

Medical Waste Management

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What is Public Health?

- The sum of all official or governmental efforts to promote, protect, and preserve the people's health.

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W E L C O M E . .

Learning objectives-1

At the end of this lecture, students are expected to :

1.Understand the Definition and Classification of Medical Waste:

- a. Identify the different types of medical waste, including sharps, pathological, pharmaceutical, chemical, and radioactive waste.
- b. Distinguish between hazardous and non-hazardous medical waste.

2.Comprehend the Risks Associated with Medical Waste:

- a. Recognize the potential risks and health hazards that medical waste poses to healthcare workers, patients, and the environment.
- b. Discuss the importance of proper medical waste segregation to minimize exposure and contamination.

3.Learn the Principles of Medical Waste Management:

- a. Outline the key principles of medical waste management, including waste minimization, segregation, labeling, storage, and transportation.
- b. Understand the role of personal protective equipment (PPE) in ensuring safety during waste handling.



Learning objectives-2

At the end of this lecture, students are expected to :

5.Explore Medical Waste Treatment and Disposal Methods:

- a. Review the various treatment methods for medical waste, such as autoclaving, incineration, and chemical disinfection.
- b. Evaluate the advantages and disadvantages of each disposal method in terms of effectiveness, environmental impact, and cost.

6.Apply Knowledge to Real-World Scenarios:

- a. Apply the learned principles to hypothetical scenarios involving medical waste management in a healthcare setting.
- b. Develop a basic medical waste management plan for a given scenario, considering local regulations and best practices.



*These objectives aim to provide a comprehensive understanding of **medical waste management** and prepare students to handle **medical waste responsibly** in their future medical careers.*

INTRODUCTION

- Medical Waste arises from a number of sources, including hospitals, medical and dental surgeries, veterinary practices, medical teaching establishments, medical research laboratories, and nursing homes.
- Medical waste is potentially dangerous because it may contain infectious materials and sharps such as needles, surgical blade, etc.



What is Bio-medical waste ??

Definition

- Anything tested or used on an individual, or any trash from biological experiments are medical waste

Generated from

- Waste generated by health care facility
- Research facility
- Laboratories

Hazardous health care waste

- 85% waste is non-infectious
- 10% are infectious
- 5% are hazardous



HEALTH CARE WASTE MANAGEMENT INTRODUCTION

- Special in that it has high potential of waste infection and injury.
- Inadequate handling of Health care waste may have serious public Health consequences and impact on the environment.
- Hospital and Health-Care establishments have responsibilities and a “duty of care” for environment and public Health.
- HHC - also carry a responsibility to ensure that there are no adverse health and environmental consequences as a result of waste handling, treatment and disposal activities.
- This paper aims at transmitting the basic skill for development and implementation of health care waste management policy.



1- Hazardous Medical Waste

- Medical Solid Waste are similar to household wastes.
- Hazardous waste, represents 20% of medical waste.



The UN, the World Bank and the World Health Organization (WHO) define medical waste as hazardous if: toxic, infectious, incendiary, or cause allergies



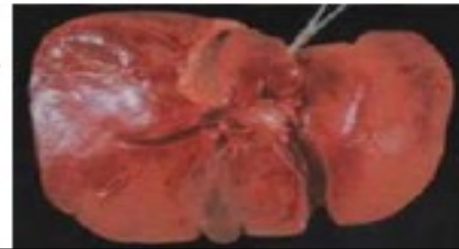


***International
community
particularly
in developing
countries,
must declare
an emergency
situation
an widespread
public health
awareness
must be created!***

3- Dangers of Medical Wastes



- They are filled with microbes and viruses transmitting diseases, especially those that are transmitted by blood.
- A reason for the breeding of insects, flies and rodents, and the expansion of diseases to wider areas.
- The plastic materials (needles, syringes and bottles) when burning leads to the emission of carcinogenic substances such as dioxin.
- The wrong way to deal with medical wastes may lead to infection with dangerous diseases as AIDS and Hepatitis transmitted by blood.





***Billions of
plastic syringes
are being
produced
every year
as dangerous
medical waste..***





SEGREGATION OF HOSPITAL BIO-MEDICAL WASTE

GENERAL WASTE

Kitchen Waste,
Paper & Tissues &
Water Bottles & Cans



DISPOSAL

Secured
Land Filling

INFECTED PLASTICS

Syringes, Gloves &
Plastic Waste



Secured
Land Filling

INFECTED WASTE

Soiled, Anatomical,
Chemical Liquid, Cytotoxic,
Laboratory Waste,
Expired & Discarded
Medicines



