



Ankara University

SCHOOL OF MEDICINE

*The First Medical School In The Republic of Turkey (1945)*

# ***Medical Waste Management***

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# 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



# 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.





# 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..***





First WHO Global Conference  
on Air Pollution and Health  
was held on

30 October - 1 November 2018

**Improving air quality, combatting climate  
change – saving lives**

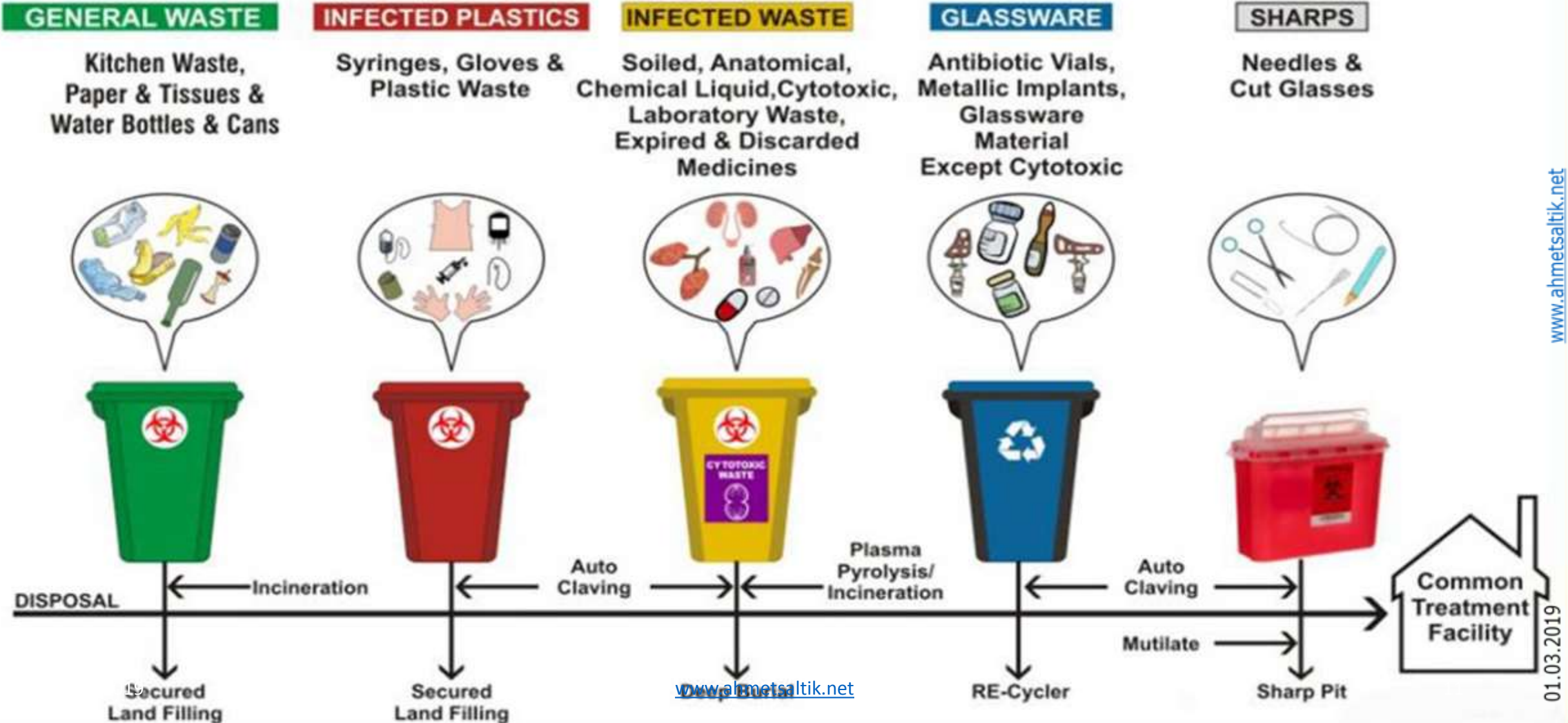
Conference summary report: **CLEAN AIR  
FOR HEALTH: Geneva Action Agenda**

