

- **LECTURE NO**
- **TOPIC** : Biomedical/ hospital waste management
- **DEPTT** : Community medicines
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**LET THE WASTE OF THE
“SICK” NOT CONTAMINATE
THE LIVES OF
“THE HEALTHY”.**

K.PARK

LEARNING OBJECTIVES

1. Define Hospital Waste
2. Classify hospital waste
3. Describe the health hazards and key disease of improper hospital waste disposal in pakistan
4. Describe the appropriate methods of disposal of hospital waste

DEFINITION OF WASTE

- Every thing is made for a defined purpose any thing that is not intended for further use is called waste.

- **Hospital waste** is “Any **waste** which is generated in the diagnosis, treatment or immunization of human beings or animals or in research” in a **hospital**. This is also called ‘Bio-Medical Waste’ (BMW).
- **Hospital Waste** Management means the management of **waste** produced by **hospitals** using such techniques that will help to check the spread of diseases through.

Medical Waste Generation in Asia

Country	Waste generation (kg/bed/day)	Total waste generation (tons/year)
Bangladesh	0.8 - 1.67	93,075 (only in Dhaka)
Bhutan	0.27	73
China	-	730,000
India	1 - 2	330,000
Malaysia	1.9	-
Nepal	0.5	365
Pakistan	1.06	250,000
Sri Lanka	0.36	6,600 (only in Colombo)
Thailand	0.68	
Metro Manila (Philippines)		17,155
Vietnam	2.27 (Hanoi)	60,000

Developed Countries- 1-5 kg/bed/day, with variations among countries.

Developing Countries: 1-2 kg/patient/day

Classification of Hospital Waste:

WHO CLASSIFICATION

Non-Hazardous:

Waste Categories	Description and Examples
1. General Waste	No risk to human health eg: office paper, wrapper, kitchen waste, general sweeping etc.
2. Pathological Waste	Human Tissue or fluid eg: body parts, blood, body fluids etc.
3. Sharps	Sharp waste eg: Needle, scaples, knives, blades etc.
4. Infectious waste	Which may transmit bacterial, viral or parasitica disease to human being, waste suspected to contain pathogen eg: labrotory culture, tissues (swabs) bandage etc.
5. Chemical waste	Eg: Labrotory reagent, disinfectants, Film Developer
6. Radio-active waste	Eg: unused liquid from radiotherapy or lab research, contaminated glasswares etc.

Hazardous:

CLASSIFICATION OF HOSPITAL WASTE

Non-Hazardous Waste

Bio-degradable

Non bio-degradable

Potentially Infectious Waste

Dressings, swabs, laboratory wastes, instruments used in patient care..

