WASTE MANAGEMENT IN HEALTHCARE FACILITY

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Introduction :

Waste management in healthcare facility

Biomedical waste (BMW)

General waste

Infectious waste

Cytotoxic waste

Radioactive waste

Electronic waste

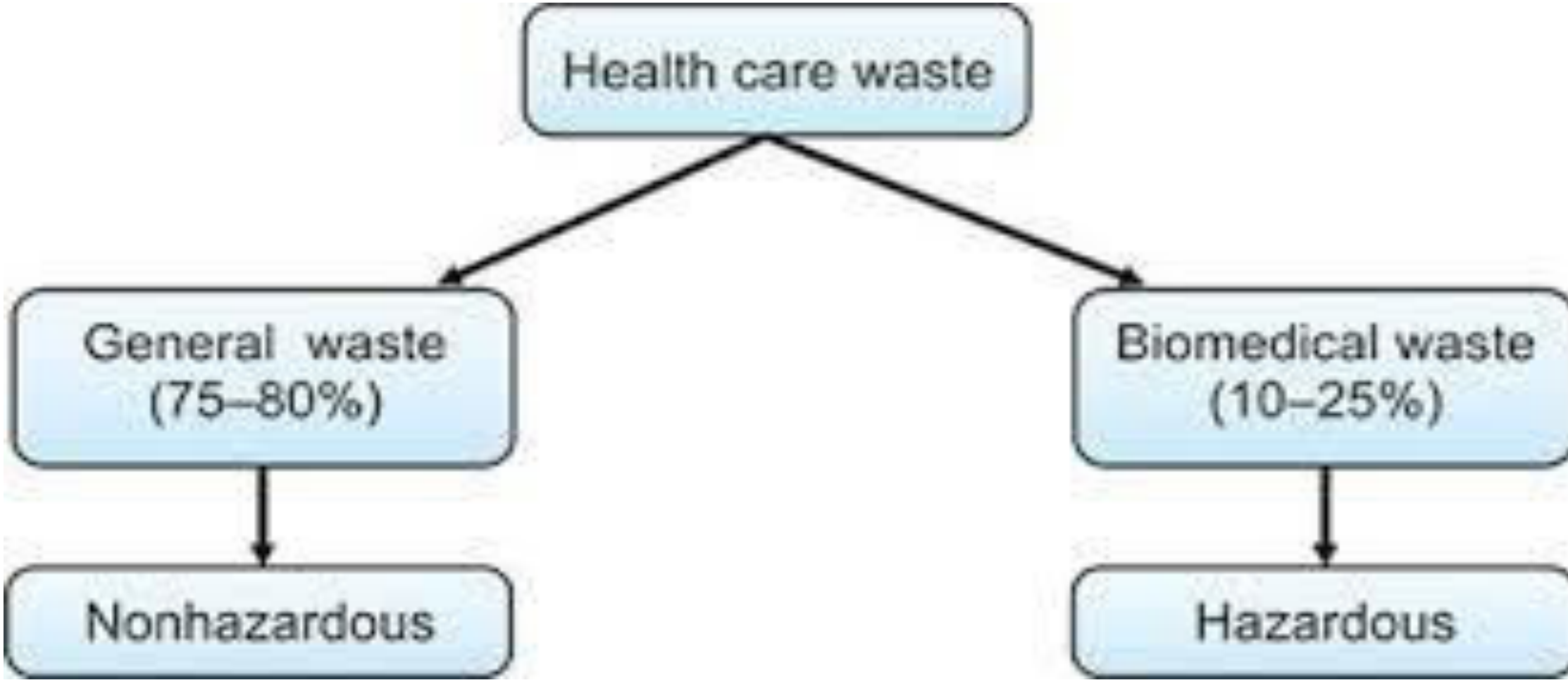
Biomedical waste – Definition

Wastes that are generated during the laboratory diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological or in health camps.

Waste generated in hospitals :

Quantity of waste generated in hospitals :

½ kg/ bed to 2kg/bed.



Need of BMW management?