www.ahmetsaltik.net

GLASSWARE

Antibiotic Vials,
Metallic Implants,
Glassware
Material
Except Cytotoxic



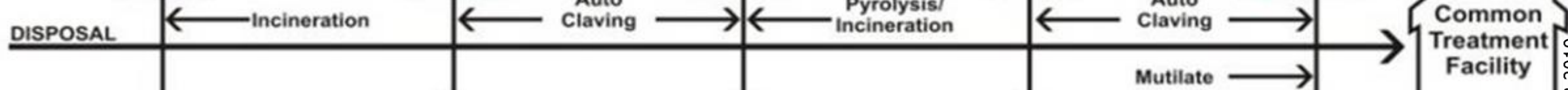
RE-Cycler

SHARPS

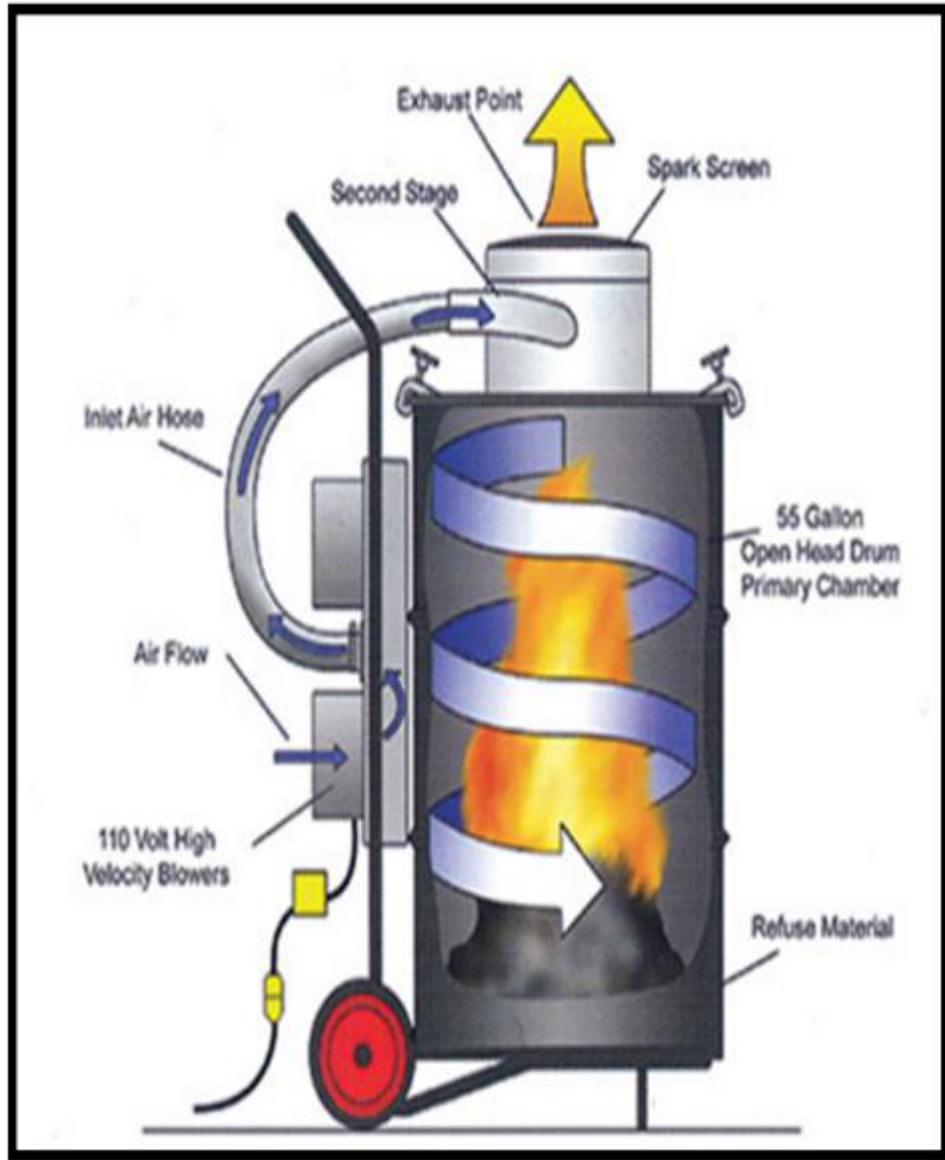
Needles &
Cut Glasses



Sharp Pit



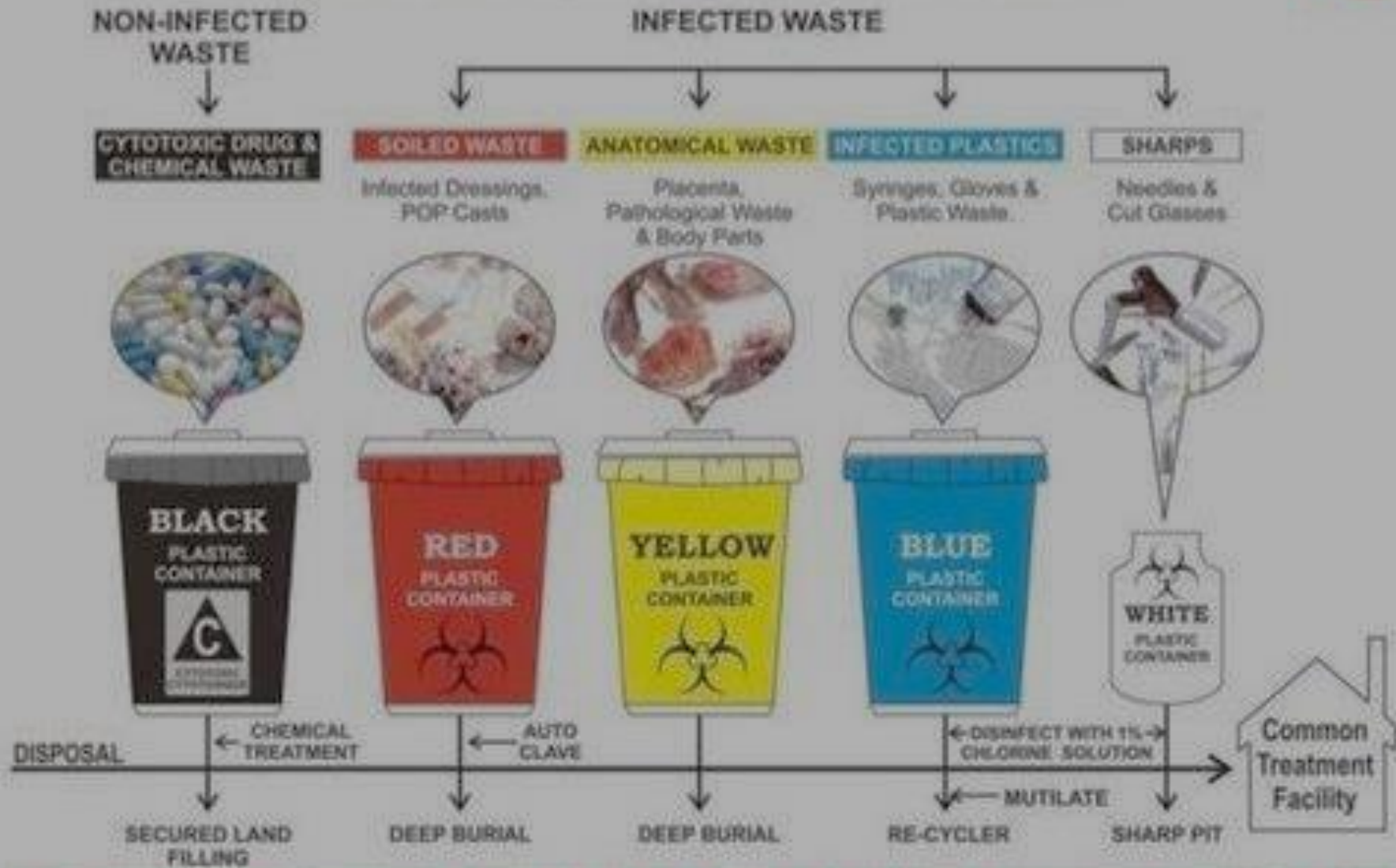
INCINERATOR



Medical wastes cause serious potential hazards. In case of disease, outbreak, toxication, contamination of underground waters, injuries, explosions and fires; the risk becomes a reality.



SEGREGATION OF SOLID BIO-MEDICAL WASTE



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

The e-waste mountains are growing in Africa! The UN Environment Program (UNEP) warns the rich countries draining electronic wastes and toxic chemicals to the poor countries! (www.ntvmsnbc.com/news/, 28.11.06)



These hazardous wastes pollute agricultural products and groundwater.



MEDICAL WASTE SEGREGATION CHART 2015

SHARPS

Red Sharps Container

- ✓ Needles
- ✓ Ampules
- ✓ Broken Glass
- ✓ Blades
- ✓ Razors
- ✓ Staples
- ✓ Trocars
- ✓ Guide Wires
- ✓ Other Sharps



BIOHAZARD

Red Container or Red
Liner in Container

- ✓ Infectious Waste
- ✓ Blood Products (albumin.etc)
