Bio-medical waste

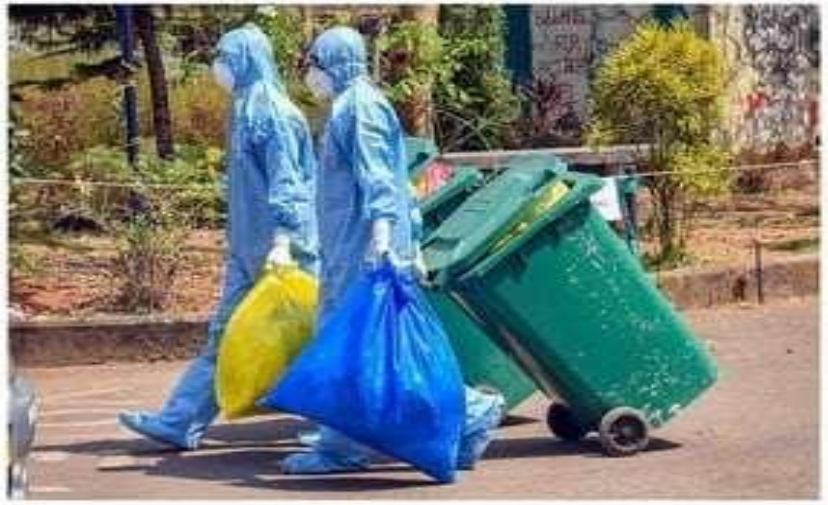
Definition:

Biomedical waste is defined as any waste produced during the diagnosis, treatment, or vaccination of humans or animals, as well as during related research projects, biological product manufacturing, or testing.

What is Biomedical Waste Management?

The safe and effective handling, treatment, and disposal of waste produced in healthcare settings is known as **biomedical waste management**.

Medical care is vital for our life, health and well being, But the waste generated from medical activities can be hazardous, toxic and even lethal because of their high potential for diseases transmission.