Health care waste is a risk to all, it affects us in different ways

Situation in India:

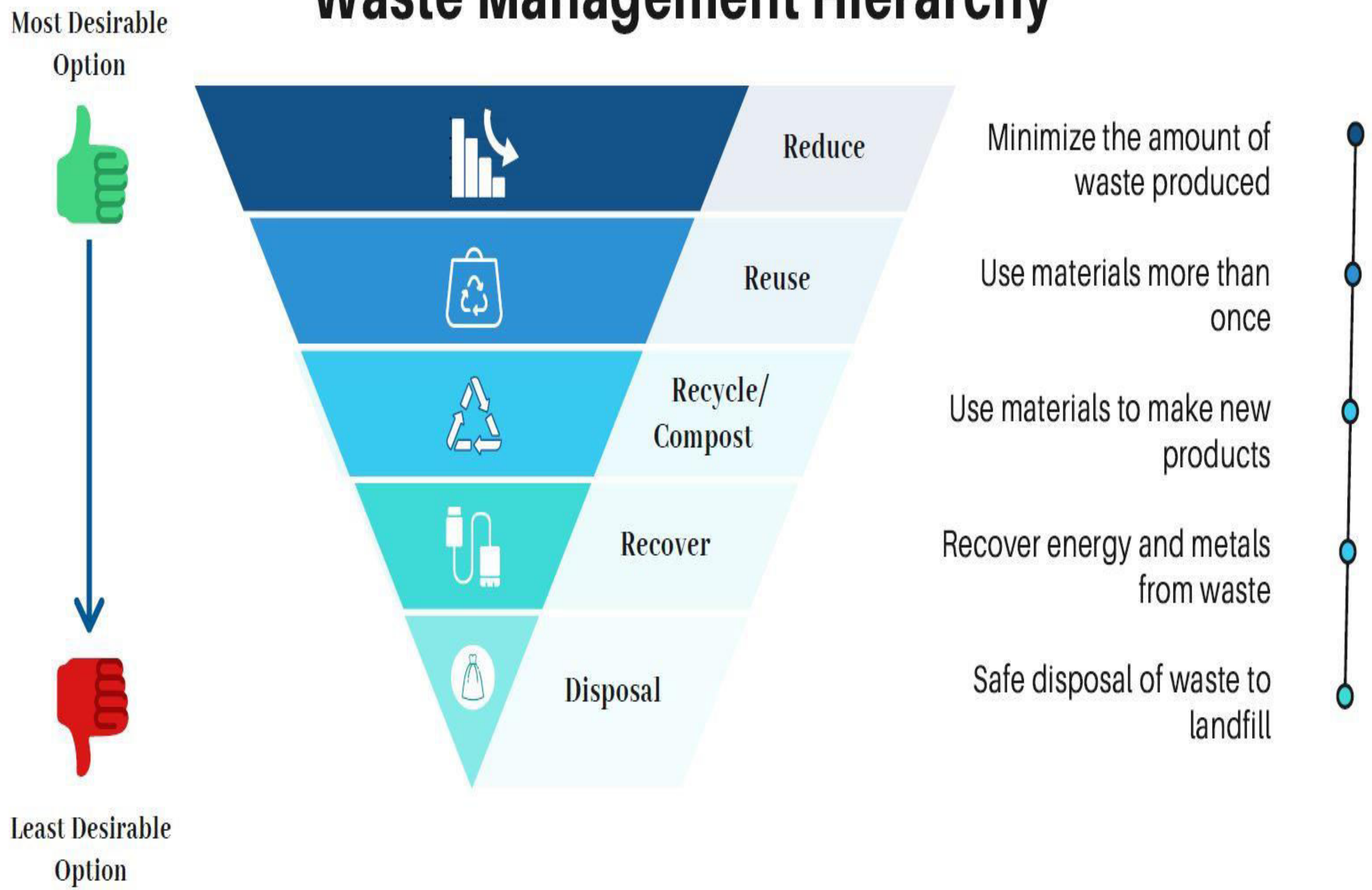
According to the ministry of Environment and forests (MOEF), gross generation of BMW in India is about 484 tons per day (TPD) from 1,68,869 health care facilities.

Unfortunately only 447 TPD is treated and 37 TPD (8%) left untreated

Karnataka – Top followed by Maharashtra .

Common BMW treatment and disposal facility (BMWTF) in operation:198

Waste Management Hierarchy



Biomedical waste rule , India :

The Ministry of environment and forest has formulated BMW rule in 1998 which was functional till 2016.

