A decorative vertical bar in a dark blue-grey color runs along the left edge of the page. From the bottom of this bar, several thin, curved lines in varying shades of blue and grey extend upwards and outwards, creating an abstract, organic shape.

Biomedical Waste Management Manual

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THINK OUTSIDE THE TRASH.....

Reduce, reuse, recycle, replenish!!

Did you know?

*Recycling **1 aluminium can** saves enough energy to run a TV for 3 hours!*



**One man's trash is another man's
treasure.....**

Chapter I:
Introduction

What is biomedical waste (BMW)?

*“Bio-medical waste” means any waste generated during the **diagnosis, treatment***
or

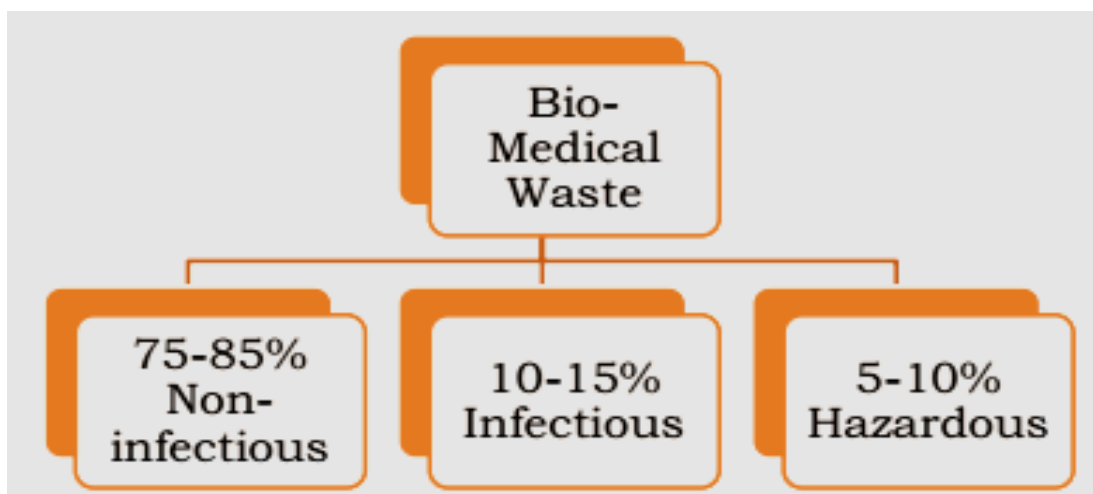
***Immunization** of human beings*

or

*Animals or **research activities** pertaining thereto*

or

*In the production or testing of **biologicals**.*



What is Not Biomedical Waste?

- **Kitchen or domestic waste**
- **Office generated waste, paper waste**
- **Non-hazardous chemicals**
- **Scrap metal**
- **Electronic waste**
- **Wooden cardboards**



Need for BMW management



BMW may have serious public health consequences and a significant impact on the environment!

WHO has estimated that. . .

In year 2000, injections with contaminated syringes caused:

- 21 million **hepatitis B virus (HBV)** infections (32% of all new infections)*
- 2 million **hepatitis C virus (HCV)** infections (40% of all new infections)*
- 2.6 million **HIV** infections (5% of all new)*



Health disaster associated with the re-use of contaminated syringes

An outbreak of Viral Hepatitis B in Modasa Town, Gujarat

In the year 2009, Modasa town of Sabarkantha district, Gujarat witnessed the outbreak of hepatitis B virus. Around 800 cases and 1000 contacts were evaluated for the virus. Investigations revealed that the root cause of this outbreak was inadequately sterilized needles and syringes. Unsafe injection practices by private practitioners in the Modasa town and surrounding areas directed the transmission of this virus. This outbreak was of serious concern as it led to the death of 100 cases. Within four months of this incident, doctors and traders involved faced serious penalty. This incident puts light on the importance of pre-treatment of biomedical waste especially while handling this virus.

