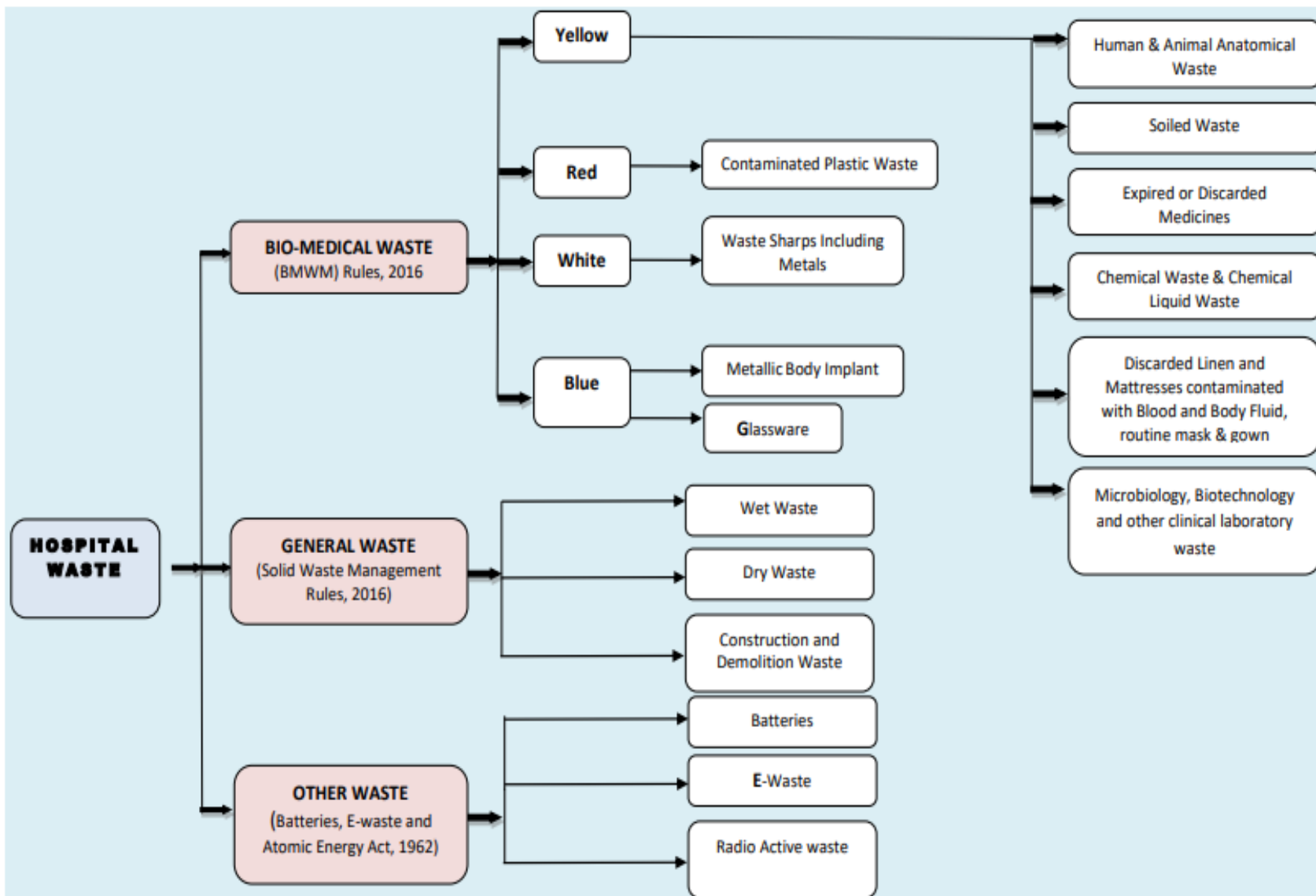


# CATEGORIZATION AND SEGREGATION OF BIOMEDICAL WASTE

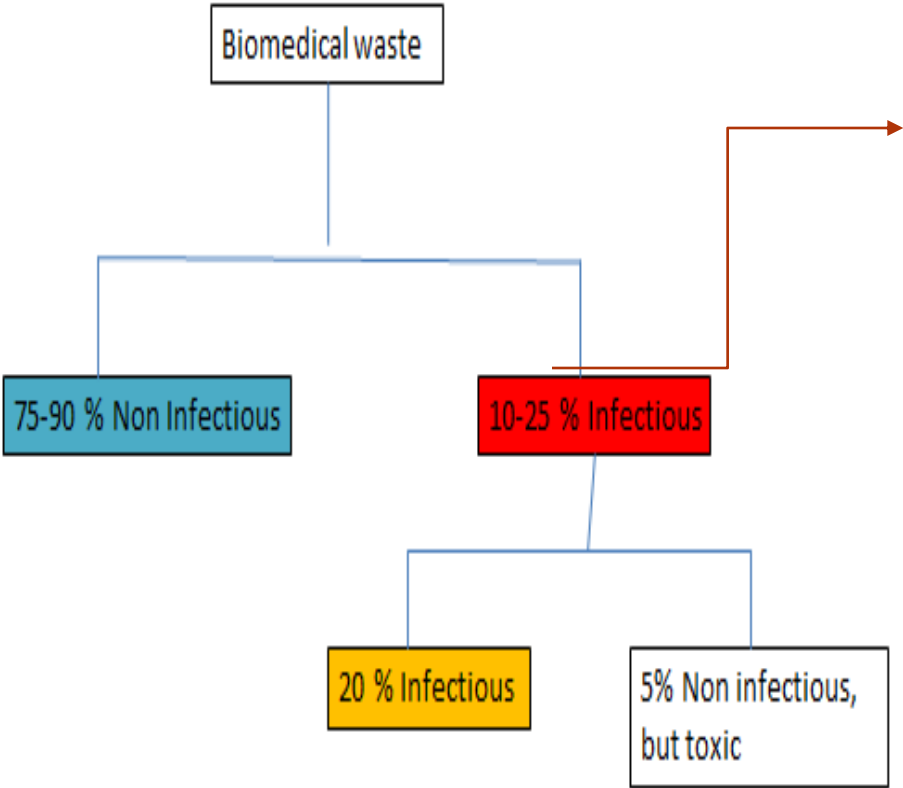
**-Dr. Shambhavi Singh**  
**Assistant Professor**  
**Department of Microbiology**  
**GMCH Haldwani**  
**Uttarakhand**

Figure 2: Categorization & Classification of Wastes in Health Care Facilities.

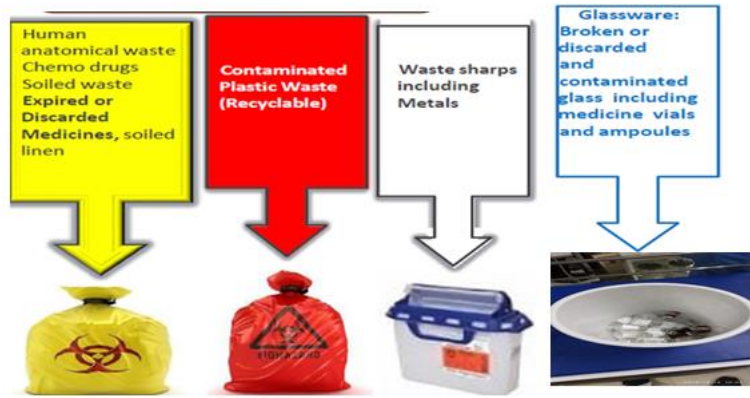