In 2011, it was modified as draft, but did not get notified because of lack of consensus on categorization and standards.

The new BMW guideline has b

2016 with an amendment ad

Biomedical waste management

Waste segregation: Most crucial step by using containers of four different colors.

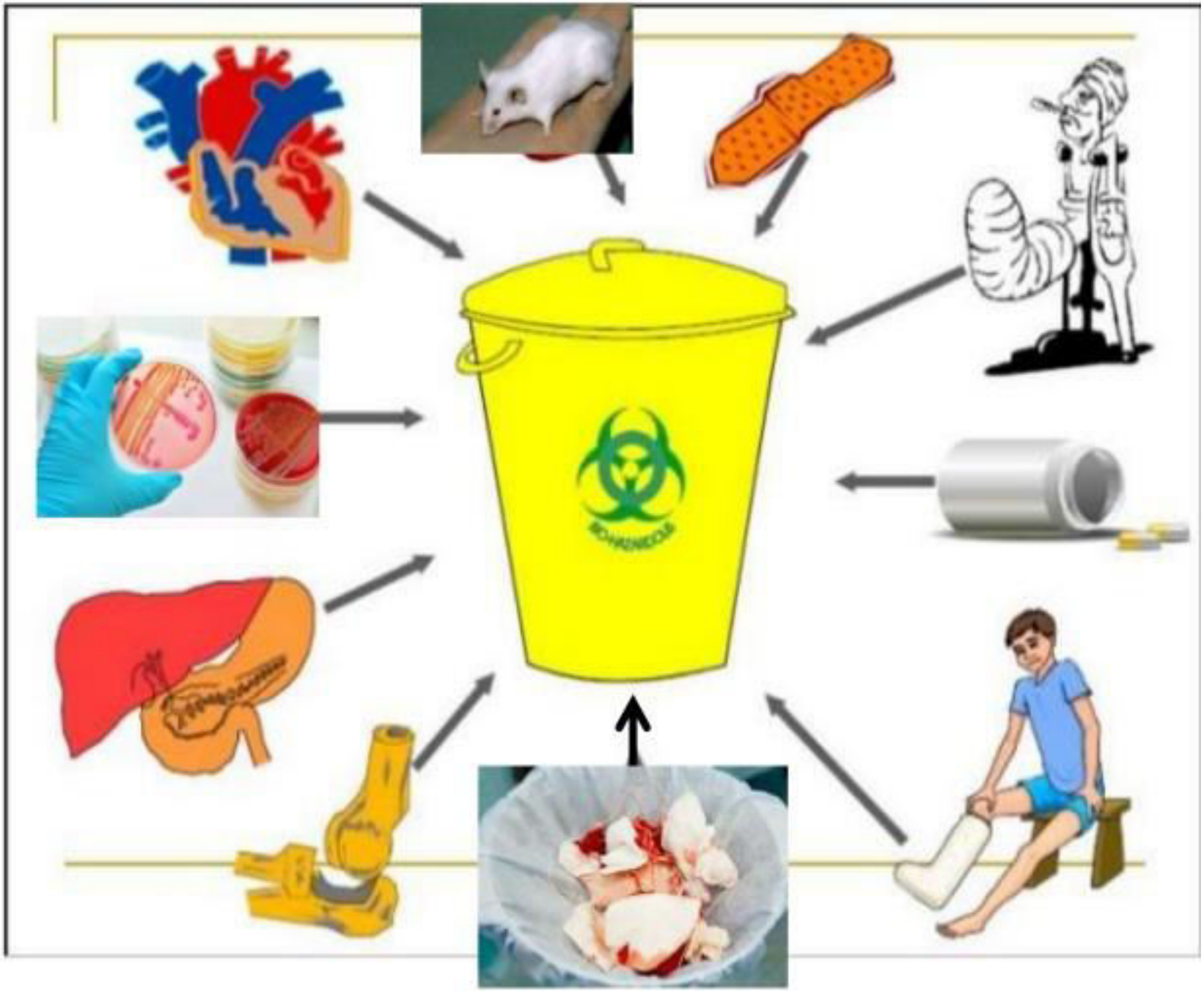
Yellow bag: For infectious non plastic waste.