The hazardous and toxic parts of waste from health care establishments comprising infectious, bio-medical and radio-active material as well as sharps (hypodermic needles, knives, scalpels etc.) constitute a grave risk, if these are not properly treated/disposed or is allowed to get mixed with other municipal waste.

Types of Medical Waste

Infectious waste

Sharps waste

Pharmaceutical waste

Radioactive waste

Non-hazardous waste

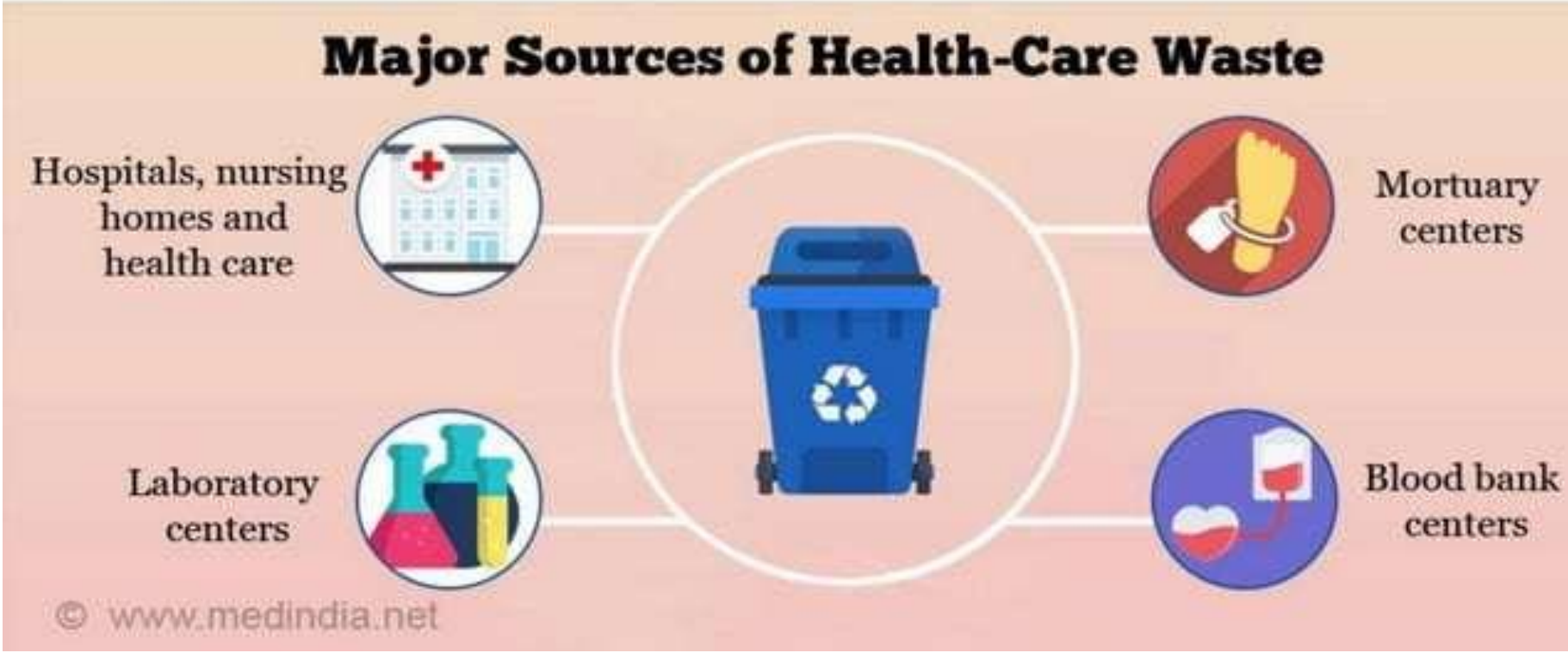
What are the Types of Medical Waste?