Potentially Toxic Waste

Radioactive

Chemical

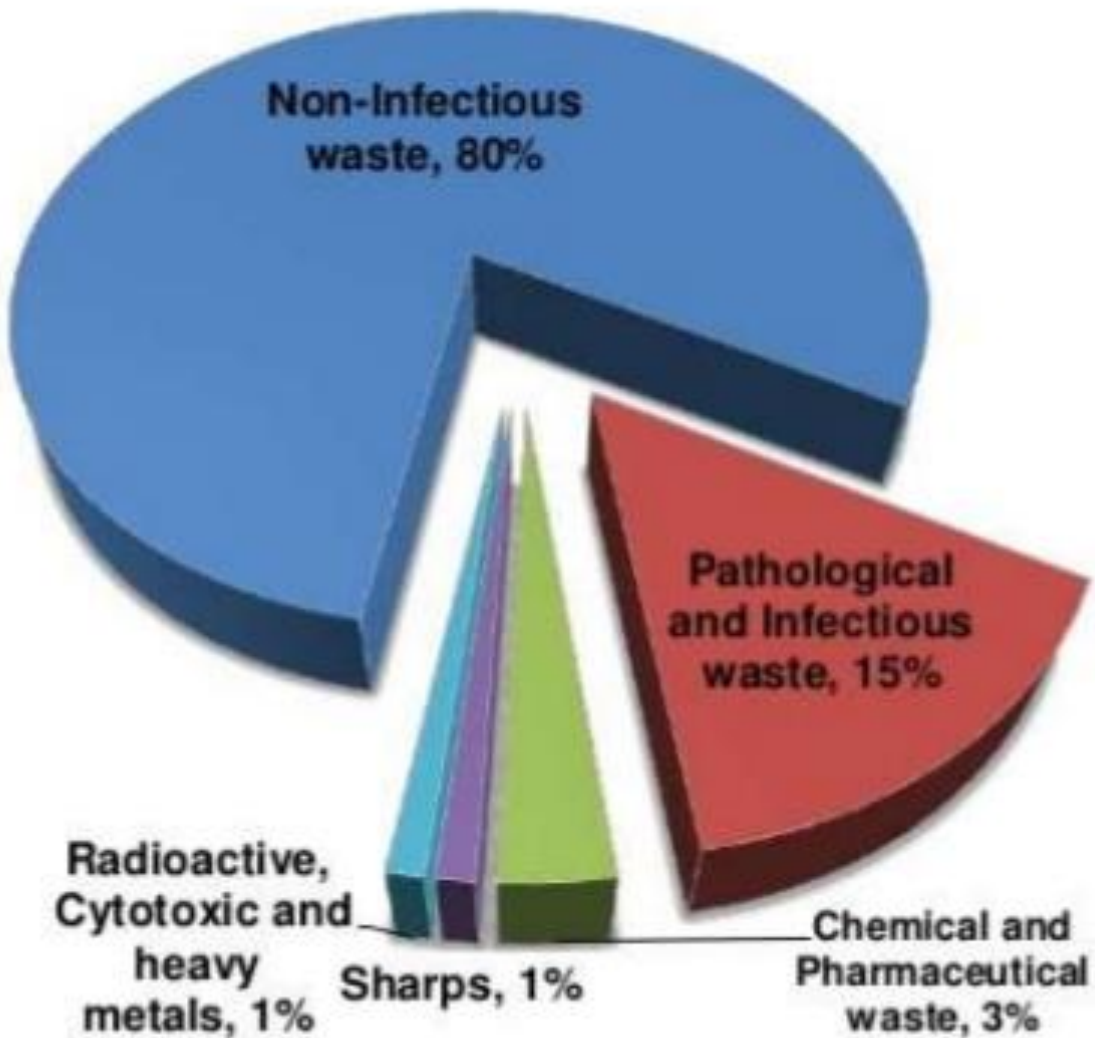
Pharmaceutical

Categories OF BIOMEDICAL WASTES

WASTE CATEGORY	TYPE OF WASTE
Category No. 1	Human Anatomical Waste
Category No. 2	Animal Waste
Category No. 3	Microbiology & Biotechnology Waste
Category No. 4	Waste Sharps
Category No. 5	Discarded Medicine and Cytotoxic drugs
Category No. 6	Soiled Waste
Category No. 7	Solid Waste
Category No. 8	Liquid Waste
Category No. 9	Incineration Ash
Category No.10	Chemical Waste

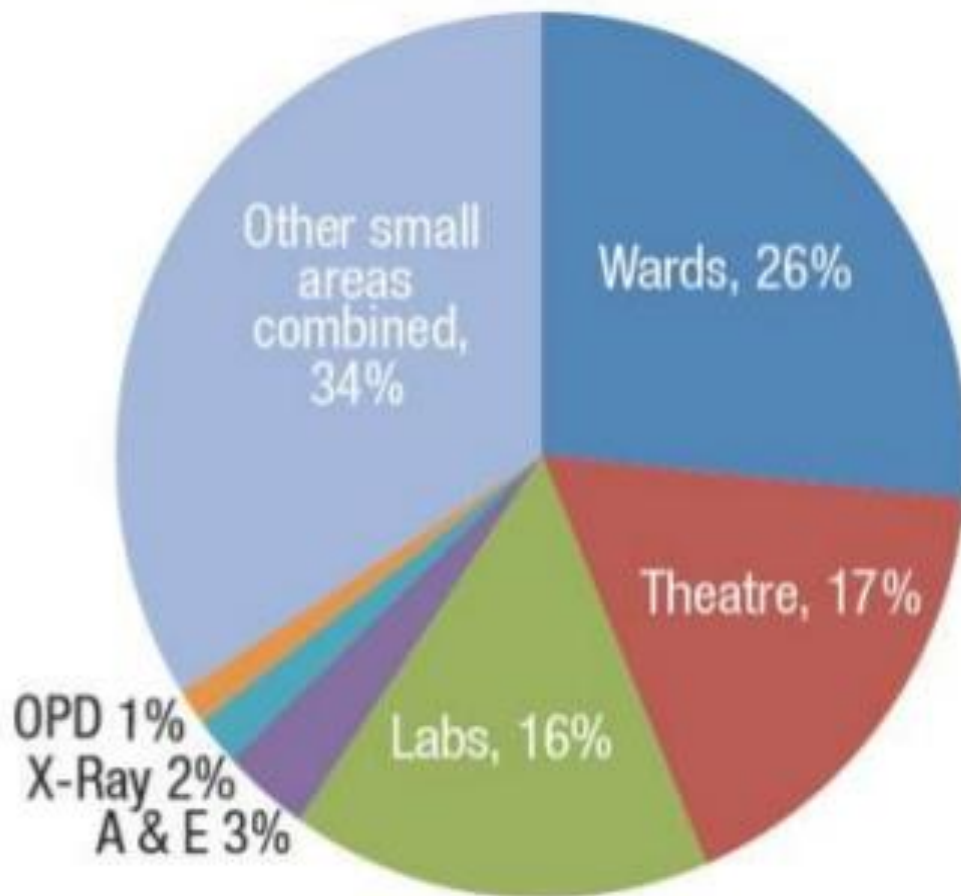
Composition:

Bio-Medical Wastes



Sources of Hospital Waste

Main sources of healthcare risk waste



Health Risks from Poor Hospital Waste Management

Injuries from sharps leading to infection to all categories of hospital personnel and waste handler.

Risk of infection outside hospital for waste handlers and scavengers and at time general public living in the vicinity of hospitals.

Risk associated with hazardous chemicals, drugs to persons handling wastes at all levels

WHO ARE AT RISK?

- Doctors
- Nursing staff
- Ward staff
- Housekeepers
- Patients & visitors
- Community
- Environment



Health Hazards:

1. Infection

2. Genotoxicity and Cytotoxicity

In genetics, **Genotoxicity** describes the property of chemical agents that damages the genetic information within a cell causing mutations, which may lead to cancer.

Cytotoxicity is the quality of being toxic to cells.

3. Chemical toxicity

4. Radioactivity hazards.

5. Physical injuries

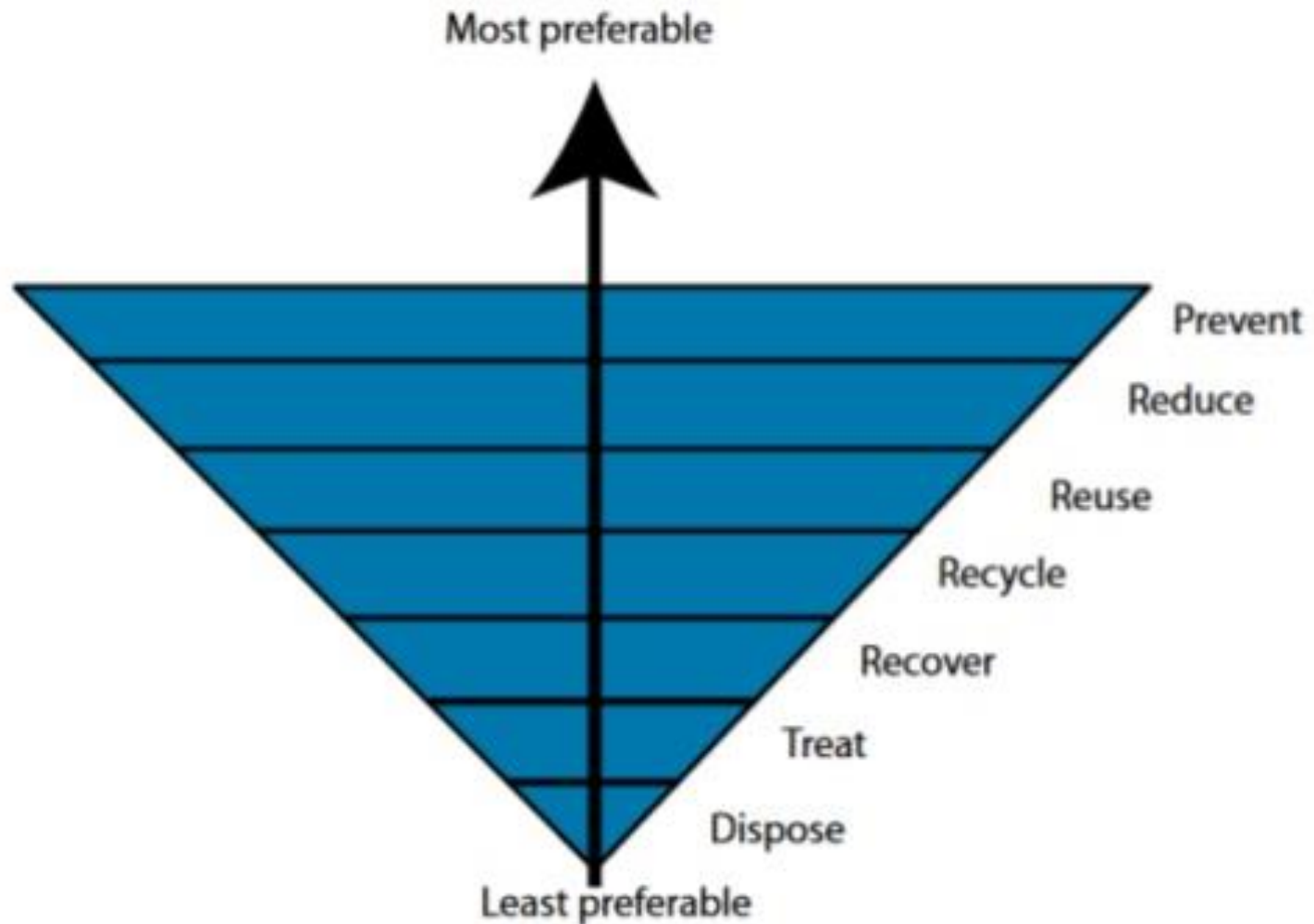
6. Public sensitivity.