- ✓ Contaminated Personal
Protective Equipment (PPE)
- ✓ IV Tubing
- ✓ Cultures, Stacks



TRACE CHEMO

Yellow Container

- ✓ Empty vials, ampules
- ✓ Empty Syringes, Needles
- ✓ Empty IVs
- ✓ Gowns
- ✓ Gloves
- ✓ Tubing
- ✓ Aprons
- ✓ Wipes
- ✓ Packaging





MEDICAL WASTE SEGREGATION CHART 2015

RCRA HAZARD Black Container

- ✓ Hazardous meds (RCRA)
- ✓ Half/Partial doses (RCRA)
- ✓ Hazardous bulk meds
- ✓ P-listed drugs, packaging
- ✓ Bulk chemo
- ✓ Pathological Waste (Incineration Only)



PHARMACEUTICAL Blue Container

- ✓ Pills
- ✓ Injectables
- ✓ Antibiotics



RADIOACTIVE Shielded Containers with Radioactive Symbol

- ✓ Fluorine-18 (F-18). 110 minutes half-life.
- ✓ Technetium-99 (T-99m). 6 hours half-life.
- ✓ Iodine-131 (I-131). 8 days half-life.
- ✓ Strontium-89 (Sr-89). 52 days half-life.
- ✓ Iridium-192 (Ir-192). 74 days half-life.
- ✓ Cobalt-60 (Co-60). 53 years half-life.





5 Ways of Treating Medical Waste

Incineration



Typically for pathological waste, and pharmaceutical waste. Never for plastics.

Non-Incineration Systems

Thermal

(Autoclaving)



Typically for sharps waste, and infectious waste. Never for pathological waste.