Red bag: for infectious plastic waste.

White or translucent sharp container:

(Puncture – Proof) – for metal sharp

Blue container (Puncture – proof box) for broken glass items and metal implants.










Ankle Implants


SoClean
SHARP WASTE ONLY

Specification of waste receptacle :

According to WHO plastic bags must be labeled with biohazard logos, non chlorinated with a thickness of $\geq$ 50 µm .

Sharp – box should be a puncture – proof and leak – proof and tamper – proof impermeable container that is difficult to break open after closure.

Either disposable or reusable after disinfection.

Onsite collection and transport to central storage area:

Onsite transport should take place during less busy hours.

Set routes should be used to prevent exposure to staff and patients through separate lifts.

PPE: Health care workers handling BMW during transport or in the storage area should wear appropriate PPEs such as heavy duty gloves

Dedicated trolley :

Separate trolley for general and hazardous waste painted with appropriate colors and having biohazard logo.

Routings:

- Regular transport routes and collection timings should be fixed.
- In general a waste route should follow the principle "from clean to dirty".
- ex: ICUs, dialysis and theaters
- Interim storage of BMW is strongly discouraged in the wards.

Central storage area :

- Have an impermeable , hard – standing floor with good drainage .

Storage time :

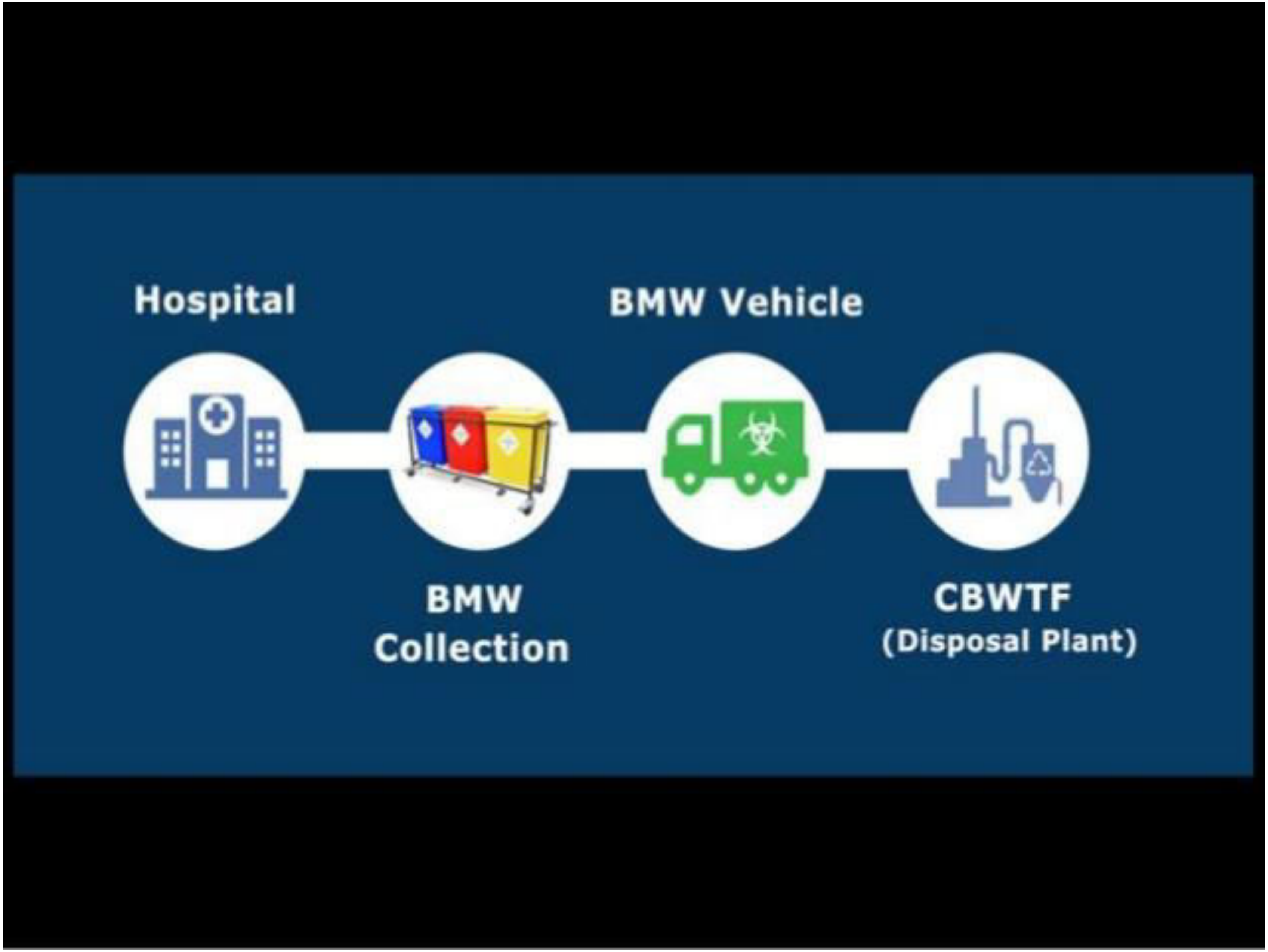
According to WHO's blue book, storage times for infectious waste should not exceed:

Warm climate (India) :48 hours during the cool season

24 hours during the hot season

Transport to Common biomedical waste treatment facility(Operator) :

Should be on daily basis in a dedicated closed type transport vehicle


Hospital
BMW Vehicle
BMW
Collection
CBWTF
(Disposal Plant)

Treatment and disposal methods:

As per the mandate of the BMWM rules 2016, only seggregation and pretreatment (for microbiology waste) is required at the Health care facility level.

Final disposal and recycling must be performed at CBMWTF.

Incineration :

For the wastes that cannot be reused ,recycled or disposed off in a land fill site .

For Ex: Human and animal anatomical waste ,
microbiological waste,
solid non plastic infectious waste.

Autoclave :

Infectious plastic waste and
sharp waste including microbiological waste.

Chemical Disinfection : 1-2% hypochlorite for 20 minutes.

For liquid waste such as blood, urine, stool and hospital sewage.

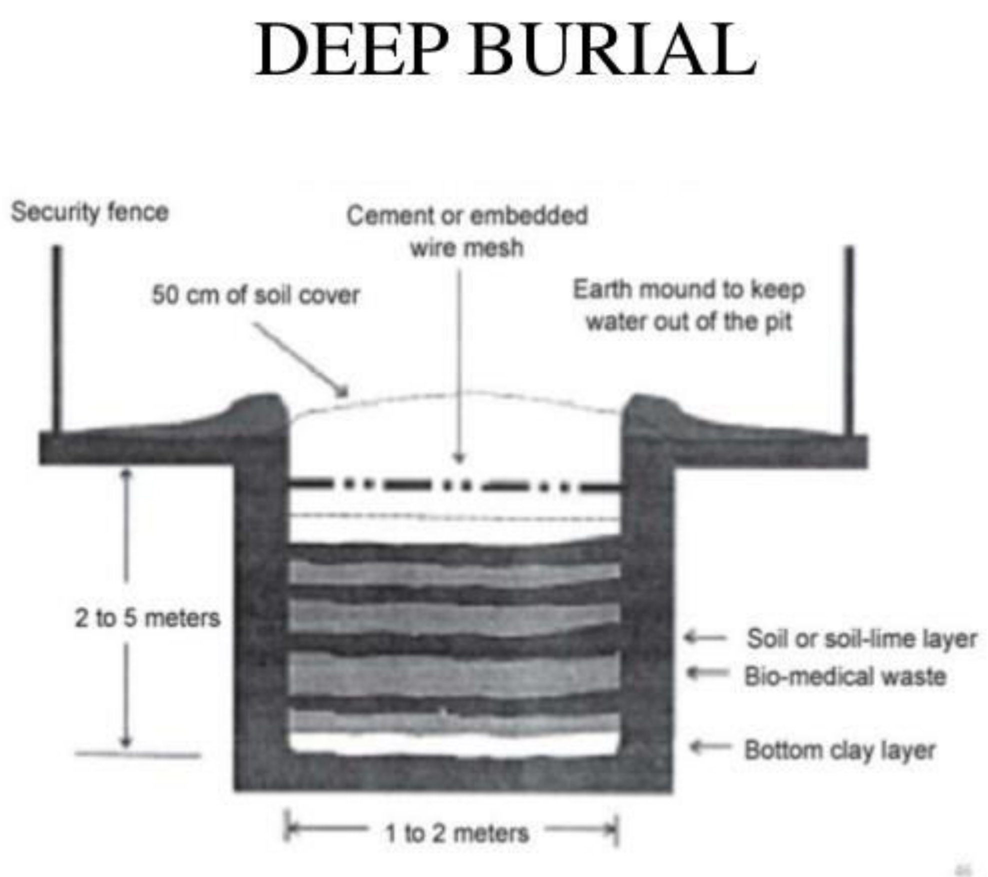
Effluent treatment plan : Liquid effluent generated during the process of washing containers , vehicles, floors etc is first subjected to chemical treatment and then disposed in effluent treatment plant.