# Hospital Waste: classification

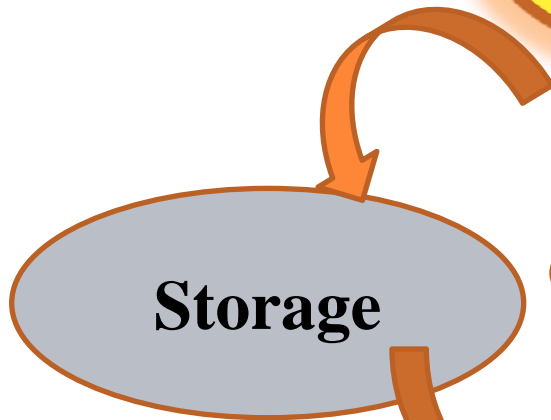
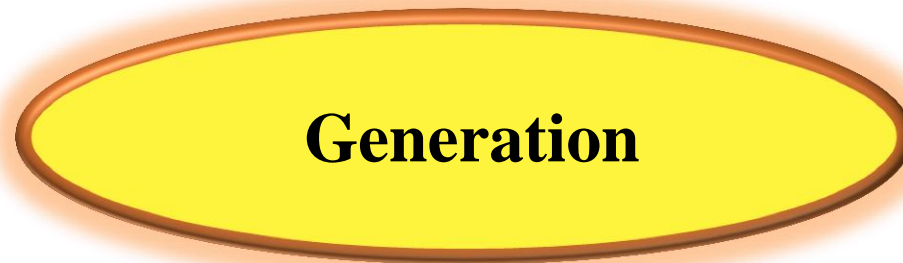
## Categorization of Hospital Waste



## Segregation of Infectious-BMW



# STEPS IN WASTE MANAGEMENT



Bio- medical waste generated from a healthcare facility is required to be segregated at the **point of generation** as per the colour coding stipulated under Schedule-I of BMWWM Rules, 2016.