1. **Infectious wastes:** These are materials contaminated by water and body fluids, cultures and stocks of infectious organisms, and patient wastes from isolation wards.
2. **Pathological waste:** These include tissue material of humans, organs, fluids, and animal carcass.
3. **Sharps waste:** These include used needles, syringes, disposable scalpels and blades.
4. **Chemical waste:** Materials like heavy metals in devices, solvents in laboratory reagents and detergents.
5. **Pharmaceutical waste:** Waste materials that include unused, contaminated, expired drugs and vaccines.
6. **Genotoxic waste:** Hazardous, mutagenic, carcinogenic and cytotoxic drugs in cancer treatment and metabolites.
7. **Radioactive waste:** Products including radioactive diagnostic and therapeutic materials.
8. **Non-hazardous waste:** Materials that are not biological, chemical or radioactive hazards.

What are the Sources of Health-Care Waste?

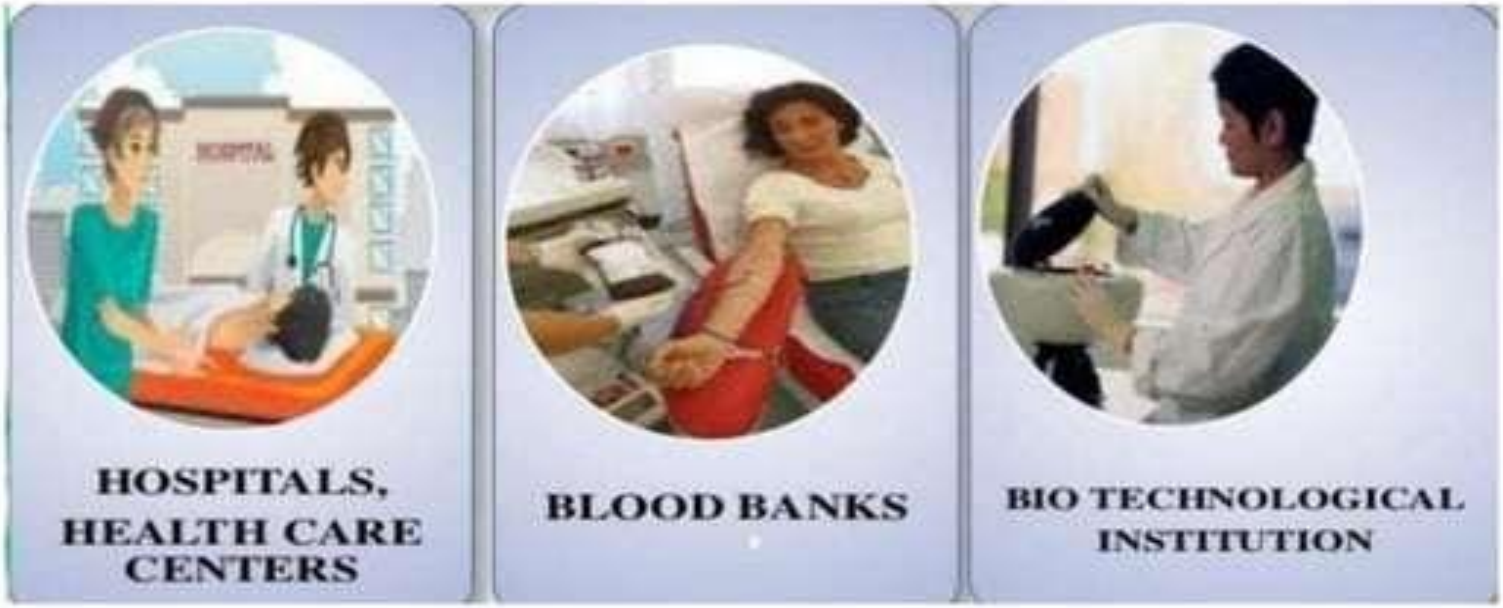
The major sources of health care waste are:

1) Hospitals, nursing homes and health care facilities
2) Diagnostic research and laboratory centers
3) Blood bank/Autopsy and mortuary centers
4) Animal research centers
5) Palliative and rehabilitative centers
6) Blood bank and pathology centers



Minor Sources of Biomedical waste

1. Physicians/ dentists' clinics
2. Animal houses/slaughter houses.
3. Blood donation camps.
4. Vaccination centers.
5. Acupuncturists/psychiatric clinics/cosmetic piercing.
6. Funeral services.
7. Institutions for disabled persons



What are the Health Impacts of Health Care Waste?