Irradiative

(Microwave)



Typically for sharps waste, and infectious waste. Never for pathological waste.

Chemical



Typically for chemical waste, and liquid waste (e.g. generated from laboratory cleaning).

Biological

(Enzymes)



Undeveloped and rarely used technology for medical waste disposal.

BioMedicalWasteSolutions.com/Medical-Waste-Disposal/

| Category | Type of Waste | Type of Bag or Container to be used | Treatment and Disposal options |
|-------------------|---|---|---|
| RED | a) Contaminated Waste (Recyclable) | non-chlorinated plastic bags or containers | Autoclaving or micro-waving followed by shredding or mutilation |
| White Translucent | Waste sharps including Metals | Puncture proof, Leak proof, tamper proof containers | Autoclaving or Dry Heat Sterilization followed by shredding or mutilation or encapsulation |
| Blue | a) Glassware b) Metallic Body Implants | Cardboard boxes with blue colored marking | Disinfection (by soaking the washed glass waste in Sodium Hypochlorite) or through autoclaving or microwaving and then sent for recycling |



Collecting urban wastes : Just like atomic ants!

Infectious waste

Sharps

Needles, scalpels, syringes, blades and glass which can cause needle stick injury or be unwisely reused.

Sharps can be autoclaved and shredded using special shredding equipment. Some of these metals may be recycled when they have been properly treated.

Recycling

Landfill

Plastics

Contaminated items include syringes, blood & urine bags, IV bottles and tubing. This is often single use PVC which should not be incinerated (Dioxin and Furans).

Autoclave

Microwave (not suitable for blood sterilisation)

Shredding to prevent reuse

Recycling

Landfill

Pathological Waste

Human tissue, blood bandages, soiled cotton dressings, etc.

Incineration

Deep Burial

Microbiological Waste

Viral and bacterial infected waste from all sources should never be mixed with uninfected waste.

Autoclaved Hydroclaved

Recycling

Incineration

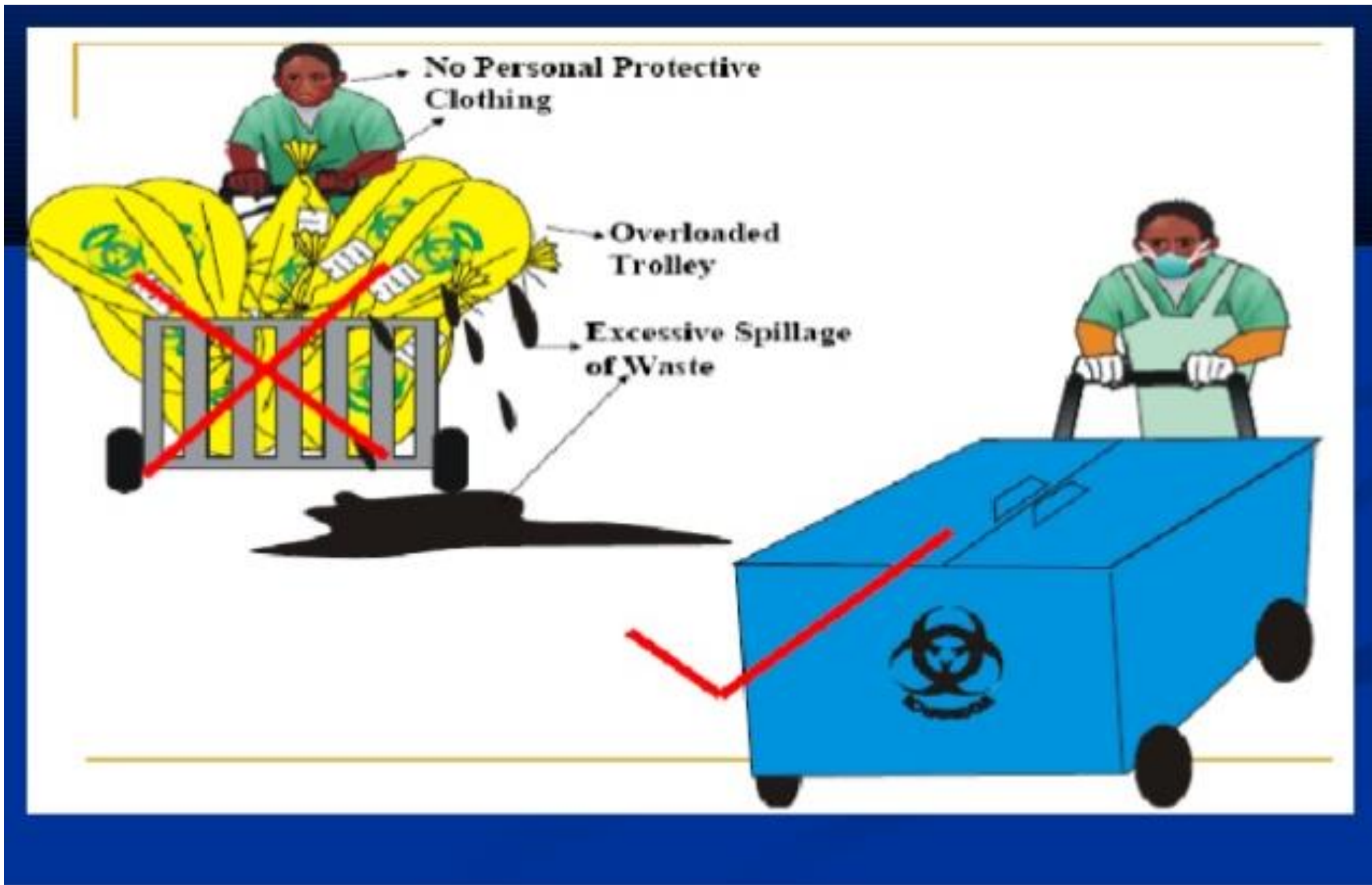
Landfill

Liquid Wastes

All body fluids – blood, urine and suction.