Mechanical processes:

shredding

- Used to destroy plastics and sharp solid waste so that their reuse can be prevented.
- 1% sodium hypochlorite is used to treat the inorganic wastes.
- It has a set of blades/shafts ,which cut the waste into small pieces.
- Maintenance cost is high

Deep burial :


DEEP BURIAL
Security fence
Cement or embedded wire mesh
50 cm of soil cover
Earth mound to keep water out of the pit
2 to 5 meters
Soil or soil-lime layer
Bio-medical waste
Bottom clay layer
1 to 2 meters

Sharp pit :

- Constructed within hospital premises provides an alternative method for disposal of the sharp waste.
- 1mx 1mx1m size concrete lined protected pit with a cement lid.
- Sharp containers need to be discarded in entirety.

Inertization

- Mixing waste with cement and other substances before disposal in order to minimize the risk of toxic substances contained in the waste migrating into surface water or ground water.
- Suitable for pharmaceuticals and for incineration ashes
- Not applicable to infectious waste

Duties of stakeholders :

Occupier

Operator

Prescribed authorities.

Duties of occupier :

Occupier means a person having administrative control over the institution

Duties :

1. To provide safe storage of BMW in colored bags
2. To outsource the treatment and disposal facility to CBMWTF if it is within the range of 75km.
3. To establish a barcode system for bags or containers
4. To document and update all the registers regarding BMW and display annual report on website.

BMW AUDIT

Establish a system to review and monitor the activities related to BMWM.

To constitute BMW management committee:

The committee shall meet once in every six months and the minutes of the meetings should be submitted along with the annual report to the prescribed authority and the health care.

BIOMEDICAL WASTE MANAGEMENT COMMITTEE :

Medical superintendent.

BMW – management officer – member secretary

Infection control officer

HODs of hospital

Chief pharmacist

Radiation officer

Nursing superintendent

BMW – management officer is central driving force and should liaise with ICO.

Challenges in implementing biomedical waste 2016 :

- Non availability of nonchlorinated autoclave stable plastic bags or containers.
- Phasing out from chlorinated to nonchlorinated bags in March 2019 may not practically feasible.
- Limited availability of CBMWTF .
- Limited availability of authorized dealer providing barcoding system at an affordable cost.
- Inability of the most of available effluent treatment technologies in removing antimicrobial residues

- Establishing sewage treatment plant for all HCF regardless of the bed strength .
- No written rule mentioning buyback policy for the manufacturer for cytotoxin or pharmaceutical waste.
- Specification for plastic bags and containers such as thickness, size , etc not clearly mentioned.
- Transporting liquid waste in yellow color bag may not be feasible.

Microbiological plastic waste such as Petri dishes with cultures , kits , ICT or ELISA kits, etc.

Ideally it should be treated as infectious plastic and segregate for red bag but in BMW rule it is mentioned as yellow bag.

Monitoring of biomedical waste management :

- BMW seggregation audit by direct observation.
- CCTV camera
- Conducting surveys through structured questionnaires.
- Barcoding based tracking of BMWM starting from segregation to disposal.