Management of Healthcare Waste

Effective Waste Management needs:

- National Policy, Strategy, Plan, Guidelines and SOP
- Legislation/ Rules for waste management
- Political commitment
- Committed manpower
- Good Management
- Proper budgetary allocation

Waste Management Hierarchy



The waste-management hierarchy

Most favoured option

Reduce

lowering the amount of waste produced



Reuse

using materials repeatedly



Recycle

using materials to make new products



Recovery

recovering energy from waste

Treatment: Disinfecting, detoxicating, turning inert



Landfill

safe disposal of waste to landfill

Least favoured option

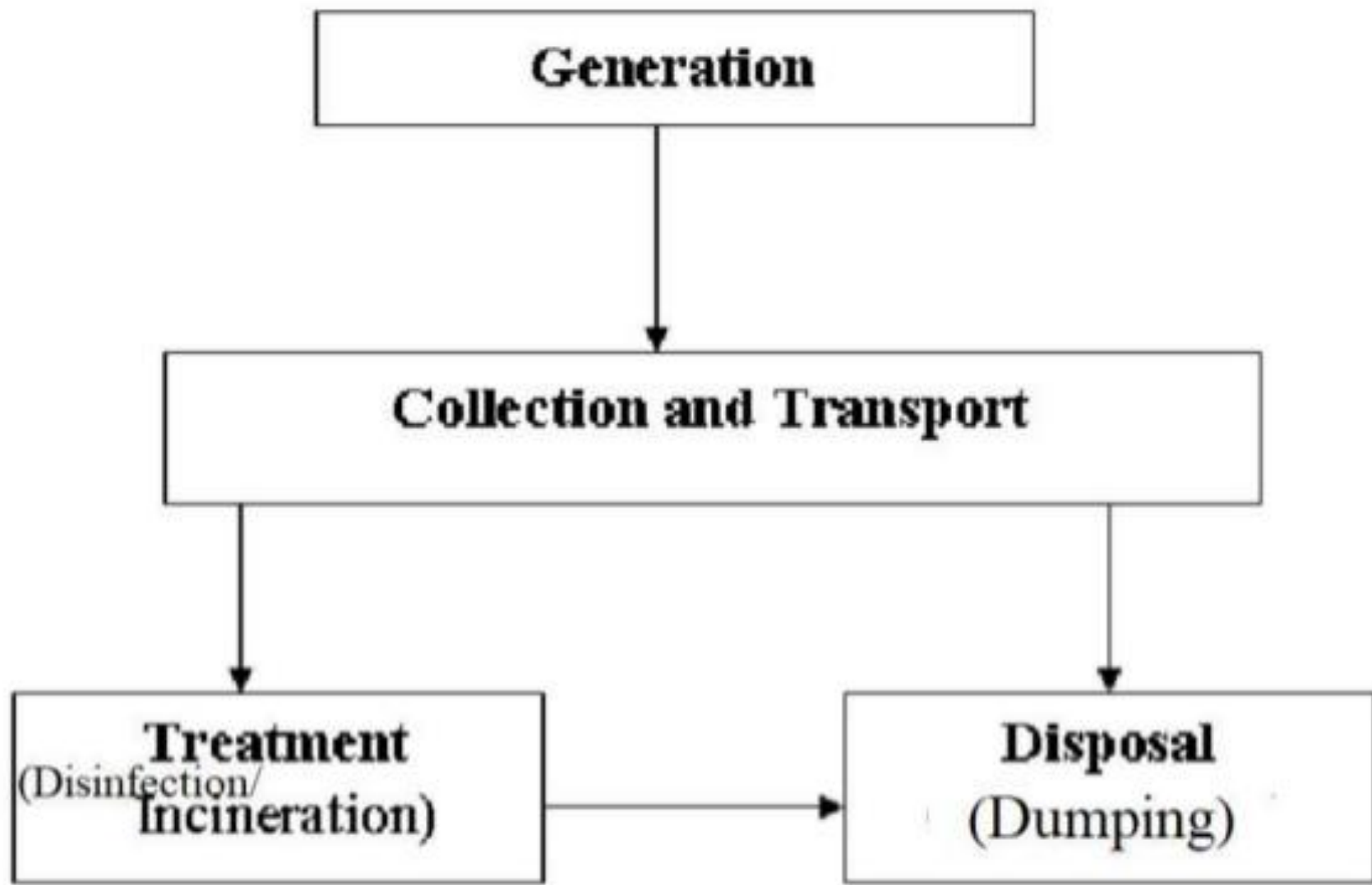
WHO Hospital Waste Management Cycle



Steps in Management of Hospital Waste

Steps in the management of hospital waste include : -

- Training and Awareness
- Generation
- Segregation / separation
- Collection
- Transportation
- Storage
- Treatment
- Final disposal



Waste Minimization

Waste minimization is a process of elimination that involves reducing the amount of [waste](#) produced in society and helps to eliminate the generation of harmful and persistent wastes.

Waste Minimization Techniques

Source Reduction

Recovery, Reuse, Recycling (on-site or off-site)

Product Change

Process Change

Good Practices

- Product substitution
- Change in composition
- Change in concentration

- Change in input material
- Better process control
- Technology change or modification
- Change in operation

- Improved segregation
- Procedural measures
- Loss prevention
- Better management practices
- Material handling improvement

- Recovery and return to original process
- Recovery and use as a raw material for another process

- Processing for resource recovery
- Processing to create a useful by-product

Waste Identification

- An appropriate way of identifying the waste is by sorting the waste into different **COLOR CODE**.
- Color code is **easy for identification** and thereby easy for **safe handling, transportation and waste treatment**.
- The color code **varies from country to country**

WHO Recommended Colour Code

Type of waste	Color code
Highly infectious	Red