Chemical Disinfection.
Liquids usually collected and treated with 1% bleach for 1 hour after which it can be discharged to sewer.
Sodium Hypochlorite solution is mixed with the liquid to produce a bleach concentration of 1%
At Health Centre, the waste goes to on site waste water treatment

Infectious waste represents about 10 to 15% of all hospital waste.



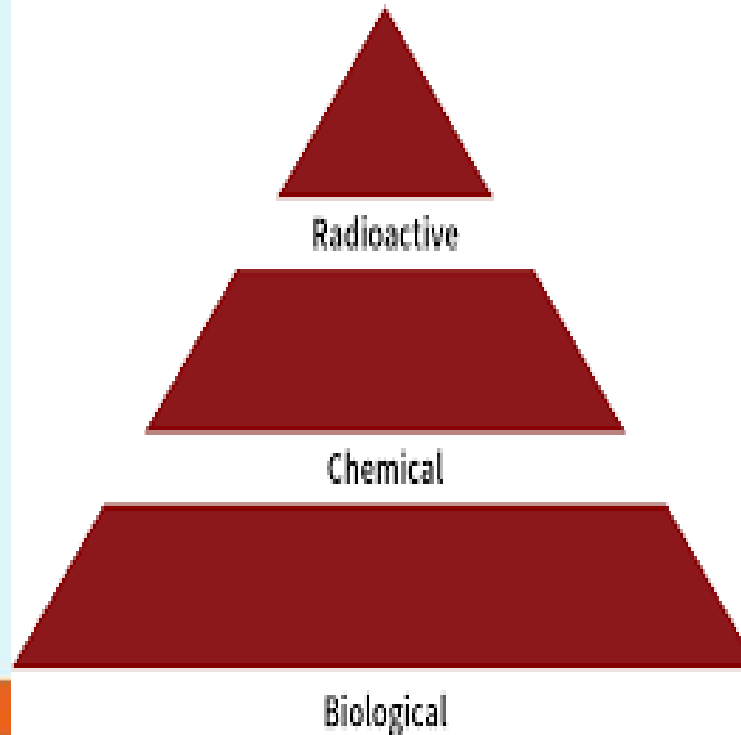
Components Of Medical Waste Management



Health care waste management system comprises of the following components:

1. Collection and segregation
2. Transportation
3. Storage
4. Treatment
5. Final disposal

Waste Hierarchy



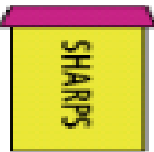

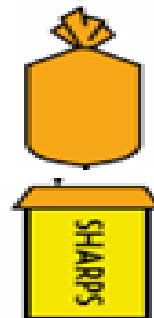

***Waste Container
for cutter - drilling
and syringe needles***

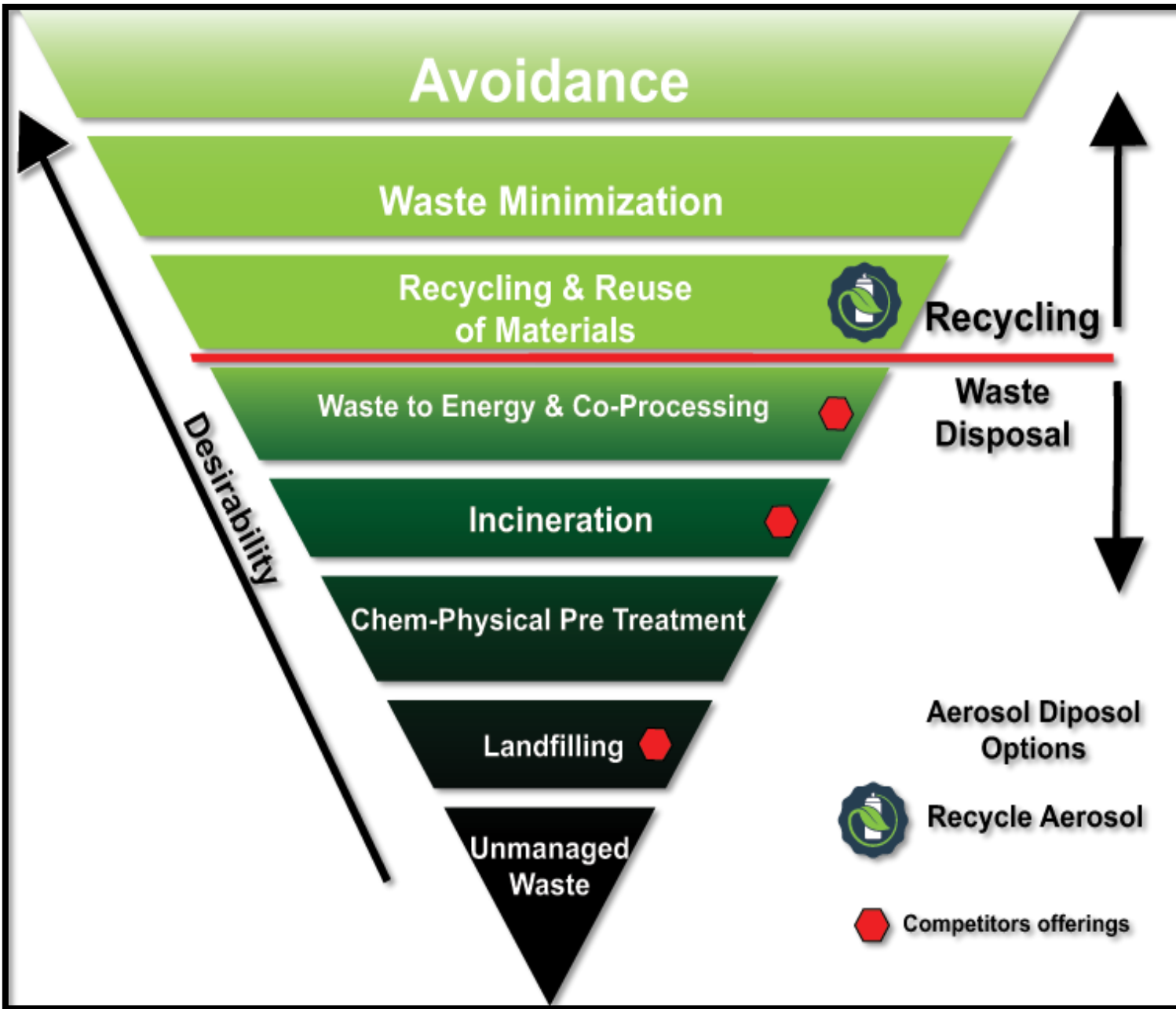


Let's Go Green Together





| Container | Type of waste | Disposal reqt |
|---|---|---|
|  | Cytotoxic/ cytostatic | High temperature incineration |
|  | Infectious contaminated with chemicals or medicines | High temperature incineration |
|  | Infectious – soiled dressings or swabs with visible signs of blood that may be infected | Alternative treatment (eg rotoclave) or incineration |
|  | Offensive – dressings, swabs, incontinence pads, disposable clothing | Landfill |



Know Where To Throw

Biohazard Red Bag Waste

- Fluid Blood**
- Hemovacs**
- Chest Drainage Units**
- Suction Conisters**
- Bags and IV Tubing**

