



GOVERNMENT MEDICAL COLLEGE & HOSPITAL-32, CHANDIGARH



MANUAL FOR BIOMEDICAL WASTE MANAGEMENT



MANUAL FOR BIOMEDICAL WASTE MANAGEMENT



Authors:

- Prof. Ravi Gupta, MS (Orthopedics), DNB, FRCS, FACS, FAMS, FIMSA
Medical Superintendent
- Prof. Sanjeev Palta, MBBS, MD (Anaesthesia)
Joint Medical Superintendent.
- Dr. Sonali Shamdasani, MBBS, DNB (Health & Hospital
Administration)
Senior Resident, Department of Hospital Administration.



Preface

Hospitals generate substantial quantity of wastes that has potential to cause health and environmental hazards. In order to streamline the waste collection, processing and disposal practices, the Government of India has been revising the rules from time to time. On March 28, 2016, the Government of India published the “Biomedical Waste Management Rules, 2016” in supersession of the Biomedical Waste (Management and Handling) Rules, 1998. In the new Biomedical Waste Management Rules, 2016, several changes and additions have been made to further improve the collection, segregation, processing, treatment and disposal of the biomedical wastes in an environmentally sound manner. Under the new regime, the coverage has been increased to include vaccination camps, blood donation camps, surgical camps etc. and also provision for pre-treatment of lab waste, blood samples, etc. It has simplified the process of categorisation of waste and authorisation. The rules clearly delineate the duties of occupier i.e. healthcare facility and operator of common biomedical waste treatment facility. In the public interest, the Biomedical waste management rules, 2016 have been further amended on March 28, 2018 as “Bio-Medical Waste Management (Amendment) Rules, 2018”.

The biomedical waste poses risk of hazards due to sharps, recycling of disposables, air, water, soil pollution etc. This requires spending of so many resources in terms of money, manpower, material and machine for management of hospital waste. All officials, medical, paramedical staff, attendants, safaikaramcharis and also general public should be well oriented to the biomedical waste management rules so that adverse effects to human health and environment are avoided.

Thus, this manual aims at elucidating the Biomedical waste management rules, 2016 and its salient features, along with Bio-Medical Waste Management (Amendment) Rules, 2018. The manual also entails need to follow the rules and how the waste generated from all over the hospital is handled in our hospital (GMCH). It is not only important for efficient patient care but also has legal implications.

**Prof. Ravi Gupta,
Medical Superintendent**

Acknowledgement

The biomedical waste management manual will remain incomplete without expressing gratitude to the contributors of this manual as well as the hospital staff who have made implementation of the rules possible.

Worthy Medical Superintendent was the first to envisage the idea of this manual, with the vision that each and every staff of GMCH should be aware of the biomedical waste management rules and how the waste is being handled at GMCH. Thus, we are grateful to him for conceptualising the idea and his leading contribution in converting idea into reality.

Heartfelt gratitude for Joint Medical Superintendent who has always been there for providing guidance at all stages while framing of the manual.

Gratitude is also expressed to Dr. Ashwani Dalal, Dy. Medical Superintendent III, who has taken the responsibility of monitoring the activities of BMW and is handling challenges faced during biomedical waste management dexterously making the correct application of rules possible.

The Department of Hospital Administration has always been at the forefront of implementation of the rules. The contribution of hospital administration by keeping the staff updated about the rules through training classes conducted time to time, taking corrective actions if anything found wrong during rounds, displaying of the poster in all areas of the hospital etc. is significant.

Nevertheless, contribution of Nursing Superintendent has been considerable in managing such a large cadre of nursing staff and ensuring that the waste is being handled in a proper manner. The work of Ms. Navjot, ANS Incharge BMW is also appreciated who has been supervising the activities of biomedical waste management meticulously.

Thanks to Ms. Mamta, Incineration Supervisor for all the help she has provided towards the formulation of this manual and also for taking the pain in managing day to day activities in biomedical waste management.

Lastly, we thank all the hospital staff who are working day and night in various areas of the hospital for providing efficient and effective patient care during which they have been giving their valuable contribution in biomedical waste management. We hope this manual will be of help for all the hospital staff.

Dr. Sonali Shamdasani
Senior Resident, Admin.