Infectious, Pathological, Anatomical	Yellow
Sharp	Yellow colored box
Chemicals, Pharmaceuticals	Brown
Radioactive	Silver
General waste	Black



Infectious



Sharp



Liquid



General

- If waste is properly segregated, small amount are needed for disposal instead of large quantity of waste, ultimately related manpower, related cost, related risk lowered.
- If segregation is not properly done, small quantity of hazardous waste has a chance to mix with large volume of non-hazardous waste making the whole volume into hazardous waste.

Waste Handling

Waste handling means the links between packing, storage and transportation of medical waste from every area of the institution by designated individual.

Out-Fit of Waste-Handler



Waste Collection

- Collectors must wear **protective materials**.
- Collection of waste in colored bag or **colored covered bins**.
- Content of the container should not exceed three quarter of its capacity.
- If bag is used for waste collection, **tie the neck tightly**.
- Avoid throwing, dragging over floor or **holding the bottom of the containers**.



Transportation

In-house transportation

- Means transportation of waste from the site of origin or collection to temporary storage area within the institution.
- Waste should be transported by designated trolley, through the designated route according to time schedule given by the institutional authority.

Temporary in-house storage

- The store will be a room or area or building within the health care facility depending upon the quantity and quality of waste production and frequency of waste collection.
- Normally waste should not be stored **more than 24 hours**.

Record Keeping

- Accurate record keeping is needed for effective medical waste management.
- Record keeping might give some important information , which are needed for:
 - a. Assess the recurrent expenditure
 - b. Assess the quality and quantity of generated waste

Treatment and Final Disposal of Hospital Waste

Principles are:

- **Incineration** (Destruction) (Temp over 850 degree Centigrade)
- **Chemical disinfection**
- **Render inert**



References

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