

**5**

BIO MEDICAL WASTE MANAGEMENT

5.1 INTRODUCTION

Bio medical waste (BMW) may be defined as any solid, fluid or liquid waste material including its container and any other intermediate products which is generated during short term and long term care consisting of observational, diagnostic, therapeutic and rehabilitative services for a person suffering or suspected to be suffering from disease or injury or during research pertaining to production & testing of biologicals during immunization of human beings. From total quantity of waste generated by health care activities almost 80-90% is general waste comparable to domestic waste. This comes from the administrative and housekeeping functions of Hospital and laboratories. The balance 10-20% of waste is considered hazardous and / or infectious. This lesson discusses about biomedical waste management.



OBJECTIVES

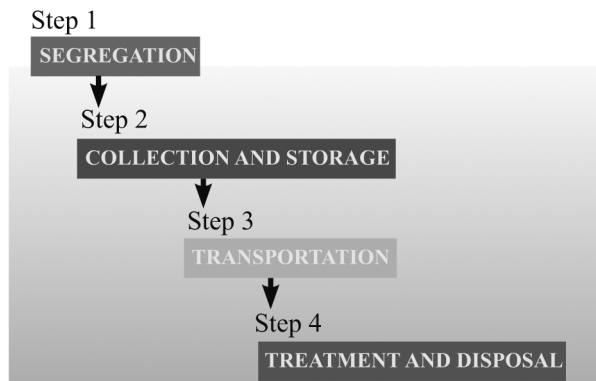
After reading this lesson, you will be able to:

- describe the concept of bio medical waste management
- explain steps of bio medical waste management
- segregate and dispose waste materials appropriately



Notes

Steps of biomedical waste management:



Segregation should be done as per categories.

| Category | Type of Container | Colour coding |
|--|--------------------------|-------------------------------|
| 1. Human anatomical waste | Plastic bag | yellow |
| 2. Animal waste | Plastic bag | yellow |
| 3. Microbiology and Biotechnology waste | Plastic bag | yellow/red |
| 4. Waste sharp | Puncture proof container | Blue/white |
| 5. Discarded Medicines and cytotoxic waste | Plastic bag | Black |
| 6. Solid soiled waste | plastic bag | yellow/red |
| 7. Solid waste | plastic bag | blue(all disposable plastics) |
| 8. Liquid waste | – | – |
| 9. Incineration ash | plastic bag | black |
| 10. Chemical waste (solid) | plastic bag | black |



INTEXT QUESTIONS 5.1

Match the following

- | Waste | Colour Coding |
|-----------------------------|---------------|
| 1. Human Anatomical waste | a. Blue/white |
| 2. Vials of cytotoxic drugs | b. Red |
| 3. Plastic IV Bottles | c. Yellow |
| 4. Needles | d. Black |

Location of containers: All containers having different coloured plastic bags should be located at the point of generation of waste i.e. near diagnostic services areas.

Bags: It should be ensured that waste bags are filled upto only three fourth capacity, tied securely and removed from the site of the generation regularly and timely.

Certain categories of waste, which may need pre-treatment (decontamination / disinfection) at the site of generation such as plastic and sharp materials, etc, should be removed from the site of generation only after treatment.

Storage of Waste

- No untreated BMW should be stored beyond 48 hours.
- If necessary to store beyond 48 hours, the authorized person must take permission of the prescribed authority.
- The authorized person should ensure that waste does not adversely affect human health and environment.

Transportation

Within the hospital

- Waste routes should be designated and separate time should be earmarked for BMW to reduce chances of its mixing with general waste.
- Dedicated wheeled trolleys are used and they should be cleaned and disinfected in case of any spillage.
- Trolleys should not have any sharp edges and should be easy to clean.

Outside the hospital

- BMW shall be transported only in vehicles authorized by competent authority as specified by government.

Treatment and Disposal of Waste

General waste

- Most of the waste (80-90% generated in the hospital is general waste). This waste is non toxic and non infectious and comprises of paper, left over food articles, peels of fruits, disposable and paper container for tea / coffee etc, card board boxes, outer cover or wrappings.
- These general wastes should be put into black coloured polyethylene bags and deposited at the municipal dumps- It is subsequently collected by local civic authorities.
- Safe disposal by local municipal authority.