These Don't Go In Red Bag

Sharps

Medication

Garbage

Garbage

Hazardious Waste

www.securewaste.net

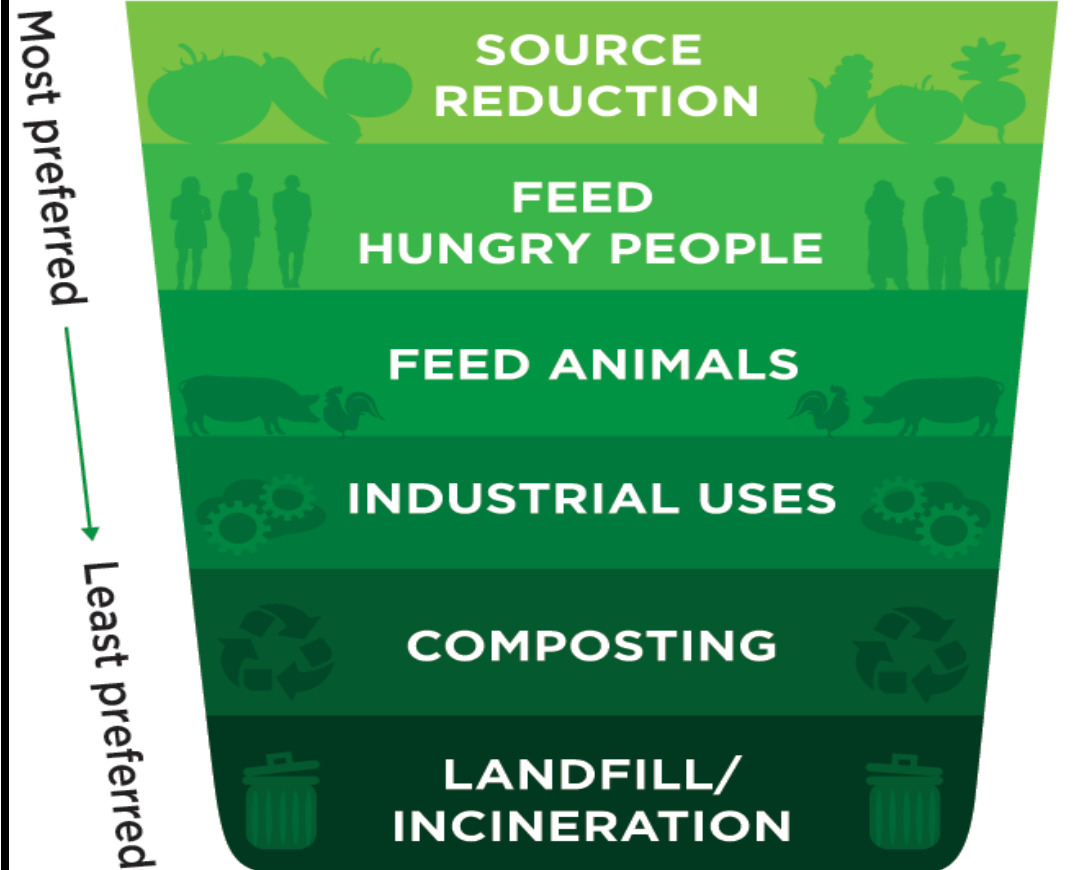
SOURCE REDUCTION FACTS

Click on a subject:

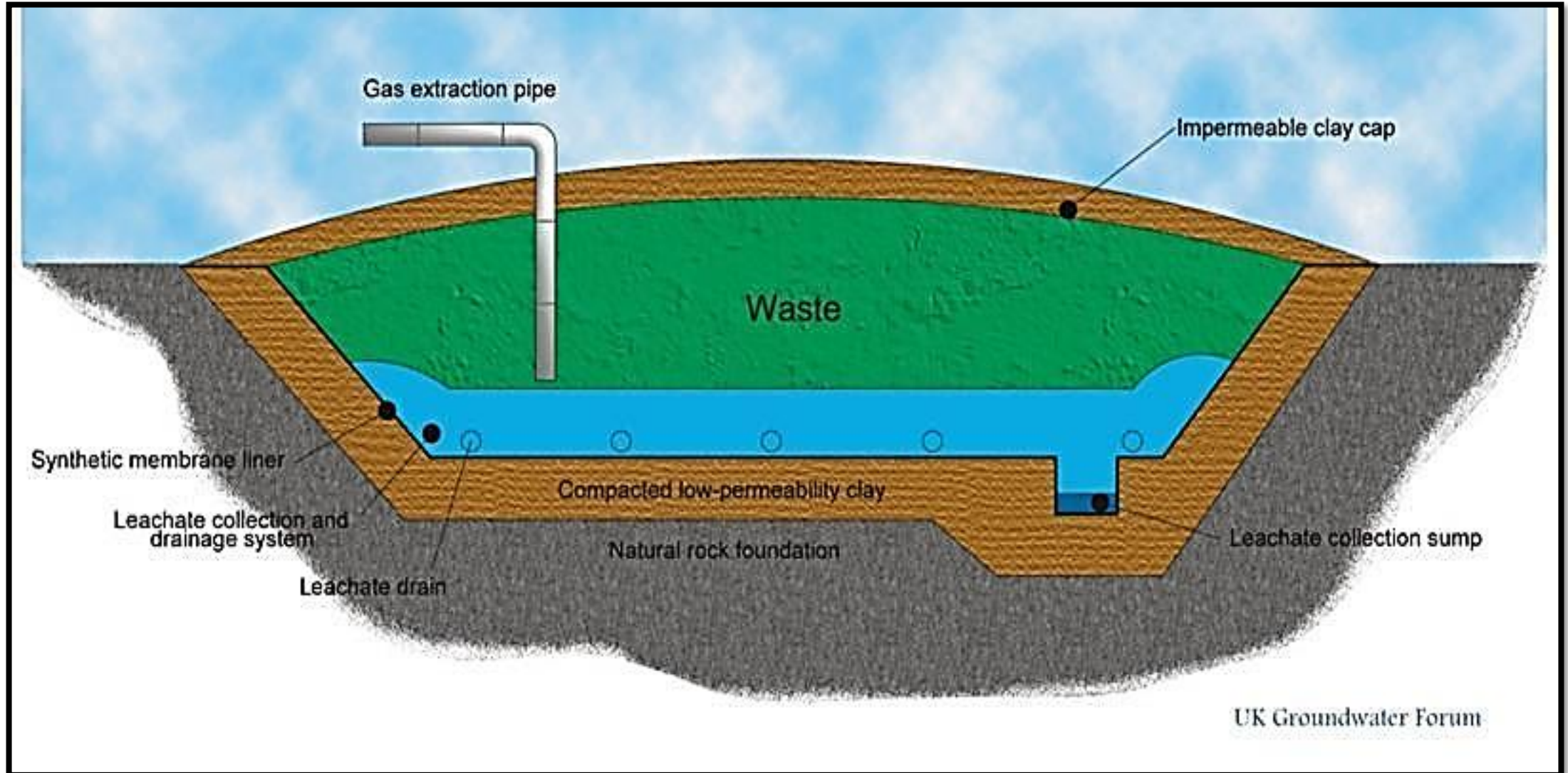
- STATES WITH BOTTLE BILLS
- BACKYARD COMPOSTING
- STATES WITH YARD WASTE BANS
- THIRD CLASS MAIL
- HOUSEHOLD HAZARDOUS WASTE
- HEAVY METALS IN MSW