## Following activities to be followed to ensure proper waste segregation:

Waste must be segregated at the **point of generation** of source and not in later stages.

**Posters / placards** for bio-medical waste segregation should be provided in all the wards as well as in waste storage area.

**Adequate number of colour coded bins** / containers and bags should be available at the point of generation of bio-medical waste.

Colour coded **plastic bags should be in line** with the Plastic Waste Management Rules, 2016.

Provide **Personnel Protective Equipment** to the bio-medical waste handling staff.

# Waste Segregation in Hospitals (four different colors)



**Yellow bag**  
infectious  
non-plastic  
waste

**Red bag**  
infectious  
plastic waste

**White or  
translucent  
sharp  
container**  
(puncture-  
proof box)  
metal sharps

**Blue  
container**  
(puncture-  
proof box)  
broken glass  
items and  
metal implants

# Segregation, packaging, transportation and storage-

No untreated bio-medical waste shall be **mixed** with other wastes.

The bio-medical waste shall be segregated into containers or bags at the **point of generation** in accordance with Schedule I prior to its storage, transportation, treatment and disposal.

**Bar code and global positioning** system shall be added by the Occupier and common bio-medical waste treatment facility in one year time.

# Segregation, packaging, transportation and storage- (Cont..)

The operator of common bio-medical waste treatment facility shall **transport** the bio-medical waste from the premises of an occupier to any off-site bio-medical waste treatment facility only in the vehicles authorized.

The **vehicles** used for transportation of bio-medical waste shall **comply** with the conditions if any stipulated by the State Pollution Control Board or Pollution Control Committee in addition to the requirement contained in the Motor Vehicles Act, 1988 (59 of 1988).

**Untreated human anatomical waste**, animal anatomical waste, soiled waste and, biotechnology waste shall not be stored beyond a **period of 48 hours**:

(> 48 hours-appropriate measures to ensure that the waste does not adversely affect human health and the environment and inform the prescribed authority)

**Microbiology waste** and all other clinical laboratory waste shall be **pre-treated** by sterilisation .

# General principles of segregation, transport and storage of BMW.

**Waste receptacles:** The waste receptacles should have the following properties-

**Plastic bags** must be labeled with biohazard logos



**Containers** should have well-fitting lids



**Sharp box** should be puncture-proof, leak-proof and tamper-proof impermeable container



# General principles of segregation, transport and storage of BMW (Contd...)

- Importance of segregation
- Securement
- Labelling
- Pre-treatment
- Transport
- Central storage area
- PPE

# Infectious Solid waste

## Yellow Bin/ Bag

Type of waste: Human/ Animal anatomical & soiled waste




**Incineration, plasma pyrolysis, deep burial**

# Category - YELLOW

Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
<p>(a) Human Anatomical Waste: Human tissues, organs, body parts and fetus below the viability period .</p>	<p>Yellow coloured non-chlorinated plastic bags</p>	<p>Incineration or Plasma Pyrolysis or deep burial*</p>
<p>(b) Animal Anatomical Waste : Experimental animal carcasses, body parts, organs, tissues, including the waste generated from animals used in experiments or testing in veterinary hospitals or colleges or animal houses.</p>		



# Category – YELLOW (Cont.)

Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
<p>(c) Soiled Waste: Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and bags containing residual or discarded blood and blood components.</p>	<p>Yellow coloured non-chlorinated plastic bags</p> 	<p>Incineration or Plasma Pyrolysis or deep burial* In absence of above facilities, autoclaving or micro-waving/hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery.</p>

