

MEDICAL WASTE MANAGEMENT

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WHAT IS A MEDICAL WASTE?

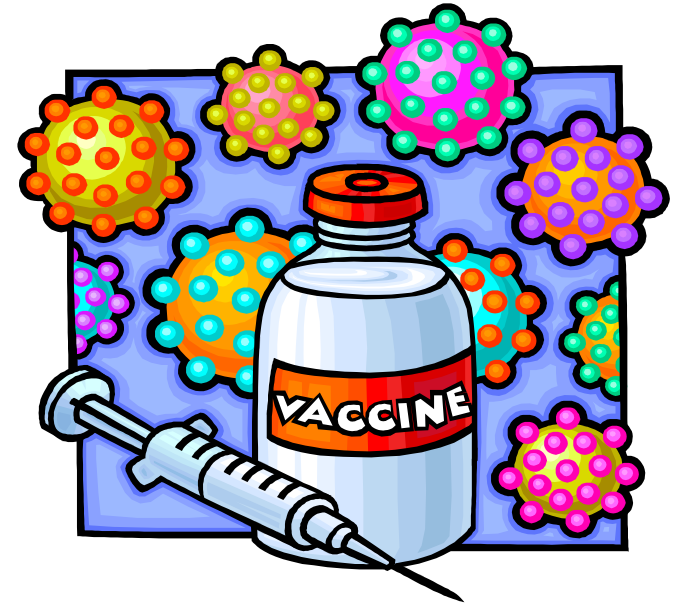
Definition :

Medical waste includes

- ✧ all infectious waste
- ✧ hazardous
- ✧ any other wastes

■ Generated from all types of health care institutions

- ✧ Hospitals
- ✧ Clinics
- ✧ doctor's
- ✧ medical laboratories.



CATEGORIES OF BIOMEDICAL WASTE

| Category | Type of waste | Treatment & disposal |
|------------|--|--|
| Category 1 | Human anatomical wastes | Incineration/ deep burial |
| Category 2 | Animal wastes | Incineration/deep burial |
| Category 3 | Microbiology and biotechnology waste | Local autoclaving/microwaving /incineration |
| Category 4 | Waste sharps like Needles, syringes, scalpels, blades, glass etc | Disinfection (Chemical/autoclaving/mi cro waving and mutilation/shredding |
| Category 5 | Discarded Medicines and cytotoxic durgs | Incineration/destruction and disposal in land fills |

CATEGORIES OF BIOMEDICAL WASTE

| Category | Type of waste | Treatment & disposal |
|-------------|---|---|
| Category 6 | Soiled wastes Items contaminated with blood and body fluids including cotton, dressings, soiled plaster, linens, bedding, other materials, contaminated with blood | Incineration / autoclaving/microwaving |
| Category 7 | Solid wastes Wastes generated from disposable items other than waste sharps such as tubing, catheters, IV sets | Disinfection by chemical treatment/autoclaving/microwaving and mutilation and shredding |
| Category 8 | Liquid wastes Laboratory, blood banks, hospitals, house etc. | Disinfection by chemicals and discharge into drains |
| Category 9 | Incineration ash | Disposal in municipal landfills |
| Category 10 | Chemical wastes | Chemical treatment and discharge into drains for liquid and secured land |

NEW Categories

| Waste Category | Type of waste | Treatment And Disposal Option |
|----------------|--|---|
| Category No. 1 | Human Anatomical Waste (Human tissues,organs, body parts) | Incineration (Incineration/deep burial) |
| Category No. 2 | Animal Waste (Animal tissues, organs, body parts, Bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals and colleges, discharge from hospitals, animal houses) | Incineration Incineration/deep burial |

Category No.3

Microbiology & Biotechnology Waste
(Wastes from clinical samples, pathology, hematology, biochemistry, blood bank, laboratory culture, specimen of live micro organisms or attenuated vaccines, infectious agents from research and industrial laboratories)
vaccutainer(non sharp)

Local autoclaving/ microwaving /chemical treatment



F/b mutilation/shredding



Secured landfill/
Recyclable

Category No.4

Waste Sharps (Needles, syringes, scalpels blades, glass,

Local autoclaving/ microwaving /chemical treatment



F/b mutilation/shredding



Secured landfill/recyclable

Category No.5

Discarded Medicine and Cytotoxic drugs (Wastes comprising of outdated, contaminated and discarded

Incineration / destruction and disposal in secured landfills
(varies from drug to

Category No.6

Soiled Waste (Items contaminated with body fluids including cotton, dressings, soiled plaster casts, linens, bedding and other materials contaminated with blood.

Incineration

(Incineration / autoclaving / microwaving)

Category No.7

Solid Waste (Waste generated from disposable items **other than the waste sharps** such as tubing, catheters, intravenous sets, etc.)
Like cat-2 ??

Local autoclaving/
microwaving /chemical
treatment



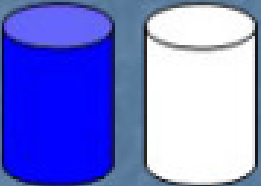

F/b mutilation/shredding

Secured landfill/

Category No.8

Chemical Waste (Chemicals used in production of biological, chemicals used in disinfecting, as insecticides, etc.)
Like cat 5 ??