**Air pollution kills 7 million people each year.** Around the world, 9 out of 10 people breathe air that has been polluted by traffic emissions, industry, agriculture and **waste incineration**. About 3 billion people continue to use smoky, polluting stoves and fuels inside their homes for cooking and heating. This week, government leaders, intergovernmental organizations, scientists and advocates gathered at WHO's headquarters in Geneva for the first [Global Conference on Air Pollution and Health](#). The conference aims to raise awareness of this growing public health challenge and exchange information and tools on the health risks of **air pollution** and solutions to tackle this problem

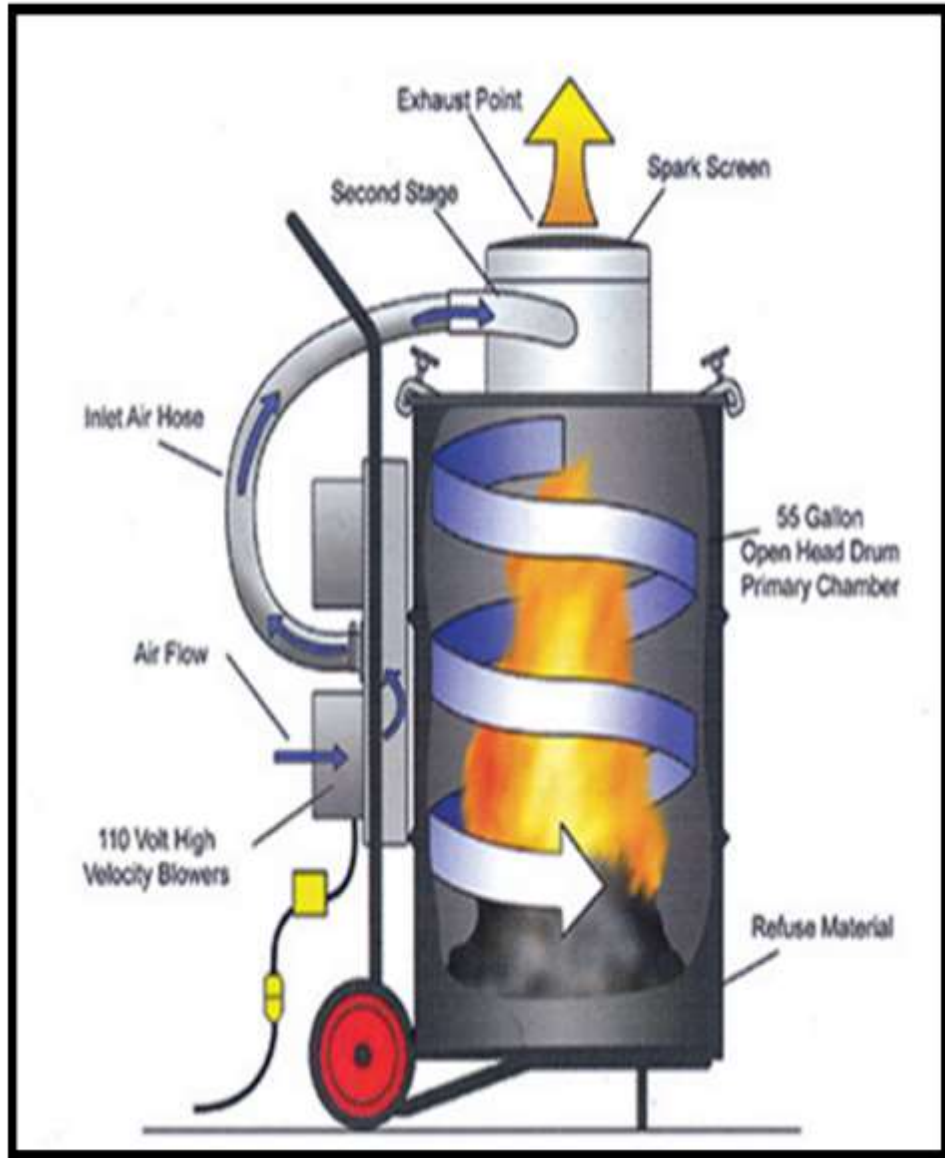