TABLE OF CONTENTS

1. Government Medical College & Hospital, Chandigarh: A Brief Overview...	1
2. Biomedical Waste Management: An Overview.....	2
3. Need of Biomedical Waste Management.....	3
4. Landmark decisions to streamline hospital waste management.....	4
5. Bio-Medical Waste Management Rules, 2016.....	6
6. Biomedical Waste Management at GMCH.....	15
7. Responsibilities of various categories of staff.....	24
8. Annexures.....	25
• Annexure I: Form I- Accident reporting.....	25
• Annexure II: List of prescribed authorities and the corresponding duties.....	26
• Annexure III: Segregation list of common items in hospital as per bio-medical waste management rules 2016 (English and Hindi).....	30
9. Abbreviations.....	32

GOVERNMENT MEDICAL COLLEGE & HOSPITAL, CHANDIGARH: A BRIEF OVERVIEW

GMCH was established in the year 1991 as a medical college with intake of 50 MBBS students and 500 bedded hospital. Due to high quality medical care and medical education, GMCH has made a niche in the region and has emerged as a highly popular institution. It is ranked in the first 10 Government Medical Colleges of the country with present intake of 100 MBBS students and 122 postgraduate students every year. GMCH caters not only to patients from Chandigarh but also patients hailing from the surrounding states of Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir and Rajasthan. There has been rise in number of beds from 500 in year 1991 to 813 beds at present. GMCH is providing not only specialist care but also super speciality services like Neurosurgery, Neurology, Cardiology, Urology, Gastroenterology, Endocrinology, Nephrology etc. The bed occupancy is 104% and about 10,000 patients visiting the OPDs per week. The emergency has around 350-400 patients visiting it per day. Thus, hospital generates enormous hospital waste and effective handling of the bio medical waste is a major challenge for the hospital administration of the institute.

BIOMEDICAL WASTE MANAGEMENT: AN OVERVIEW

Biomedical waste is defined as “any solid, fluid and liquid or liquid waste, including its container and any intermediate product, which is generated during the diagnosis, treatment or immunisation of human being or animals, in research pertaining thereto, or in the production or testing of biologicals and the animal waste from slaughter houses or any other similar establishment”. All biomedical wastes are hazardous.

According to WHO,

- Nearly 85% of all waste generated by hospital is general waste.
- About 15% waste is Bio-medical Waste, which includes
 - ✓ Infectious waste - 10%.
 - ✓ Non-infectious waste such as radioactive and chemical wastes - 5%.

In a large tertiary care hospital in India, the waste generated is about 1-2 kg/bed/day as against 2.8 kg/bed/day from a similar sized hospital in USA.

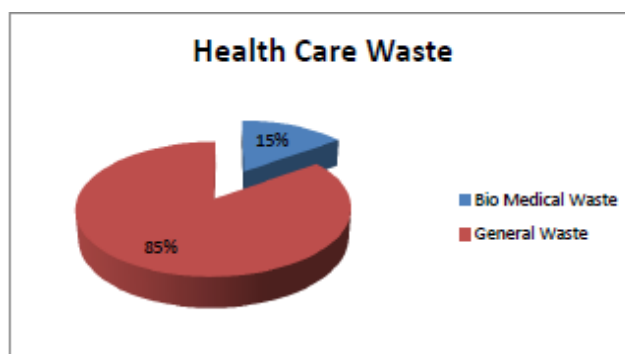


Figure 1. Percentage-wise classification of waste generated from the Health Care Facility.

Hospital waste management is a part of hospital hygiene and maintenance activities. In fact, only 15% of hospital waste (not whole of the waste) i.e. “Biomedical waste” is hazardous. But when hazardous waste is not segregated at the source of generation and mixed with nonhazardous waste, then 100% waste becomes hazardous.

NEED OF BIOMEDICAL WASTE MANAGEMENT

The need or rationale for spending so many resources in terms of money, manpower, material and machine for management of hospital waste are due to following risks:

1. Injuries from sharps leading to infection to all categories of hospital personnel and waste handlers.
2. Nosocomial infections in patients from poor infection control practices and poor waste management.
3. Risk of infection outside hospital for waste handlers and scavengers and at times, general public living in the vicinity of the hospitals.
4. Risk associated with hazardous chemicals and drugs to persons handling wastes at all levels.
5. Risk of recycling of “Disposables” which are being repacked and sold by unscrupulous elements.
6. Risk of spurious drugs due to repacking of disposed off drugs to unsuspecting buyers.
7. Risk of air, water and soil pollution directly due to waste, or due to defective incineration, emissions and ash.