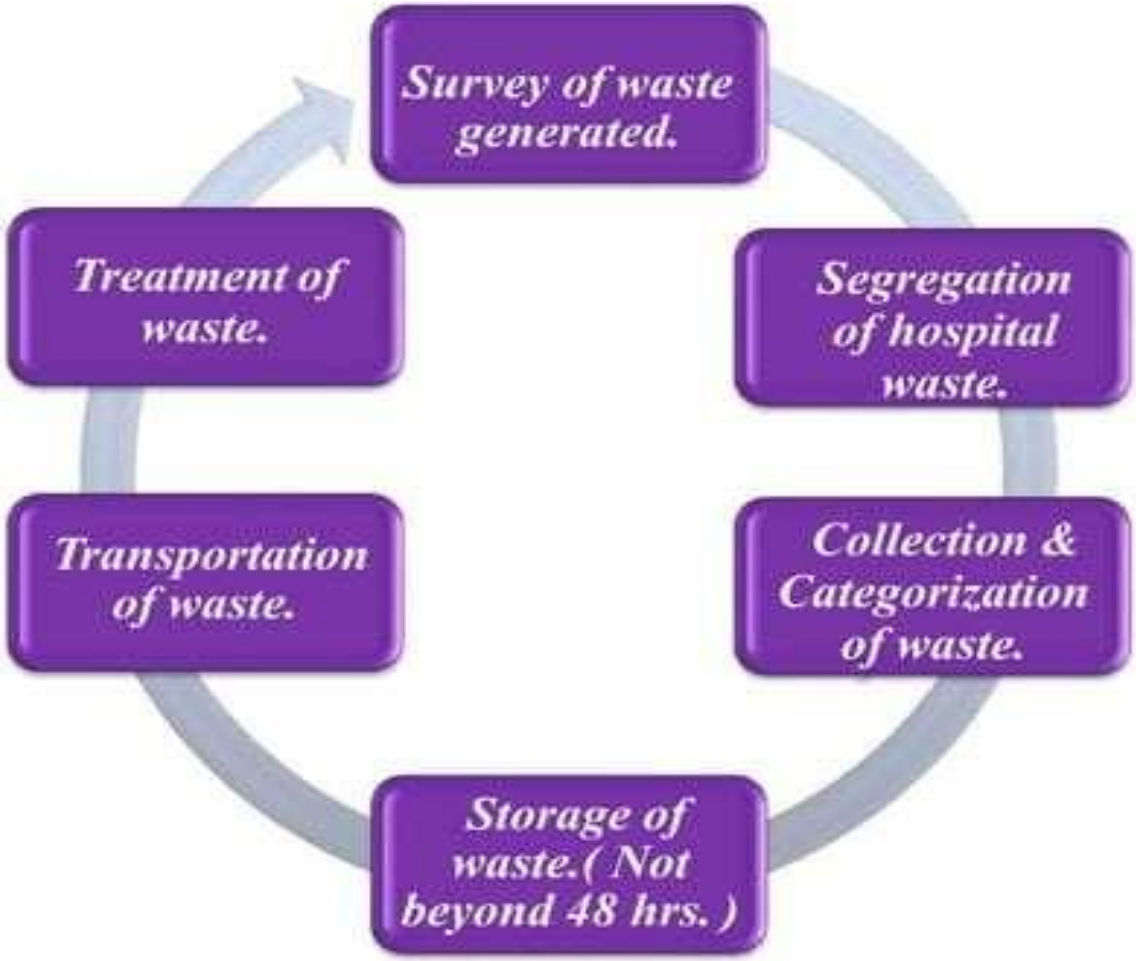
1) **Exposure to toxic chemicals** like mercury, xylene and formalin can result in **chemical injuries** among health personnel and patients in contact.
2) Improper disposal and lack of properly designed landfills result in **contamination of water and exposure to toxic wastes.**
3) Inadequate incineration can result in **toxic air pollution**; the failure to use proper filters adds to the release of such pollutants into the air. Incineration of chlorine containing waste produces dioxins that are **carcinogens.**
4) Lack of segregation of the biomedical wastes can risk an exposure to sharps among the workers of waste disposal and treatment. Even one **needle stick injury from an infected source** patient can result in 30% risk of Hepatitis B virus, 1.8% risk of Hepatitis C virus and 0.3% risk of Human immunodeficiency virus.
5) **Open waste dumping** results in piling up of the waste which attracts insects; these dumps during in the rains become breeding areas for the insects and as sources for vectors which **spread infectious disease.**
6) Pouring of the antibiotics into the drain results in the **killing of required microbes and altering the environment that helps in the breakdown of biological matter in septic tanks.**

Why do Waste Management Practices Fail?

- Management of waste requires diligent knowledge and practice. Though there are laws available and implemented, there still exists a failure in proper waste disposal. Some of the concerns that require to be addressed are:

1. Lack of awareness of health hazards related to health care waste.
2. Lack of training on proper waste disposal practices.
3. Absence of available constructed waste disposal systems.
4. A low priority level even after knowing the harmful effects of improper waste disposal.
5. A lack of funds and resources towards constructing waste disposal systems.
6. Occupational risks to health care waste exist but have not been efficiently addressed.

Steps In The Management Of Biomedical Waste



Segregation of Biomedical Waste

Yellow

Human/Animal anatomical waste
Soiled waste, Expired medicine
Chemical waste, Body fluid, Clinical waste

Red

Contaminated waste (Recyclable)
Plastic bags, Bottles
Pipes, Container, Catheters

White

Scalpels, Blades, Needles
Syringes with fixed needle
Sharp metals, Needle tip cutter