# SEGREGATION OF HOSPITAL BIO-MEDICAL WASTE



# INCINERATOR

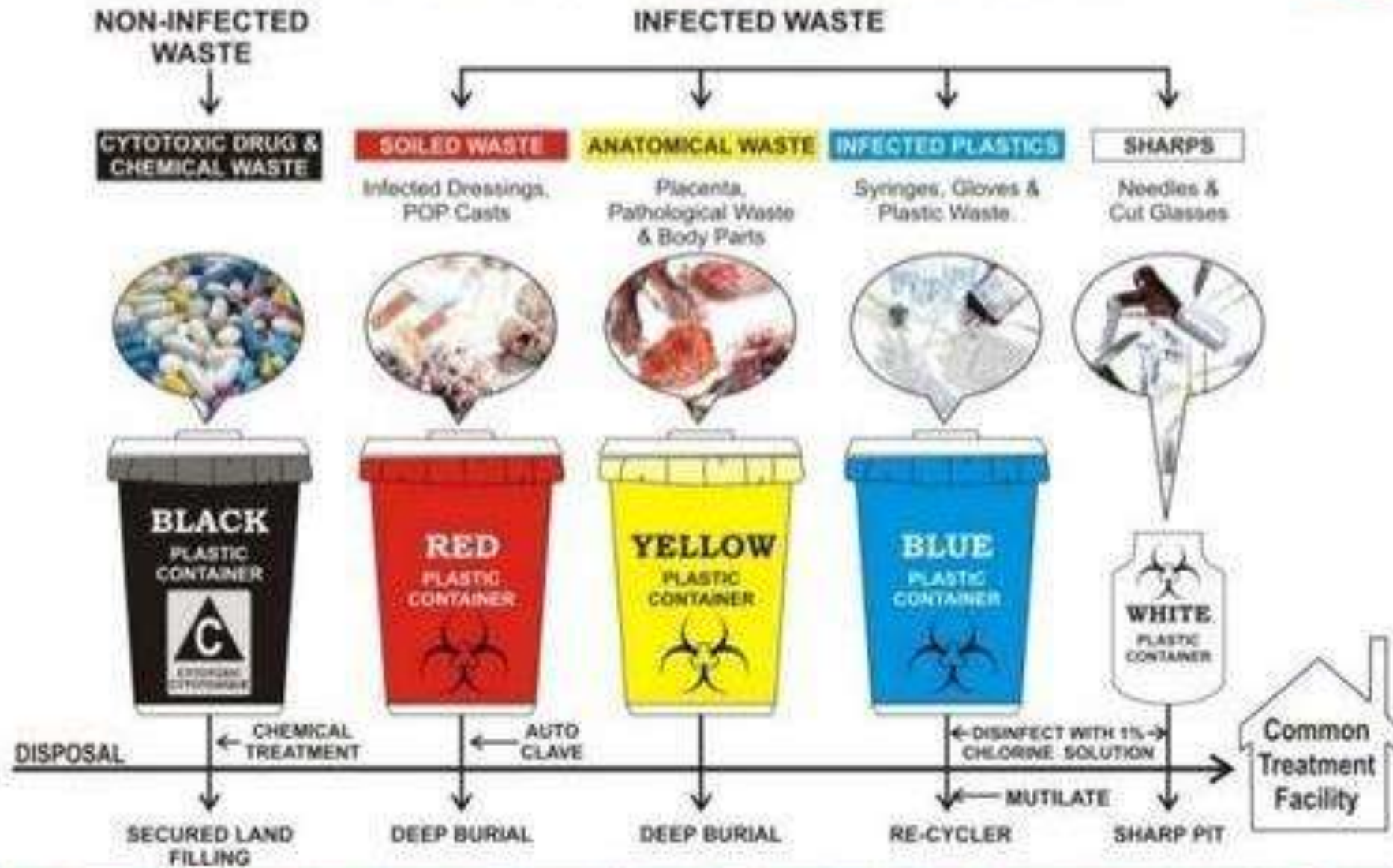


*Medical wastes causes serious potential hazards. In case of disease, outbreak, toxication, contamination of underground waters, injuries, explosions and fires; the risk becomes a reality.*





# 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/](http://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.



**BIO MEDICAL**  
WASTE SOLUTIONS

Download this Printable Chart At  
[www.BioMedicalWasteSolutions.com/Medical-Waste-Disposal/](http://www.BioMedicalWasteSolutions.com/Medical-Waste-Disposal/)





