NARAYANA
COLLEGE OF NURSING

BIO MEDICAL WASTE MANAGEMENT

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NELLORE

Let the Waste of the "Sick" not contaminate the lives of "The Healthy"

DEFINITION

- **Hospital waste:** refers to all waste, biological or non biological, that is discarded and is not intended for further use .

- **Medical waste**: refers to materials generated as a result of patient diagnoses, treatment, immunization of human beings or animals .

DEFINITION

- **Infectious waste:** are the portion of medical waste that could transmit an 'infectious disease'.

- **Pathological waste :** waste removed during surgery/ autopsy or other medical procedures including human tissues, organs, body parts, body fluids and specimens along their containers.

Sources of health care waste

- Government/private hospitals
- Nursing homes
- Physician/dentist office or clinic
- Dispensaries
- Primary health care centers
- Medical research and training centers
- animal./slaughter houses
- labs/research organizations
- Vaccinating centers
- Bio tech institutions/production units

BIO MEDICAL WASTE

NON HAZARDOUS (75-90%)

- Infectious
- Non sharps
- Plastic disposals
- Liquid wastes

HAZARDOUS (10-25%)

- Other hazardous
- Radio active
- Discarded glass
- Pressurized containers
- Chemical waste
- Cytotoxic waste
- Incinerator ash

Why Bio Medical Waste Regulated ?

- 1. To minimize the potential for **spread of disease** from a medical settings to the general public.
- 2. To reduce the overall amount of infectious medical waste produced.
- 3. Prevention of **Environment pollution**.
- 4. Infectious agents may become toys of terrorists, as ***Bio-weapons of Mass Destruction***

INCIDENCE

- No national level study
- Local /regional level study shows hospitals generate roughly 1-2 kg/ bed/day.

- A survey done in Bangalore revealed that the quantity of BMW generated in hospitals are

1. govt. hospitals ----- ½ to 4 kg/bed/day
2. private hospitals ----- ½ to 2 kg/bed/day
3. nursing homes ----- ½ to 4 kg/bed/day

SOURCES OF WASTE

1. **Infectious waste-** **lab cultures, tissues, swabs, equipments and excreta.**
2. **Pathological waste-** **human tissue or fluids e.g. body parts, blood other body fluids.**

Pathological waste

3.pharmaceutical waste- expired and contaminated medicines.

- **4.Genotoxic waste-**
  - Cytotoxic drugs, genotoxic chemicals.
- **5.Chemical waste-**
  - Expired Lab reagents, film developer, disinfectants.
- **6.Waste with high content of heavy metals-**
  - Batteries, broken thermometers.

Waste containing heavy metals

BROKEN MERCURY THERMOMETERS

- **8. Pressurized containers-**
- Gas cylinders, gas cartridges.

Pressurized containers

- **9. Radioactive waste-**
- Unused liquid in radiotherapy

Radioactive waste

Hazards of BMW

- 1. Infectious wastes and sharps cause **transmission of infections** like HIV Hepatitis B and C.

- 2. Chemical and Pharma waste **toxic, corrosive, flammable, reactive** and shock sensitive.

- 3. Genotoxic and Radioactive wastes are responsible for toxicity ranges from the headache , nausea and vomiting to the skin reactions and **malignancies**.

- 4. **Public sensitivity** for visual impact of anatomical wastes.

Biomedical Waste Management Process

- 1. Source Identification.
- 2. Segregation.
- 3. Collection and storage.
- 4. Transport.
- 5. Treatment and Disposal.

1. Source identification

2. SEGREGATION

- **"Separation of different types of waste as per treatment and disposal options."**

- It is the key to the active process of scientific waste management.

3. COLLECTION AND STORAGE

- Storage of waste refers to storage within wards or collection points within the departments.
- Collection centers are planned between 2-3 wards.
- Central collection.
- Common Treatment Facility (CTF)

4. TRANSPORT

- Transportation system should be secured with special containers and well defined route with minimum patient influx.
- The containers should have non-washable and prominently visible label showing the type of waste it contains – **Cytotoxic or Biohazrds.**

5. TREATMENT AND DISPOSAL

- The main objectives of treatment are
  - *disinfecting and decontaminating* the waste and
  - volume reduction.

Types of disposal of waste

INCINERATION

- **Method of choice** for most hazardous health care waste.
- **High temp dry oxidation process**.
- Reduces organic and combustible waste to inorganic and incombustible material.
- Significant **reduction in waste volume** and weight.

INCINERATORS

SINGLE CHAMBER INCINERATOR

DRUM/BRICK INCINERATION

AUTOCLAVING

- Autoclaving is efficient thermal disinfection process.
- Commonly used for reusable medical equipments.
- Effective inactivation of all the ***micro-organism*** and ***bacterial spores*** at **121 degree C temperature** and **30 psi pressure** for **3 minutes holding time**.

CHEMICAL DISINFECTION

- Most suitable for treating liquid waste such as **infected blood, urine, stools, or hospital sewage**.

- Chemicals are added to waste to kill the pathogens.

MICROWAVE IRRADIATION

- Microorganisms are destroyed by the action of microwave at -

- a frequency of about 2450 MHz and

- a wavelength of 12.24 nm.

The Microsynth system is a multimode microwave that can accomodate reaction volumes up to one liter. (Source: Milestone Inc.)

LAND DISPOSAL

- Whatever may the modality of waste treatment, final product has to be taken to the land.