LANDMARK DECISIONS TO STREAMLINE HOSPITAL WASTE MANAGEMENT

Some landmark decisions to streamline hospital waste management have been made in the past. These are:

1. Supreme Court judgment dated 1st March, 1996 in connection with safe disposal of hospital waste ordered that:

- a. All hospitals with 50 beds and above should install either their own incinerator or an equally effective alternative method before 30th November, 1996.
- b. The incinerator or the alternative method should be installed with a necessary pollution control mechanism conforming to the standards laid down by Central Pollution Control Board (CPCB).
- c. Hazardous medical waste should be segregated at source and disinfected before final disposal.

2. Ministry of Environment & Forest, Govt. of India issued a notification for Biomedical Waste (Management & Handling) Rules, 1998 in exercise of powers conferred by Section 6, 8 & 25 of the Environment (Protection) Act, 1986 that was published in The Gazette of India Extraordinary, Part-II, Section 3-Sub-Section (ii) New Delhi, July 27, 1998. The salient features of Biomedical Waste (Management & Handling) Rules, 1998 are:

- a. The rules were restricted to healthcare facilities with more than 1000 beds and they are required to obtain authorisation.
- b. Biomedical waste was divided into ten categories as per their treatment and disposal methods.
- c. Biomedical waste should be segregated into containers/bags at the point of generation itself.
- d. The containers should be clearly marked with the bio-hazard and cytotoxic hazard symbol.

3. Presently, Biomedical Waste Management Rules, 2016 are an attestation to the commitment of the Govt. of India.

“Bio-medical Waste Management Rules, 2016” came into force in supersession of the 1998 rules with gazette notification no. G.S.R. 343(E), dated 28th March, 2016. Further, the rules have been amended and published in the Gazette of India, Extraordinary, vide G.S.R. 343(E), dated the 28th March, 2016, after having dispensed with the requirement of notice under clause (a) of sub-rule (3) of rule 5 of the said rules in public interest, namely the [Bio-Medical Waste Management \(Amendment\) Rules, 2018](#).

According to Bio-medical Waste Management Rules, 2016, the Central Pollution Control Board and the State Pollution Control Committees have the authority to cancel the consent to operate and the authorization of healthcare institutions, for non-compliant hospitals. Indeed, there have been such instances in India.

It is therefore, essential that:

- ✓ All officials concerned with the administration of hospitals and other health care echelons to take all steps to adhere to the laid down directives to ensure that waste generated is handled at source without any adverse effect to human health and environment.
- ✓ It is equally important that all medical, dental, nursing officers, other paramedical staff and waste handlers such as safai karmacharis, hospital attendants & sanitation attendants be well oriented to the basic requirements of handling and management of biomedical waste.

[BIO-MEDICAL WASTE MANAGEMENT RULES, 2016#](#)

Steps in the management of biomedical waste include:

- a. Generation
- b. Segregation

- c. Collection
- d. Storage
- e. Treatment
- f. Transport
- g. Disposal.

Thus, the Bio-medical Waste Management rules are applicable to all persons who generate, segregate, collect, receive, store, treat, transport, dispose, or handle bio medical waste in any form.

In addition to Bio-Medical Waste rules 2016, the following types of wastes are also covered under different other acts:

1. Radioactive wastes (Atomic Energy Act, 1962).
2. Hazardous chemicals (Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989).
3. Lead acid batteries (Batteries (Management and Handling) Rules, 2001).
4. Hazardous wastes (Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016).
5. E-waste (e-waste (Management) Rules, 2016).
6. Municipal solid wastes (Solid Waste Management rules, 2016).
7. Hazardous microorganisms, genetically engineered microorganisms and cells (Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms, Genetically Engineered Micro organisms or Cells Rules, 1989).

Salient features of BMW Management Rules, 2016 along with Bio-Medical Waste Management (Amendment) Rules, 2018

1. The scope of the rules has been expanded to include vaccination camps, blood donation camps, surgical camps or any other healthcare activity.

