college for waste collection between 3:00PM to 4:00PM on all working days.

(III) The waste generated by different labs of the constituent colleges/hospital of the university shall be collected in the specified waste collection bins.

(IV) After collection all the waste will be transported to the storage/treatment site located in the University for further processing for disposal.

INFRASTRUCTURE

A. The Biomedical waste management unit

(I) The University has installed the necessary basic machinery for incineration, autoclaving, chemical disinfection, shredding & also deep burial facility in a remote corner of its campus and handed over to a certified Government agency by the name of Synergy Waste Management Company for effectively managing the facility.

(II) The University has entered into an agreement with the Synergy Waste Management company for collection and disposal of biomedical and hazardous waste in a scientific manner.

B. ETP & STP Units

(I) The University has installed two ETP Units for the scientific treatment of liquid biomedical waste.

(II) Almost all the places, which require the facility of ETP are connected by a separate line with the ETP plant. However, the liquid from those places which could not be connected with the ETP plant through a pipe line is collected in containers and is disposed off in the ETP through a special inlet valve.

- (III) After treatment of the liquid biomedical waste, the treated liquid goes to the STP which has also been installed by the University.

C. The Management

- (I) The University provides colour coded bags for the collection of waste material at the sight of its generation.
- (II) The University provides the colour bins and containers for storage of the waste of different types within the hospital and other colleges and departments of the University.
- (III) The University has constructed the waste storage facility for the temporary storage of waste material.
- (IV) The Synergy Waste Management Company also provides the vans for transportation of Biomedical and hazardous waste.
- (V) The University has purchased its own waste disposal vans for collecting the different types of waste including the biomedical and hazardous waste separately also.

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