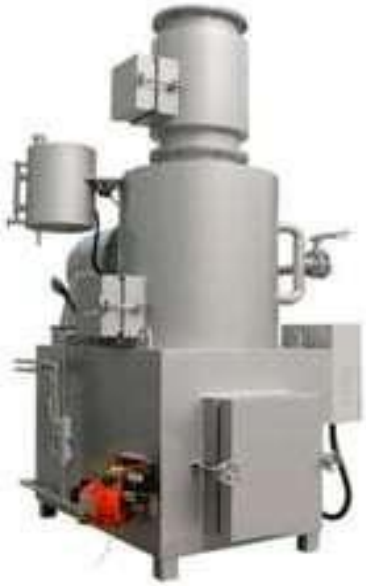
Blue

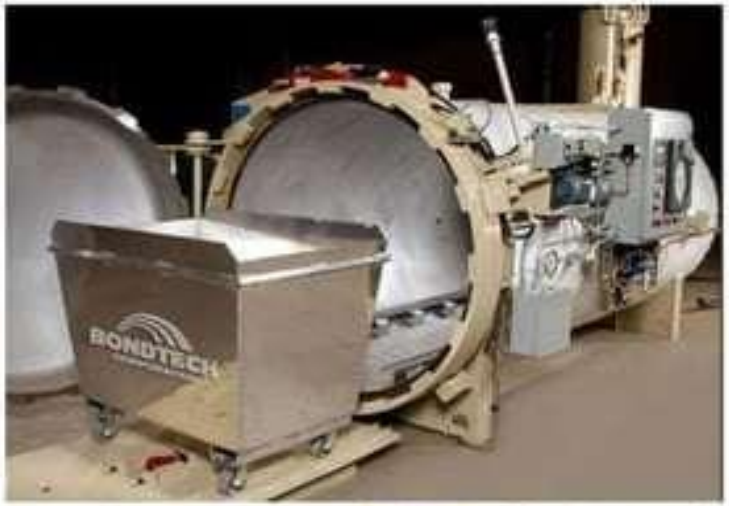
Broken glassware, Cytotoxic waste
Metallic body implant
Contaminated glasses including medicine vials

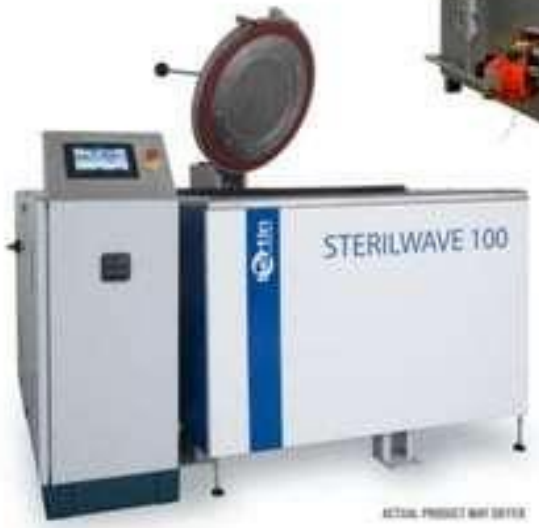
COLOR	WASTE	TREATMENT
Yellow	Human & Animal anatomical waste / Micro-biology waste and soiled cotton/ dressings/ linen/beddings etc.	Incineration / Deep burial
Red	Tubing's, Catheters, IV sets.	Autoclaving / Microwaving / Chemical treatment
Blue / White	Waste sharps (Needles, Syringes, Scalpels, blades etc.	Autoclaving / Microwaving / Chemical treatment & Destruction / Shredding
Black	Discarded medicines/ cytotoxic drugs, Incineration ash, Chemical waste.	Disposal in secured landfill.

Methods of disposal for Biomedical Waste

- Incineration
- Autoclaving
- Microwaving
- Chemicals







- **Incineration Technology:** This is a high temperature thermal process employing combustion of the waste under controlled condition for converting them into inert material and gases.

- **Autoclaving:** An autoclave is a machine that provides a physical method of sterilization by killing bacteria, viruses, and even spores present in the material. In general, an autoclave is run at a temperature of 121° C for at least 30 minutes

- **Microwave irradiation:** At a frequency of about 2450 MHz and a wavelength of 12.24 cm, microwaves destroy the majority of microorganisms.

- **Chemical Methods:** 1 % hypochlorite solution can be used for chemical disinfection.

Thank You