# Category – YELLOW (Cont.)

Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
<p>(d) Expired or Discarded Medicines: Pharmaceutical waste like antibiotics, cytotoxic drugs including all items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc.</p>	<p>Yellow coloured non-chlorinated plastic bags or containers</p>  <p>The image shows two yellow bio-hazard waste containers. On the left is a rigid yellow bin with a bio-hazard symbol and Chinese characters. On the right is a yellow plastic collection bag with a bio-hazard symbol and the text 'BIO-MEDICAL WASTE COLLECTION BAG', 'BIO-HAZARD', and 'INSPECTIVE HANDLE WITH CARE - NOT FOR REUSABLE USE'.</p>	<p>Expired cytotoxic drugs and items contaminated with cytotoxic drugs to be returned back to the manufacturer or supplier for incineration at temperature <math>&gt;1200\text{ }^{\circ}\text{C}</math> or to common bio-medical waste treatment facility or hazardous waste treatment, storage and disposal facility for incineration at <math>&gt;1200\text{ }^{\circ}\text{C}</math> or Encapsulation or Plasma Pyrolysis at <math>&gt;1200\text{ }^{\circ}\text{C}</math>.</p>

# Category – YELLOW (Cont.)

Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
<p>(e) Chemical Waste: Chemicals used in production of biological and used or discarded disinfectants.</p>	<p>Yellow coloured containers or non-chlorinated plastic bags</p>	<p>Disposed of by incineration or Plasma Pyrolysis or Encapsulation in hazardous waste treatment, storage and disposal facility</p>



# Category – YELLOW (Cont.)

Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
<p>(f) Chemical Liquid Waste : Liquid waste generated due to use of chemicals in production of biological and used or discarded disinfectants, Silver X-ray film developing liquid, discarded Formalin, infected secretions, aspirated body fluids, liquid from laboratories and floor washings, cleaning, house-keeping and disinfecting activities etc</p>	<p>Separate collection system leading to effluent treatment system (ETP) .</p>	<p>After resource recovery, the chemical liquid waste shall be pre-treated before mixing with other wastewater. The combined discharge shall conform to the discharge norms given in Schedule III.</p>

# Category – YELLOW (Cont.)

Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
<p>(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid.</p>	<p>Non-chlorinated yellow plastic bags or suitable packing material</p> 	<p>Non- chlorinated chemical disinfection followed by incineration or Plazma Pyrolysis or for energy recovery. In absence of above facilities, shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery or incineration or Plazma Pyrolysis.</p>

# Category – YELLOW (Cont.)

Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
<p>(h) Microbiology, Biotechnology and other clinical laboratory waste: Blood bags, Laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines, human and animal cell cultures used in research, industrial laboratories, production of biological, residual toxins, dishes and devices used for cultures.</p>	<p>Autoclave safe plastic bags or containers</p>  <p>The image shows two pieces of yellow biohazard waste packaging. On the left is a yellow plastic bin with a biohazard symbol and text. On the right is a yellow plastic bag with a biohazard symbol and text, including 'BIO-HAZARD', 'BIO-MEDICAL WASTE COLLECTION BAG', and 'INFECTIVE HANDLE WITH CARE NOT FOR PRIVATE USE'.</p>	<p>Pre-treat to sterilize with nonchlorinated chemicals on-site as per National AIDS Control Organisation or World Health Organisation guidelines thereafter for Incineration.</p>

## Segregation list of common items in hospital as per bio-medical waste management rules 2016 (English and Hindi)

 <p>The image shows a yellow banner with the word "YELLOW" in bold letters. Below the banner is a row of seven circular icons representing various types of waste: a hand, a bandage, pills, a syringe, a foot, internal organs, and a blood splatter. Below the icons are two yellow disposal containers: a bin on the left and a bag on the right, both featuring a biohazard symbol and a warning triangle.</p>	<p>a) Human Anatomical Waste b) Animal Anatomical Waste c) Soiled Waste d) Expired or Discarded Medicines &amp; Cytotoxic drugs along with glass or plastic ampoules, vials etc. e) Chemical Waste f) Micro, Bio-t and other clinical lab waste g) Chemical Liquid Waste h) Discarded linen, mattresses, beddings contaminated with blood or body fluids.</p>	<p>शरीर रचना संबंधी, प्रयोगशाला, फार्मास्यूटिकल, और संक्रामक कचरा</p> <p>सभी मानव और पशु शारीरिक अपशिष्ट (टिशू, अंग और शरीर के अंग), गर्भनाल, भ्रूण, टोस अपशिष्ट (खून से भीगी पट्टियां, रुई के फूहे, प्लास्टर सांचा और खून की थैलियां), माइक्रोबायोलॉजिकल, जैव प्रौद्योगिकी, फार्मास्यूटिकल, साइटोटॉक्सिक अपशिष्ट (और सभी साइटोटॉक्सिक दूषित वस्तुएं) गद्दे या बिस्तर।</p>
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# Red Bin/ Bag

All infected plastic recyclable waste



# Category - RED

## Type of Waste

Contaminated Waste (Recyclable)  
Wastes generated from disposable items such as tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles and fixed needle syringes) and vaccutainers with their needles cut) and gloves.