Notes



Notes

Bio medical waste

- Always remember to disinfect and mutilate the waste before its final disposal
- Remember the following while treating the bio medical waste
 - Anatomical waste to be deep buried
 - Syringes to be cut (with hub cutters) and chemically disinfected with 1% bleaching powder solution at source of generation before final disposal into sharps pit
 - Infected plastics to be chemically disinfected or autoclaved, shredded and recycled and sent for final disposal into municipal dumps

Incineration: The specific requirements regarding norms of combustion efficiency and emission level have been defined in BMW rules 1998.

- Suitably designed pollution control devices should be installed.
- Incinerator should be certified from pollution control board.
- In case of small hospitals, joint facilities for incineration can be developed.
- The chlorinated plastic bags should not be incinerated.
- Waste to be incinerated shall not be chemically treated with any chlorinated disinfectants.
- The functioning of the incinerator and the number of cycles operated per day should be documented in a log book.
- Regular monitoring of the process should be done as per CPCB norms.
- The ash produced by incinerator should be sent for secure land filling and should also be periodically checked for toxic metals.

Deep Burial: BMW rule 1998 mentions waste under category 1 and 2 can be accorded deep burial and this shall be an option available only in towns with population less than five lakhs and in rural areas. The location of the deep burial site will be authorized by the prescribed authority and it should be distant from residential areas and it should be ensured that no contamination occurs of any surface waste or ground water. The area should not be prone to flooding or erosion.

Autoclave and Microwave: Category 3, 4, 6 & 7 can be treated by these techniques.

Shredding: Plastic (IV bottles, syringes, catheter etc.), sharps (needles, blade, glass) should be shredded after chemical treatment/ microwaving/ autoclaving.

Needle Destroyers: They can be used for disposal of needles directly without chemical treatment.

Secured landfill: Incinerator ash, discarded medicines, cytotoxic substances and solid chemical waste should be treated by this option.

Sharp pit: Sharp waste can be disposed in a circular or rectangular pit, after disinfection. Pit can be dug and lined with bricks, masonry or concrete rings. The pit should be covered with heavy concrete slab which is penetrated by galvanized steel pipe projecting about 1.5m above the slab with an internal diameter of upto 20mm. Pit should be 2-5m deep and 1-2m wide (WHO) When pit is full it can be sealed completely, after another has been prepared. It should be half filled with waste, and then covered with lime within 50 cm of surface before filling the rest of the pit with soil.



Notes

Safety Measures

Health Care Workers (HCW) require following Personal Protection Equipments (PPE):

- Gloves
- Masks
- Protective glasses
- Plastic aprons
- Gum boots for waste handlers
- Hepatitis B and Tetanus immunization

All accidents while doing therapeutic, diagnostic and handling waste should be recorded. All waste handlers should be made aware of risks involved in handling BMW.

Training

Entire HCW should be made aware of BMW Rule 1998 through training programmes



INTEXT QUESTIONS 5.2

Match the following

Lab specimen

PPE

- | | |
|---------------------|-------------------------------------|
| 1. Blood collection | (a) Gloves and Mask |
| 2. Sputum | (b) Gloves, Mask, Apron and Goggles |
| 3. Blood products | (c) Gloves |
| 4. Urine specimens | (d) Gloves, Mask |

MODULE

Microbiology

Bio Medical Waste Management



Notes



WHAT YOU HAVE LEARNT

- The biomedical waste is the waste that is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto, or in the production or testing of biological components.
- Steps of biomedical waste management are a) segregation b) storage c) transport d) disposal.
- The biomedical wastes are categorized into ten according to its characteristics taking into account treatment and disposal.
- The treatment options for biomedical waste as per the schedule I of the Rules are incineration, deep burial, autoclave, microwave, chemical treatment, destruction and shredding, and disposal in secured land fills.



TERMINAL QUESTIONS

1. Define and classify biomedical waste.
2. Describe the steps of biomedical waste management.



ANSWERS OF INTEXT QUESTIONS

5.1

1. (c)
2. (b)
3. (d)
4. (a)

5.2

1. (b)
2. (d)
3. (a)
4. (c)