Source: Patel et al., 2012. J Glob Infect Dis. 2012 Jan;4(1):55-9

Chapter II:
BMW Management at IRSHA

STEPS INVOLVED



**Steps in the
Management of
Biomedical Waste**

Segregation of waste in colour coded bags at the point of generation

1

Intra-departmental transportation of segregated waste to a common storage area

2

Temporary storage of biomedical waste in central storage area

3

Transport to authorized facility (PASSCO Pvt. Ltd.)



4

Segregation

- It refers to the basic separation of different categories of waste generated at source
- Reduces the risks and cost of handling and disposal
- Effective segregation alone can ensure effective bio-medical waste management



Categories of BMW

Category	Type of Bag/container used	Type of waste
Yellow 	Non-chlorinated plastic bags Separate collection system leading to effluent treatment system	a. Human anatomical waste b. Animal anatomical waste c. Soiled waste d. Expired or discarded medicines e. Chemical waste f. Micro, other clinical lab waste g. Chemical liquid waste
Red 	Non-chlorinated plastic bags or containers	Contaminated waste (Recyclable) Tubing, bottles, IV tubes and sets, catheters, urines bags, syringes (without needles) and gloves
White 	(Translucent) Puncture, Leak, tamper proof container	Waste sharps including Metals
Blue 	Cardboard boxes with blue colored marking	Glassware



Biomedical Waste Segregation

(Biomedical Waste Management Rules, 2016)



Yellow Bag

- Human/ Animal anatomical waste
- Soiled waste including gloves
- Expired chemicals/ reagents
- Microbiological waste



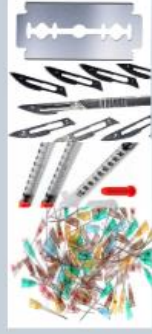
Red Bag

- Plastic & rubber waste
- Vials & tubes
- Vacutainers
- Syringes without needles
- Gloves



White Container

- Contaminated Sharps
- Needles
- Syringes
- Blades
- Scalpels



Blue Bin

- Broken or discarded glass
- Beakers, flasks, pipettes
- Glassware contaminated with chemicals (except cytotoxic waste)



YELLOW BIN

Human and animal anatomical waste, soiled waste, expired or discarded medicines, chemical solid and liquid waste, microbiology, biotechnology and other clinical laboratory waste



RED BIN

Contaminated Waste (Recyclable)

Wastes generated from disposable items such as tubing, bottles, intravenous tubes and sets, syringes (without needles and fixed needle syringes) and vacutainers with their needles cut) and gloves



BLUE BIN

Glassware

Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic waste



WHITE CONTAINER

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.



Waste Sharps including Metals



BMW Pretreatment (yellow category)

- On-site pre-treatment of laboratory waste, microbiological waste, blood samples, blood bags

Methods

- **Chemical disinfection**
- **Autoclave**

Chemical/liquid waste

- Some chemicals require pre-treatment before they can be safely disposed of by other types of disposal methods.
- Liquid laboratory wastes that are commonly disposed of in the sink include used buffer solutions, neutralized acids and caustics, and very dilute aqueous solutions of water-soluble organic solvents (e.g., methanol, ethanol).
- Any form of liquid waste should be diluted with at least a 100-fold excess of water or with a large excess of water up to 10 gallons.
- Acids should be neutralised with an equal volume of a base and further diluted in water to flush into the sink.

In case of chemical spills . . .

- Acid spills should be neutralized with sodium bicarbonate and then cleaned up with a paper towel or sponge.
- If the spill water contains bacteria, clean the area with bleach and dispose of the paper towels and gloves as biological waste.