## Type of Bag or Container to be used

Red coloured non-chlorinated plastic bags or containers



## Treatment and Disposal options

Autoclaving or microwaving/ hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent to registered or authorized recyclers or for energy recovery or plastics to diesel or fuel oil or for road making, whichever is possible. Plastic waste should not be sent to landfill sites.



**Contaminated Waste** (Recyclable)  
Vacutainers, tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves.

## दूषित अपशिष्ट

उपयोग कर फेंकने लायक वस्तुएं: शीशियां, बोतलें, IV सेट्स, कैथेटर, वेवयुटेनर्स, मूत्र बैग, सिरिंज और दस्तानें।

# Category - WHITE (TRANSLUCENT)

## Type of Waste

Waste sharps including Metals: Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades, or any other contaminated sharp object that may cause puncture and cuts. This includes both used, discarded and contaminated metal sharps

## Type of Bag or Container to be used

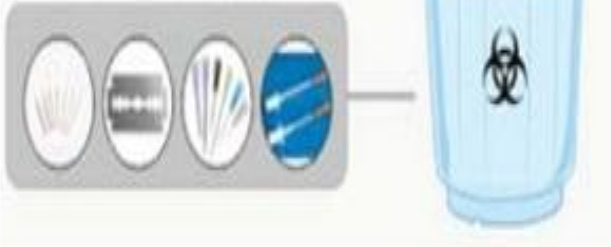
Puncture proof, Leak proof, tamper proof containers



## Treatment and Disposal options

Autoclaving or Dry Heat Sterilization followed by shredding or mutilation or encapsulation in metal container or cement concrete; combination of shredding cum autoclaving; and sent for final disposal to iron foundries or sanitary landfill or designated concrete waste sharp pit.


WHITE  
(Translucent)



Waste sharps including Metal sharps-Needles, Syringes with fixed needles, Needles from needle tip cutter/burner, Scalpels, Blades

धातुओं सहित  
नॉकदार अपशिष्ट  
सुइयां, फिक्स्ड सुइयों  
वाली सिरीज, छुरी,  
ब्लेड, निडल टिप  
कटर/बर्नर से निकली  
सुइयां, खराब  
तेजधारयुक्त अपशिष्ट ।

# Category - Blue

Type of Waste	Type of Bag or Container to be used	Treatment and Disposal options
(a) Glassware: Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes.	Puncture proof, Leak proof, tamper proof containers. 	Disinfection (by soaking the washed glass waste after cleaning with detergent and Sodium Hypochlorite treatment) or through autoclaving or microwaving or hydroclaving and then sent for recycling
(b) Metallic Body Implants		



**Broken/ discarded glass-** Medicine vials & ampoules except those contaminated with cytotoxic wastes.  
Metallic Body Implants

### कांच के बर्तन

साइटोटॉक्सिक दवाओं और शरीर में प्रत्यारोपित धातुओं के साथ दूषित को छोड़कर दवा की शीशियों समेत सभी टूटे/फेंक दिए गए/दूषित कांच।

# LABEL

## LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS



### BIOHAZARD SYMBOL

जैविक परिसंकट चिन्ह



**BIOHAZARD**  
जैविक परिसंकट

### CYTOTOXIC HAZARD SYMBOL

कोषिकाविष परिसंकट चिन्ह



**CYTOTOXIC**  
कोषिकाविष



# BIO MEDICAL WASTE COLLECTION

## TIME OF COLLECTION

Bio-medical waste should be collected on daily basis from each ward of the hospital at a fixed interval of time. There can be multiple collections from wards during the day.

Collection times should be fixed and appropriate to the quantity of waste produced in each area of the health-care facility.

General waste should not be collected at the same time or in the same trolley in which bio-medical waste is collected.

Collection should be daily for most wastes, with collection timed to match the pattern of waste generation during the day.

General waste collection, must be done immediately after the visiting hours of the HCFs, as visitors coming to facility generate a lot of general waste and in order to avoid accumulation of such general waste in the HCF.

The collection timings must enable the HCF to minimize or nullify the use of interim storage of waste in the departments.

Bio-medical waste collected by the staff, should be provided with PPEs.

**“Let the waste of the sick not contaminate the lives of the healthy”**