- Two types of methods –
- **1. Open dump.**
- **2. Sanitary landfill.**

Land Disposal Facility for Cities & Towns

Category No. 4	Waste Sharps (Needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps)	Disinfecting (chemical treatment@@ / autoclaving / microwaving and mutilation / shredding
Category No. 5	Discarded Medicine and Cytotoxic drugs (Wastes comprising of outdated, contaminated and discarded medicines)	Incineration@ / destruction and drugs disposal in secured landfills
Category No. 6	Soiled Waste (Items contaminated with body fluids including cotton, dressings, soiled plaster casts, lines, bedding and other materials contaminated with blood.)	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.)	Disinfecting by chemical treatment@@ / autoclaving / microwaving and mutilation / shredding

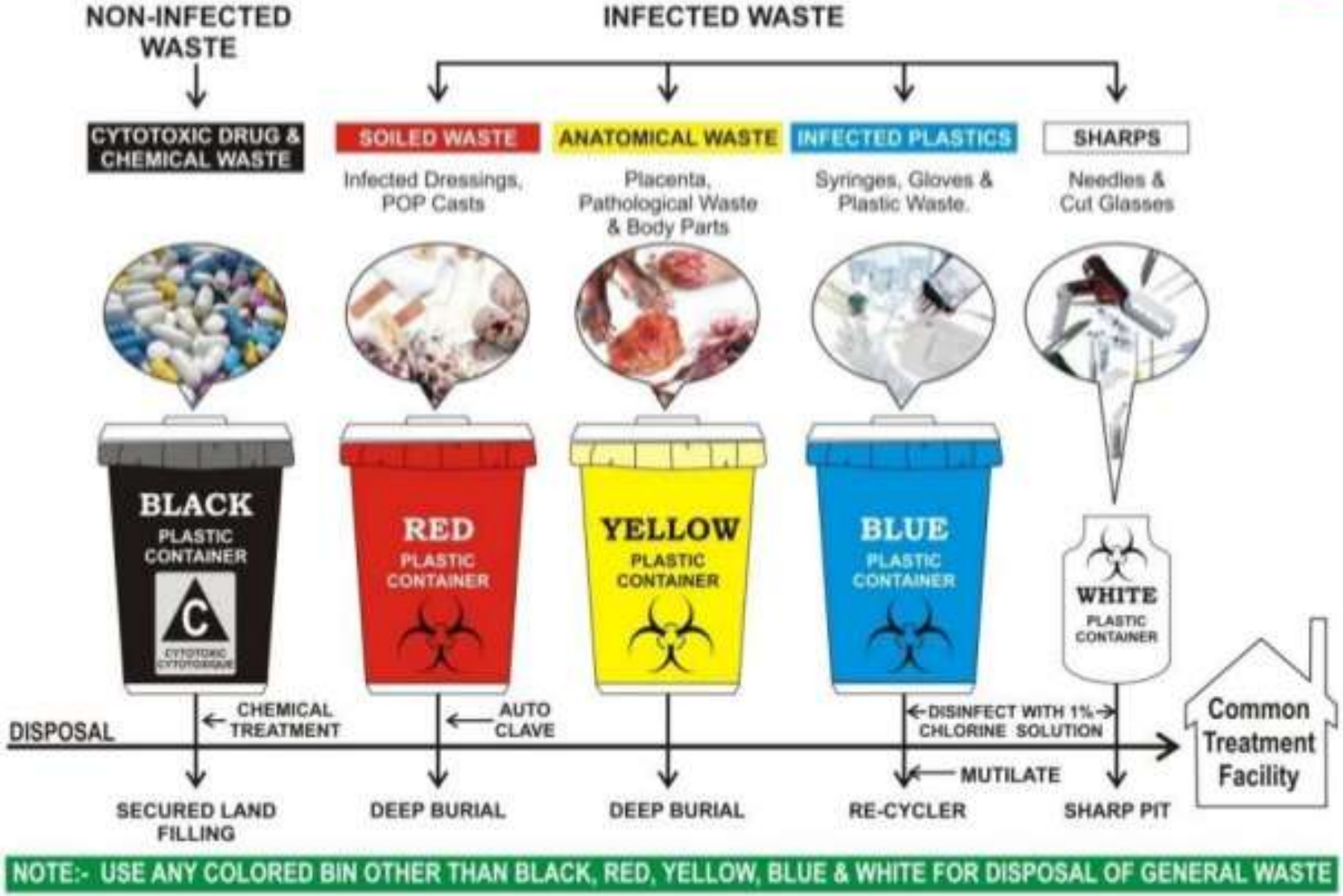
CATEGORIES OF BIOMEDICAL WASTE SCHEDULE – I

WASTE CATEGORY	TYPE OF WASTE	TREATMENT AND DISPOSAL OPTION
Category No. 1	Human Anatomical Waste (Human tissues, organs, body parts)	Incineration@ / deep burial*
Category No. 2	Animal Waste (Animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals and colleges, discharge from hospitals, animal houses)	Incineration@ / deep burial*
Category No. 3	Microbiology & Biotechnology Waste (Wastes from laboratory cultures, stocks or specimen of live micro organisms or attenuated vaccines, human and animal cell cultures used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins and devices used for transfer of cultures)	Local autoclaving/ microwaving / incineration@

COLOR CODING FOR SEGREGATION OF BMW 1998

COLOR	WASTE	TREAT
Yellow	Human & Animal anatomical waste / Micro-biology waste and soiled cotton/dressings/linen/beddings etc.	Incineration/DB/
Red	Tubings, Catheters, IV sets.	Autocl/microwav /chemical treatment
Blue / White	Waste sharps (Needles, Syringes, Scalpels, blades etc.)	Autocl/microwav /chemical treatment/destr uction/shredding
Black	Discarded medicines/cytotoxic drugs, Incineration ash, Chemical waste.	Disposal in land fields

SEGREGATION OF SOLID BIO-MEDICAL WASTE



NOTE:- USE ANY COLORED BIN OTHER THAN BLACK, RED, YELLOW, BLUE & WHITE FOR DISPOSAL OF GENERAL WASTE