# 5 Ways of Treating Medical Waste

## Incineration



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

## Thermal (Autoclaving)



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

## Non-Incineration Systems

## 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/](http://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.

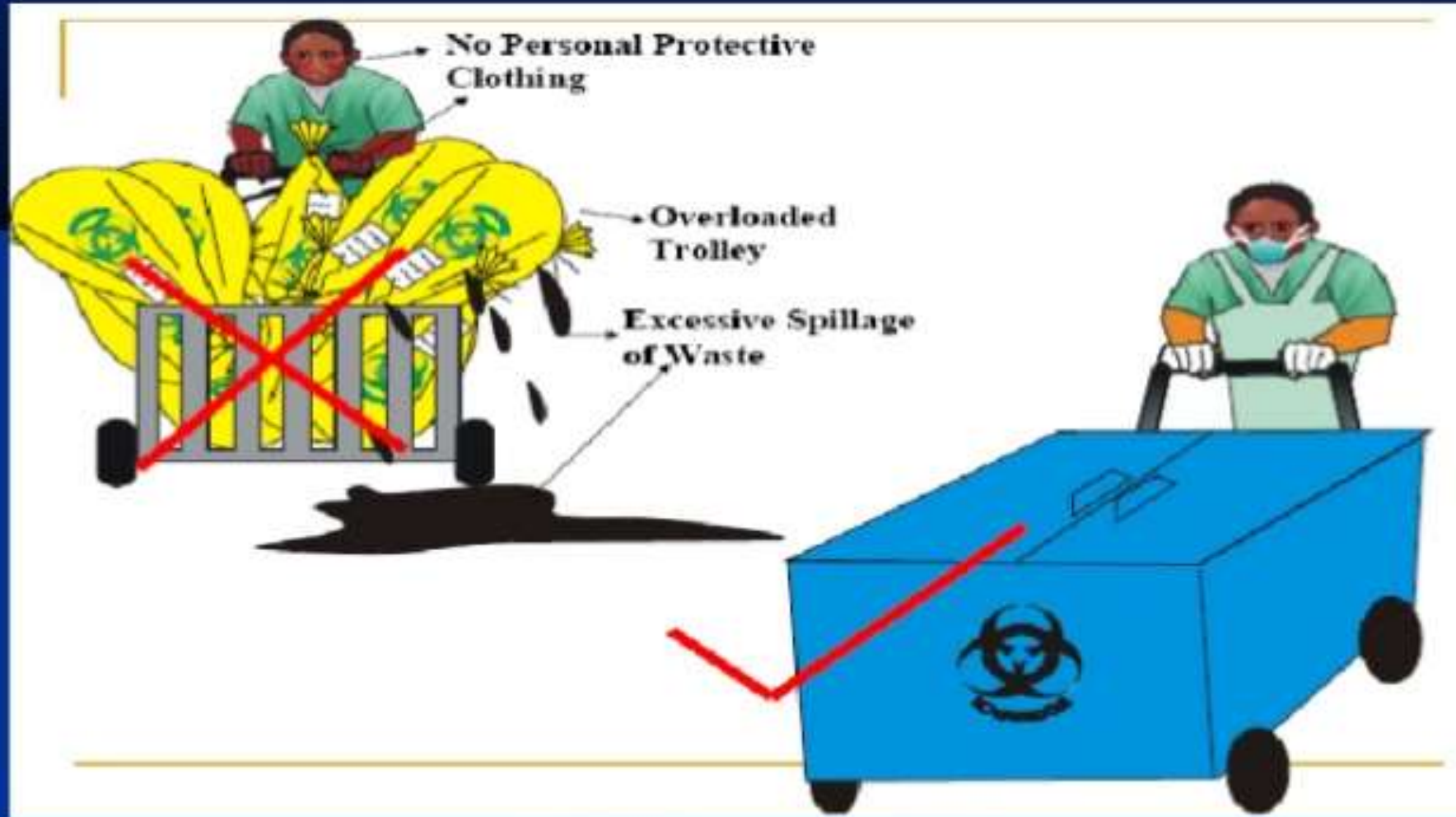
Liquids usually collected and treated with 1% bleach for 1 hour after which it can be discharged to sewer.

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.