Barcode system for effective management of Biomedical waste :

Every HCF should establish a barcode system for BMW bags or containers by 27.03.2019

In A

Bar

All

c

Bag

Occ

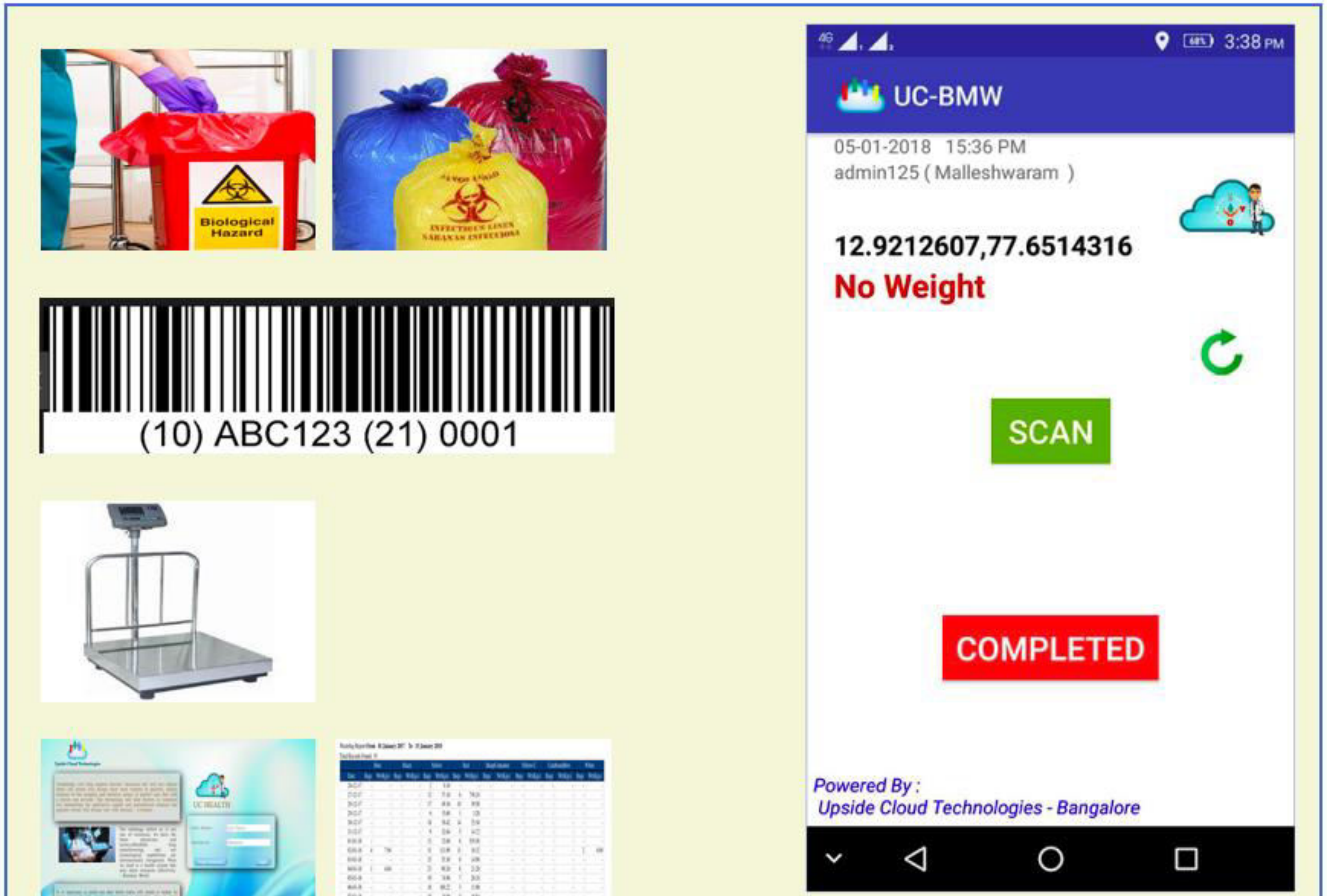
Ope

Collect & sort

Barcode

Scan with weight & Record

Report Generation



UC BMW App Screenshot

Solid general waste management :

Biodegradable waste

Ex: Paper waste,

food waste ,

kitchen waste.

Compost pit within the premises.

Vermicomposting and

converting waste to energy.

Nonbiodegradable waste

Ex: Plastic bottles,

aluminum cans

diapers, etc.


Thank you!