Chemical treatment and discharge into drains for liquids and secured landfill for solids.

| Color code | Type of container | Waste category | Treatment options |
|--|---|--|--|
| Yellow  | Plastic bags | Human and animal wastes , Microbiological and biological wastes and soiled wastes cat-1,2,3 and 6 | Incineration /deep burial |
| Red  | Disinfected container/ plastic bag | Microbiological and biotechnological wastes , soiled waste, solid waste category 3,6,7) | Autoclaving / Micro waving / chemical treatment |
| Blue /white transparent  | Plastic bags /puncture proof container | Waste sharps and solid waste category 4 and 7) | Autoclaving / Micro waving /chemical treatment, Destruction and shredding |
| Black  | Plastic bag | Discarded medicines , cytotoxic drugs , incineration ash and chemical wastes | Disposal in secured land fills |

Difference b/w old and new guideline

(1000)

- 1) Apply to those health care center having >1000 pt./month
- 2) Apply all type of waste including municipal solid waste, radioactive substance, batteries waste, hazardous chemical.
- 3) cat.3 and cat.6-red/yellow bag
cat.7-red/blue
cat.4-blue bag
- 4) 10 categories of waste.

(2011)

- 1) Apply to all health care center irrespective of no. of patients.
- 2) Not Apply to municipal solid waste, radioactive substance, batteries waste, hazardous chemical (separate act for it)
- 3) cat.3—red bag and cat.6---yellow bag
cat.7-red bag
cat.4- red bag
- 4) Only 8 categories of waste.

WHAT IS A REGULATED MEDICAL WASTE?

Definition of Regulated Medical Waste include seven distinct categories:

1. Cultures and stocks of infectious agents.
2. Human pathological wastes (e.g. tissues, body parts)
3. Human blood and blood products
4. Sharps (e.g. needles and syringes)
5. Certain animal wastes
6. Certain isolation wastes (e.g. Sputum, Stool)
7. Unused sharps.

WHAT IS AN INFECTIOUS WASTE?

EPA categorizes infectious wastes into the following seven categories:

1. Isolation wastes – wastes generated by hospitalized patients.
2. Cultures and stocks of infectious agents includes:
 - Specimens from medical and biological laboratories.
3. Human blood and blood products – this includes waste blood, serum, plasma.

WHAT IS AN INFECTIOUS WASTE?

4. Pathological waste – tissues, organs, body parts, blood, and body fluids.
5. Contaminated sharps – contaminated hypodermic needles, syringes, Pasteur pipettes, and broken glass.
6. Contaminated animal carcasses, body parts, and animal bedding
7. Miscellaneous Wastes include:
 - Wastes from surgery and autopsy
 - Miscellaneous laboratory wastes
 - Dialysis unit wastes

INFECTIOUS WASTE MANAGEMENT PLANS

1. Designation of the waste that should be managed as infectious
2. Segregation of infectious waste from the noninfectious waste
3. Packaging
4. Storage
5. Treatment
6. Disposal
7. Contingency measures for emergency situations
8. Staff training

SEGREGATING MEDICAL WASTES

- ✓ do not combine medical waste with hazardous chemicals or radioactive waste.
- ✓ Sharps should be stored in puncture-proof containers.
- ✓ Separate pathology wastes.
- ✓ Separate chemotherapy wastes.



PACKAGING INFECTIOUS WASTE

- Plastic bags

- for many types of solid or semisolid infectious waste.

- Bottles, flasks, or tanks

- for liquids.

- ✓ Place liquid wastes in capped/ tightly stopped bottles.

- ✓ Do not compact infectious wastes before treatment.

HANDLING SHARPS

- ✓ Risk for spreading blood-borne infection:
- ✓ Due to
 - During recapping of needles
 - Failing to dispose of used needles
 - Accidental breakage of glass test tube.



STORAGE

- ✓ Locating the storage area near the treatment site.
- ✓ Minimizing storage time.
- ✓ Proper packing .
- ✓ Limited access
- ✓ Displaying universal biological hazard symbol on storage area.

MEDICAL WASTE HANDLING

Three methods

1. By a healthcare professional employed & facility.
2. By contract with a transporter registered.
3. By parcel post, or courier service (sharps only).



ON-SITE (Final) TREATMENT

There are several methods .

1. Incineration
2. Thermal inactivation
3. Gas/Vapor Sterilization
4. Sterilization by irradiation
5. Chemical Disinfection
6. Autoclaving

AUTOCLAVING

- ✓ Steam sterilization :-
 - low-density material such as plastics, bottles, and flasks.
 - High-density plastic should not be used in this process.

INCINERATION

Particulate Matter

1. Carbon Monoxide
2. Dioxin
3. Sulfur Dioxide
4. Hydrogen Chloride
5. Nitrogen Oxides
6. Cadmium
7. Lead
8. Mercury



THERMAL INACTIVATION

- ✓ Treatment of waste with high temperatures.
- ✓ Liquid waste is collected in a vessel and heated by heat exchangers.
- ✓ The types of pathogens in the waste determine the temperature and duration of treatment.