# Bio Medical Wastes Collection & Transport



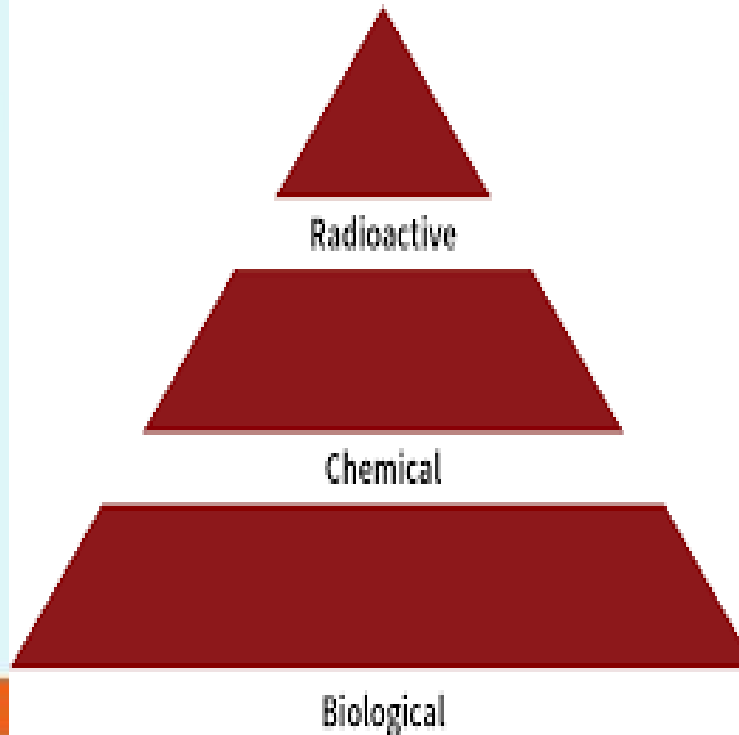
# Components Of Medical Waste Management