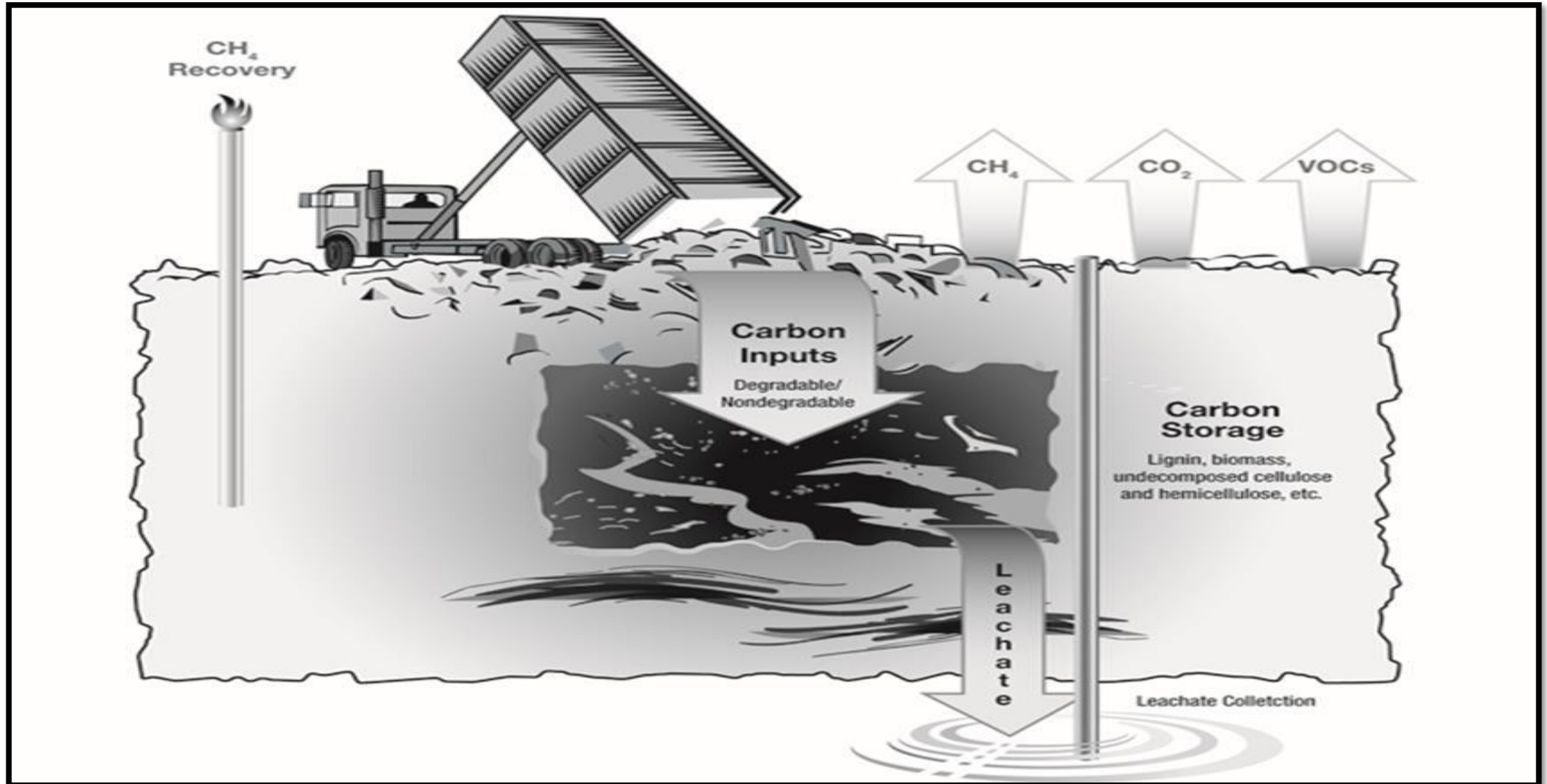
Food Recovery Hierarchy



Understructure for solid waste disposal



Understructure for solid waste disposal





BIO-MEDICAL WASTE MANAGEMENT

PUT THE RIGHT WASTE IN THE RIGHT COLOUR

(FOR HOUSEHOLDS, HOTELS, RESTAURANTS, HOSPITALS, CLINICS, PHARMACEUTICAL LABS, ETC.)



CHEMICAL WASTE



HUMAN AND ANIMAL
ANATOMICAL WASTE



SOLID OR SHARP
MEDICAL WASTE



PLASTIC WASTE



Conclusion

- ❑ The management of medical waste is a critical aspect of healthcare that ensures the **safety of patients**, healthcare workers, and the environment.
- ❑ *Through this lecture, you have gained a comprehensive understanding of the types, risks, and **proper handling** of medical waste.*
- ❑ You have learned about the importance of **segregation, treatment, and disposal methods**, and the application of these practices in real-world scenarios.
- ❑ *As future medical professionals, you are now equipped with the knowledge and skills necessary to contribute to **effective medical waste management** and uphold the **highest standards of public health** and environmental stewardship.*
- ❑ This lecture serves as a foundation upon which students can build as they continue their education and enter professional practice, always **mindful of the impact of medical waste on health and the environment.**