Autoclaving

Each autoclave should have graphic or computer recording devices which will automatically and continuously monitor and record dates, time of day, load identification number and operating parameters throughout the entire length of the autoclave cycle

All records to be kept for 05 years

Gravity displacement type

- where air is pushed out of the autoclave by steam under pressure
- This system operates at temperatures of 121°C and has a cycle time of approximately 60 - 90 minutes



Validation test for autoclave

- Use four biological indicator strips , one is used as a control and left at room temperature,
- Three will be placed in the approximate centre of three containers with the waste
- *Frequency:* Conduct this test three consecutive times to define the minimum operating conditions
- The temperature, pressure and residence time at which all biological indicator vials or strips for three consecutive tests show complete inactivation of the spores
- Follow – on action once in three months and maintain records

Temporary storage of BMW

The bags containing lab waste are brought for safe retention to the temporary storage facility till they are disposed off



Transport

- Offsite transport is the carriage of health-care waste on the public streets away from a health-care facility
- Biomedical Waste from storage area is transferred to the common regional facility for BMW final disposal - **Passco Environmental Solutions Pvt.Ltd, MPCB, Pune.**



Personal protective equipment (PPE)

Use of appropriate PPE mandatory when segregating, packing, transporting, and storing BMW.



Chapter III:
BMW Management Rules, 2016

As relevant to IRSHA

These rules don't apply for:

- **Radioactive wastes**
- **Hazardous chemicals**
- **Lead acid batteries**
- **E-waste**
- **Municipal solid wastes**
- **Hazardous microorganisms, genetically engineered microorganisms and cells**

Features of management rules everyone should know...

- a. The scope of the rules has been expanded to include vaccination camps, blood donation camps, surgical camps or any other healthcare activity
- b. Phase-out the use of chlorinated plastic bags, gloves and blood bags within two years
- c. Pre-treatment of the laboratory waste, microbiological waste, blood samples and blood bags through disinfection sterilization on-site in the manner as prescribed by WHO or NACO

Contd . . .

- d. Provide training to all its health care workers and immunize all health workers regularly.
- e. Establish a Bar-Code System for bags or containers containing bio-medical waste for disposal.



- f. Report major accidents
- g. BMW has been classified in to 4 categories instead of 10 to improve the segregation of waste at source yellow, red, white and blue
- h. No occupier shall establish on-site treatment and disposal facility, if a service of `CBMWTF is available at 75 km.
- i. Operator of a CBMWTF to ensure the timely collection of bio-medical waste from the HCF and assist the HCF in conduct of training.

Important considerations by occupier...

1. To provide a safe, ventilated and secured location for storage of segregated BMW within premises.
2. Phase out use of chlorinated plastic bags, gloves and blood bags within two years from the date of notification of these rules
3. Provide training to all its health care workers and others involved in handling of BMW.
4. Immunization against Hepatitis B and tetanus for workers.
5. Establish a Bar-Code System for bags or containers containing bio-medical waste to be sent out of the premises.

Schedule I

Categories of bio-medical wastes



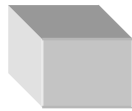
Yellow



Red



Blue



White

Schedule II

Standards for treatment and disposal of bio-medical wastes

- Standards for waste autoclaving
- Standards for liquid waste

Schedule III

List of Prescribed Authorities and the Corresponding Duties

Schedule IV

Labels for BMW containers/bags (Part A)

Biohazard symbol



Cytotoxic hazard symbol



HANDLE WITH CARE

Note: Label shall be non-washable and prominently visible

Form 1: ACCIDENT REPORTING

1. Date and time of accident:
2. Sequence of events leading to accident
3. The waste involved in accident
4. Assessment of the effects of the accidents on human health and the environment
5. Emergency measures taken
6. Steps taken to alleviate the effects of accidents
7. Steps taken to prevent the recurrence of such an accident

FORM 2: As per Biomedical Waste Management Rules, 2016, the Authorization (for operating facility) for the generation, collection, reception, treatment, storage, transport, and disposal is given below:



QMS-ISO-9001:2008
EMS-ISO-14001:2004
Reg. No. RI91/8395
Division : PMC Registered



CERTIFICATE

Date : 02/07/2019

This is to Certify that in terms of Bio Medical Waste Treatment Facility agreement dt. 20.04.2009 with Pune Municipal Corporation, you are hereby granted registration for and on behalf of Pune Municipal Corporation from **02/07/2019** till **31/03/2020**

Registration No. 006992

PESPL Code	Name & Address of the Occupier	Category	No. of Beds
PL000518	INTERACTIVE RESEARCH SCHOOL FOR HEALTH AFFAIRS (MISHR) SR.NO 79/80/81/76/4 (F),,BHARATI VIDYAPITH,,KATRAJ,,PUNE,411046	PATHOLOGICAL LAB	N.A.