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***





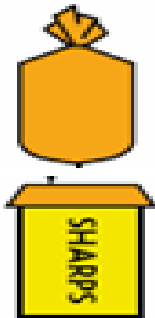



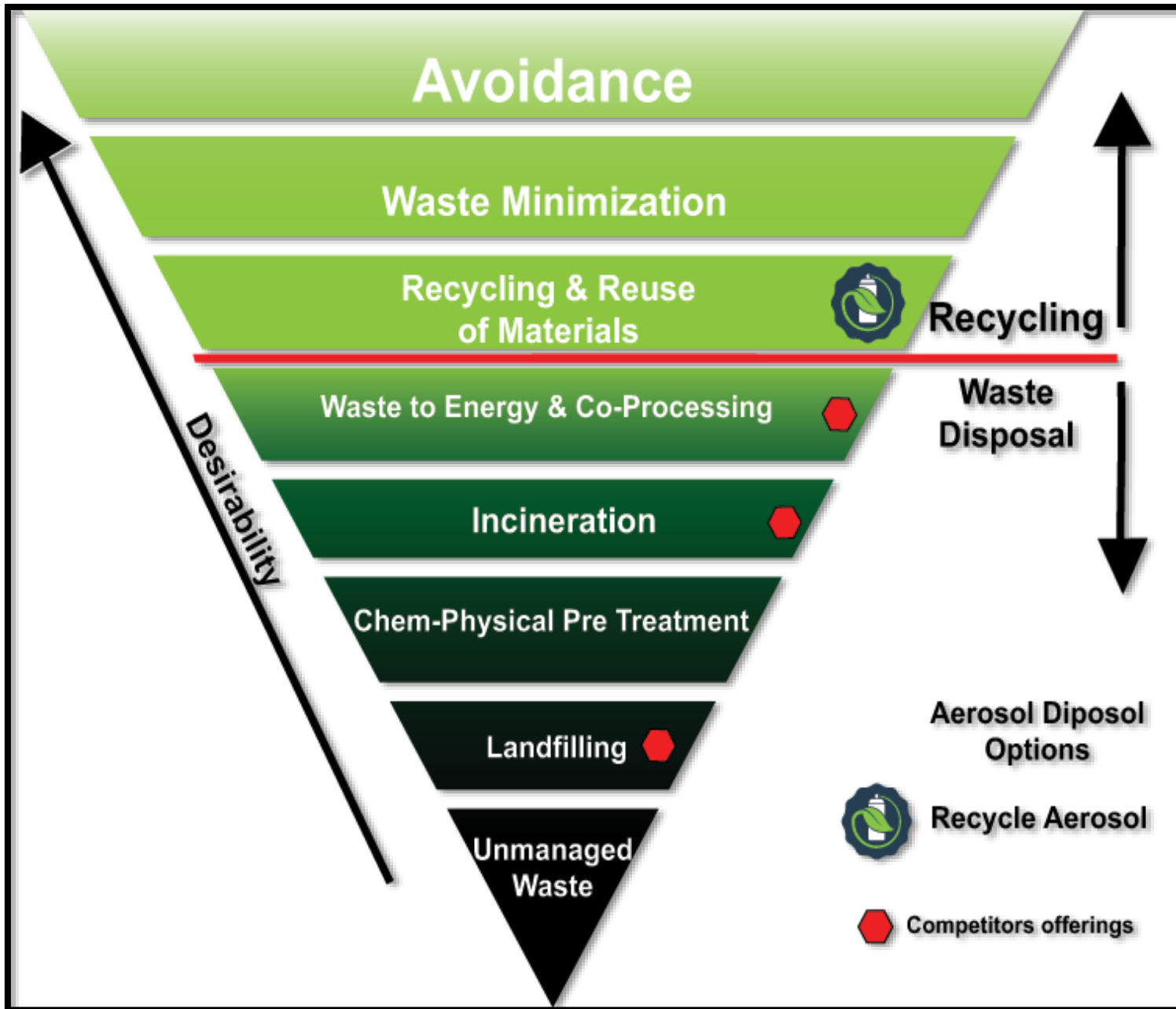
# Let's Go Green Together







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](http://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