CHEMICAL DISINFECTION

- ✓ **Consider the following:**
 - Type of microorganism.
 - Degree of contamination.
 - Amount of proteinaceous material present.
 - Type of disinfectant.
 - Other factors such as temperature, pH.

GAS/VAPOR STERILIZATION

- ✓ Gas/vapor sterilization uses gaseous & chemicals.
- ✓ Ethylene oxide is the most commonly used agent.

STERILIZATION BY IRRADIATION

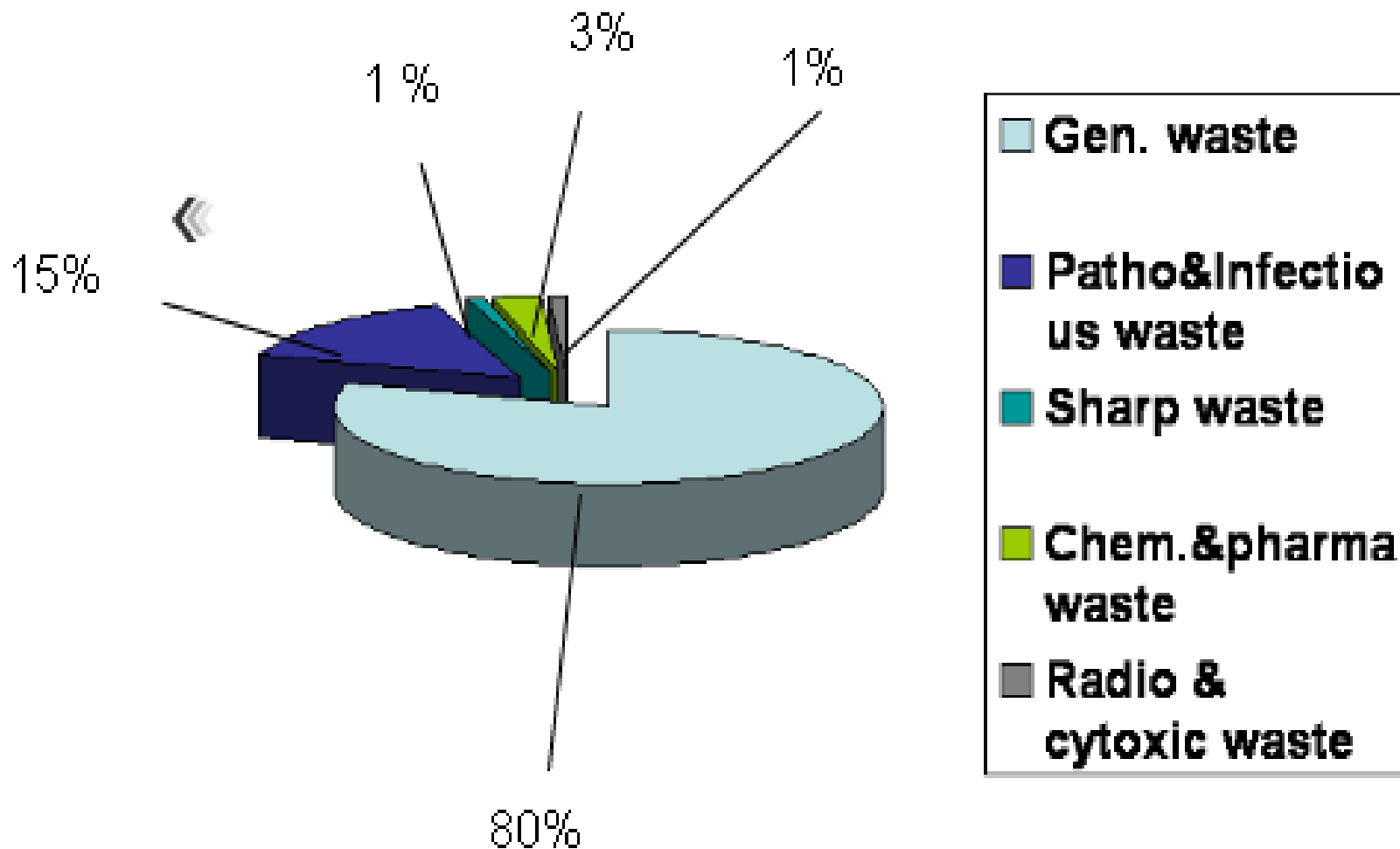
❖ **Advantages :**

- ✓ Electricity requirements are nominal.

❖ **Disadvantages:**

- ✓ Capital costs are high.
- ✓ Highly trained personnel are required.

PROPORTIONS IN HOSPITAL WASTE



DECONTAMINATION

- A solution of 5.25% sodium hypochlorite (household bleach / Clorox) diluted between 1:10 and 1:100 with water.
- Lysol for tuberculocidal disinfectant.
- Wear gloves and lab coat.
- Wash hands.