As per Biomedical Waste Management Rules, 2016 and MPCB norms, proper segregation & disposal of the same by delivering the waste to the CBWTF vehicle at designated point is the responsibility of individual Generator.

Compliance as per MPCB rules as under be ensured from your end :-

1	Proper segregation and handing over the waste to us.
2	Waste sharps, needles, metals as per schedule I (Category White) of Biomedical Waste Management Rules, 2016 to be handed in puncture-proof, leak-proof, tamper-proof container with white barcode.
3	Glass material and metallic body implants after disinfection by soaking washed glassware after cleaning with detergent and Sodium Hypochlorite treatment or through autoclaving or microwaving or hydroclaving as per schedule I Category (a) & (b) Blue of Biomedical Waste Management Rules, 2016 to be handed over in cardboard box with blue barcode.
4	Ensure delivery of biomedical waste in red bag, yellow bag, white barcode container, blue barcode box to collection vehicle.
5	No untreated bio-medical waste should be kept stored beyond a period of 48 hours.

We hereby certify that the Bio Medical Waste received at our end is disposed off as per the norms laid down by MPCB from time to time

For Passco Environmental Solutions Pvt. Ltd.

Authorized Signatory



PASSCO ENVIRONMENTAL SOLUTIONS PVT. LTD.

Operator Common Bio-Medical Waste Treatment Facility for P.M.C./P.C.M.C. Area

Regd. Office : "Narayani" 34/4 Erandawane, Behind Eisen Pharmaceuticals, Pune-411 004. India. **Telefax** : +91 20-6602 4765, 2546 7096

P.M.C. Site Office : Kailash Crematorium Compound, Next to Naidu Hospital, Pune - 411 001.

P.C.M.C. Site Office : S. No. 172, 173, 174, Y.C.M. Hospital, Ground Floor, Sant Tukaram Nagar, Pimpri-411 018. **Tel.** : +91 20 2742 0395, 6733 2149

• **Email** : helpdesk@passco.in • **Website** : www.passco.in

CIN : U33129PN2005PTC020340

FORM 4 ANNUAL REPORT

- To be submitted to the prescribed authority by 31 January every year
- Name of the occupier with Address
- Categories of waste generated and quantity [monthly average] basis
- Name of treatment facility with Address
- Category-wise quantity of waste treated
- Mode of treatment with details
- Any other information

Non-compliance to these rules may lead to...

Imprisonment of five years

OR


a fine of *Rs. 1 lakh*

OR

Both

**As per provisions of Environment (Protection)
Act, 1986**

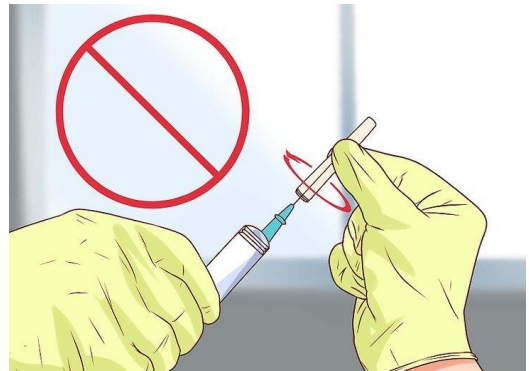
Do's & Don'ts

Do's	Don'ts
<p>Prior segregation of waste is a must</p> 	 <p>Do not allow the bags/ containers to overflow</p>
<p>Vaccination should be taken against Hep B</p> 	 <p>The waste bag should not be hanging at the edge</p>
<p>Wear heavy duty gloves while handling infectious waste</p> 	 <p>Do not transport the waste by dragging the bags</p>

Tie the biohazard bags when filled up to 3/4th level



Do not recap the needles



Clean any spills with appropriate disinfectant



Do not throw needles in biohazard bags or non-puncture proof containers