Most preferred  
↓  
Least preferred

SOURCE  
REDUCTION

FEED  
HUNGRY PEOPLE

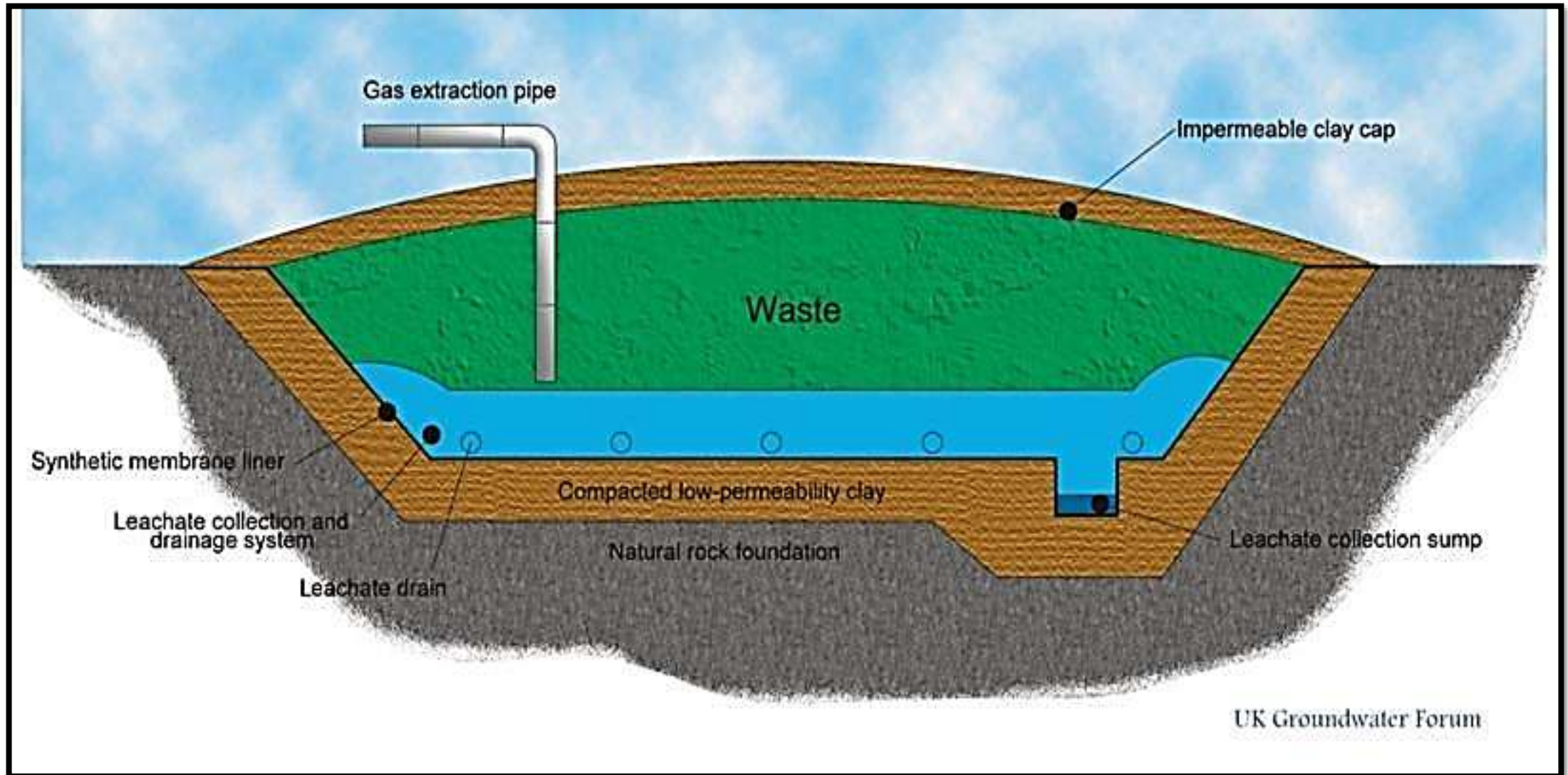
FEED ANIMALS

INDUSTRIAL USES

COMPOSTING

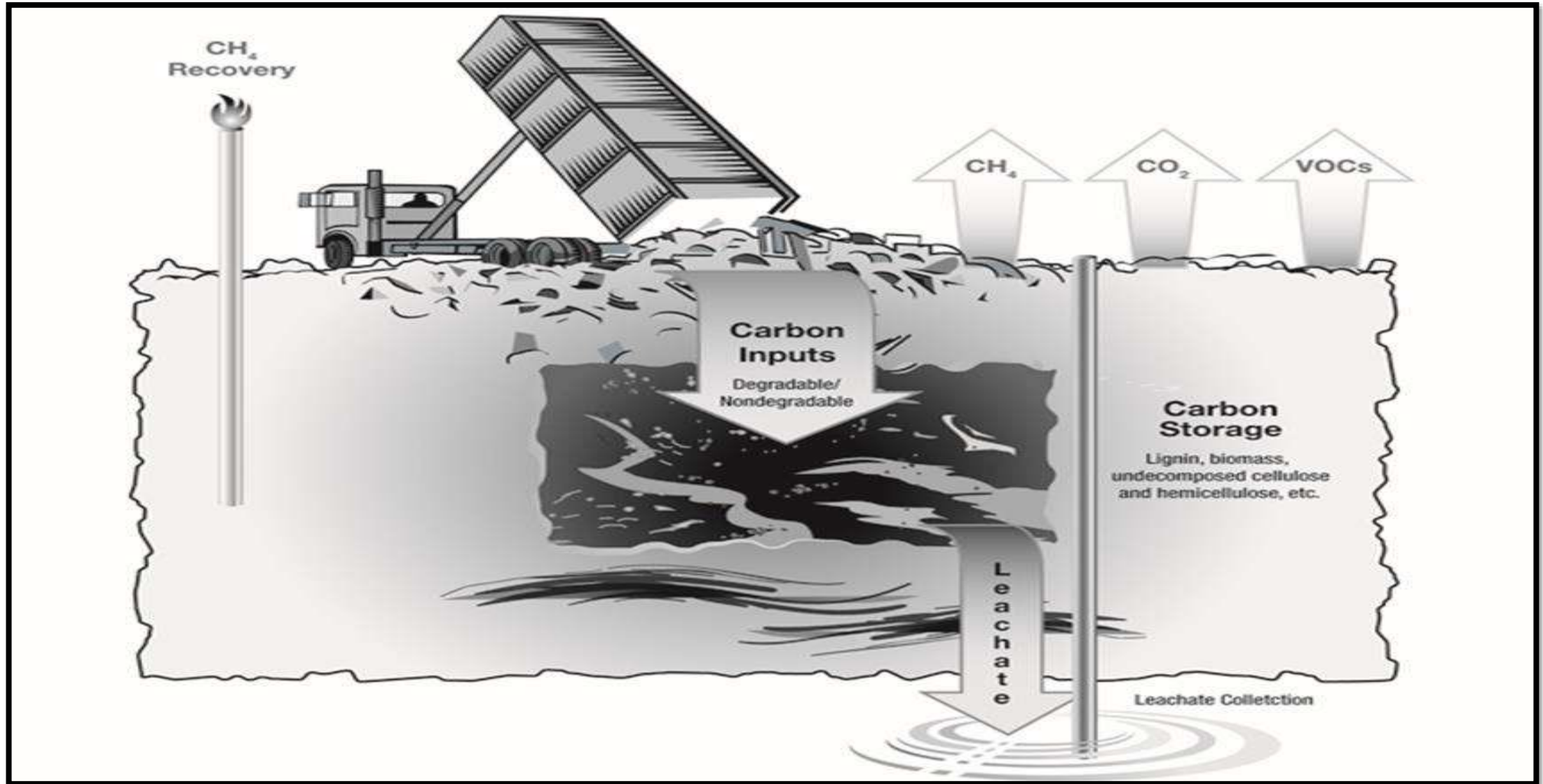
LANDFILL/  
INCINERATION

# *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



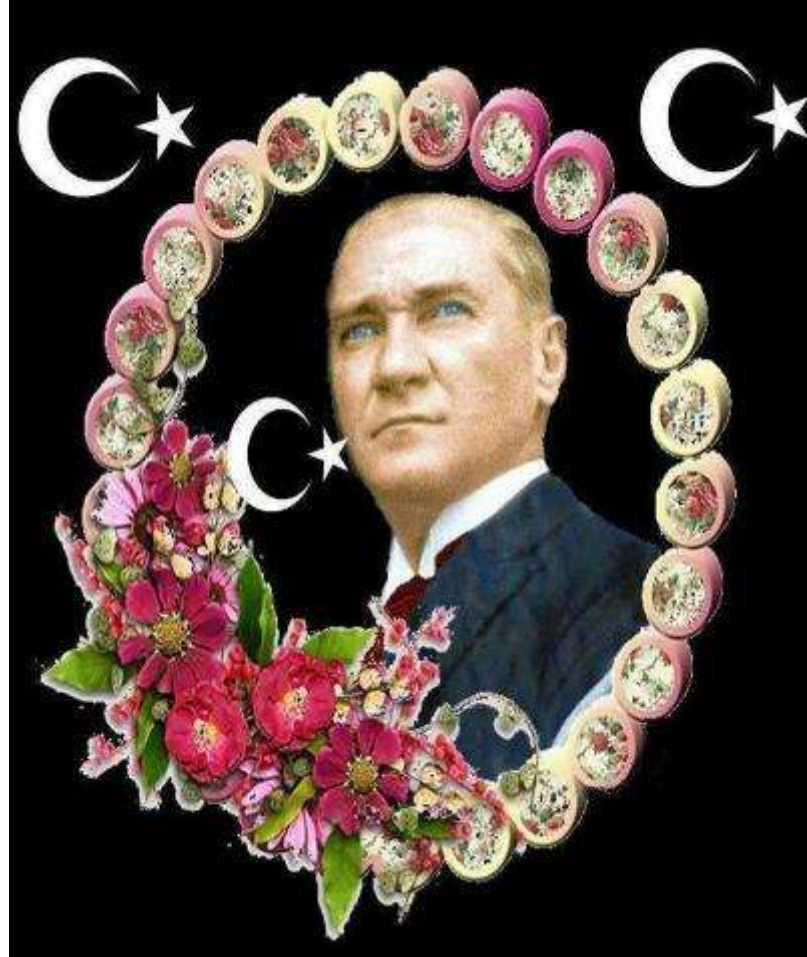






*Peacefull co-existence!  
Co-existence pacifique!  
Barış içinde birlikte!*

*Thank you for  
your participation..*



*Labor is the  
supreme  
value.  
Respect to  
labor is the  
chief  
condition of  
being human.*

*«The burden of medical responsibility is a heavy profession above all, even then death.»*

**Mustafa Kemal ATATÜRK / Founder of Turkey**