2. Phase-out the use of chlorinated plastic bags, gloves and blood bags within two years of notification of BMW management 2016 rules i.e. by 27th March, 2018. But as per the **Bio-Medical Waste Management (Amendment) Rules, 2018**, use of chlorinated plastic bags (excluding blood bags) and gloves has to be phased out by the 27th March, 2019.
3. 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.
4. Provide training to all its health care workers and immunize all health workers regularly against diseases like tetanus and Hepatitis B.
5. Establish a Bar-Code System for bags or containers containing bio-medical waste for disposal within one year of notification of rules i.e. 27th March, 2017. But as per the **Bio-Medical Waste Management (Amendment) Rules, 2018**, bar-code System has to be established in accordance with the guidelines issued by the Central Pollution Control Board by 27th March, 2019.
6. Report major accidents like needle stick injuries, broken mercury thermometer, accidents caused by fire, blasts during handling of bio-medical waste and the remedial action taken and record the same in Form I (**Annexure I**).
7. Procedure to get authorization is simplified.
8. The new rules prescribe more stringent standards for incinerator to reduce the emission of pollutants in environment.
9. No hospital/ healthcare facility (occupier) shall establish on-site treatment and disposal facility, if a service of “common bio-medical waste treatment facility” (CBMWTF) is available at seventy-five kilometers.
10. Operator of a common bio-medical waste treatment and disposal facility to ensure the timely collection of bio-medical waste from the healthcare facility and assist the healthcare facility in conducting training.

11. Bio-medical waste has been classified into 4 categories instead of 10 categories as per Biomedical Waste (Management & Handling) Rules, 1998 to improve the segregation of waste at source.

DUTIES OF OCCUPIER (HOSPITAL/ HEALTHCARE FACILITY):

1. To provide a safe, ventilated and secured location for storage of segregated BMW within premises.
2. As per the Bio-Medical Waste Management (Amendment) Rules, 2018, use of chlorinated plastic bags (excluding blood bags) and gloves has to be phased out by the 27th March, 2019.
3. Provide training to all its health care workers and others involved in handling of bio medical waste at the time of induction and once a year thereafter and maintain records for the same.
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 by 27th march, 2019 as per the Bio-Medical Waste Management (Amendment) Rules, 2018.
6. Maintain and update the bio-medical waste management register daily and display the monthly and annual record on website.
7. Report major accidents like needle stick injuries, broken mercury thermometer, accidents caused by fire, blasts during handling of bio-medical waste and the remedial action taken and record the same in Form I.

DUTIES OF OPERATOR OF COMMON BIO-MEDICAL WASTE TREATMENT FACILITY:

1. Report major accidents including accidents caused by fire, blasts during handling of bio-medical waste and the remedial action taken and record the same in Form I to State Pollution Control Board.
2. Ensure timely collection of BMW from healthcare facilities.

3. Handing over of recyclable waste after treatment by autoclaving and incineration.
4. Establish bar coding and global positioning system for handling by 27th March, 2019 as per the Bio-Medical Waste Management (Amendment) Rules, 2018.
5. Assist health care facilities in training of workers.
6. Upgradation of existing incinerators and achievement of standards for secondary chamber.

TREATMENT AND DISPOSAL:

1. No healthcare facility shall setup onsite BMW treatment facilities if a CBMWTF exists within 75 kms of distance.

SEGREGATION, PACKING, STORAGE AND TRANSPORT:

1. Bio-medical waste classified into 4 categories based on treatment options.
2. No untreated bio-medical waste shall be mixed with other wastes.
- 3. Untreated human anatomical waste, animal anatomical waste, soiled waste and, biotechnology waste shall not be stored beyond a period of forty –eight hours.**
- 4. If required to store beyond 48 hours, the occupier shall ensure that it does not affect human health and inform the SPCC with reason.**

AUTHORIZATION:

1. One time Authorization for Non-bedded HCFs.
2. The validity of authorisation for bedded health care facility and operator of a common facility shall be synchronised with the validity of the consents.

ANNUAL REPORT:

1. Every occupier or operator of CBMWTF shall submit an annual report to the prescribed authority by 30th of June every year.
2. The prescribed authority shall compile, review, analyze and report to the CPCB on or before 31st July every year.
3. The CPCB shall submit a report on the same to the Ministry of Environment, Forest & climate change by 31st August every year.
4. The Annual reports shall be available on the websites of the occupier, SPCB and the CPCB.

MAINTENANCE OF RECORDS:

1. Records in relation to generation, collection, reception, storage, transportation, treatment and disposal shall be maintained for 5 years as per rules.

ACCIDENT REPORTING:

1. In case of major accident, the authorised person shall intimate immediately and submit a report within 24 hours regarding the remedial steps taken.

SCHEDULES:

There are 4 schedules (or parts) in the Bio-Medical Waste rules, 2016:

Schedule I (Part-1 & 2): Categorization and Management of BMW.

Schedule II: Standards for treatment and disposal of BMW.


Schedule III: Prescribed Authorities and corresponding duties.


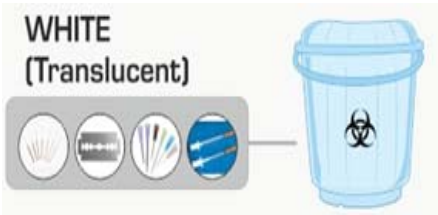

Schedule IV: Label of containers or bags **(Part A)** and label for transportation of Bio-Medical waste bags or containers **(Part B)**

Schedule I of Bio-medical Waste Management Rules, 2016 contains details of Bio-medical Waste categories and their segregation, collection, treatment, processing and disposal options.

Part 1: Bio-medical waste classified into 4 categories based on treatment options:

Table 1: Classification of BMW based on treatment.

Category	Type of bag / container used	Type of waste	Treatment/ disposal options
 <p>YELLOW</p>	<p>Non-chlorinated plastic bags</p> <p>Separate collection system leading to effluent treatment system</p>	<p>a) Human Anatomical Waste b) Animal Anatomical Waste c) Soiled Waste d) Expired or Discarded Medicines & 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. Also routine mask & gown as per BMW rules, 2018.</p>	<p>Incineration or Plasma pyrolysis or deep burial*</p>

	<p>Non-chlorinated plastic bags or containers</p>	<p>Contaminated Waste (Recyclable) Vacutainers, tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves</p>	<p>Autoclaving/ microwaving/ hydroclaving and then sent for recycling, not sent to landfill</p>
	<p>(Translucent) Puncture, Leak, tamper proof containers</p>	<p>Waste sharps including Metal sharps-Needles, Syringes with fixed needles, Needles from needle tip cutter/burner, Scalpels, Blades</p>	<p>Auto or Dry Heat Sterilization followed by shredding or mutilation or encapsulation</p>
	<p>Cardboard boxes with blue colored Marking. Puncture proof and leak proof boxes or containers with blue colored marking, as per BMW rules, 2018</p>	<p>Broken/ discarded glass- Medicine vials & ampoules except those contaminated with cytotoxic wastes. Metallic Body Implants</p>	<p>Disinfection or autoclaving, microwaving, hydroclaving and then sent for recycling</p>

Part 2:

1. Chemical treatment should be done using at least 10% sodium hypochlorite having 30% residual chlorine for twenty minutes. But **as per BMW (amendment) rules, 2018, 1% to 2% sodium hypochlorite should be used.**
2. There is no need of chemical pre-treatment before incineration, except for microbiological, lab and highly infectious waste.

3. Syringes should be either mutilated or needles should be cut and or stored in tamper proof, leak proof and puncture proof containers for sharps storage.

Schedule II: Standards for treatment and disposal of BMW- It does not pertain to GMCH but is relevant for operator of CBMWTF.

Schedule III: Prescribed Authorities and corresponding duties (**Annexure II**).

Schedule IV:

Part A: LABEL FOR BIO-MEDICAL WASTE CONTAINERS OR BAGS



Handle with care

Cytotoxic hazard symbol



Handle with care

Part B: LABEL FOR TRANSPORTING BIO-MEDICAL WASTE BAGS OR CONTAINERS

Day Month Year

Date of generation

Waste category Number

Waste quantity.....

Sender's Name and Address:

Receiver's Name and Address:

Phone Number

Phone Number

Fax Number.....

Fax Number

Contact Person

Contact Person

In case of emergency, please contact:

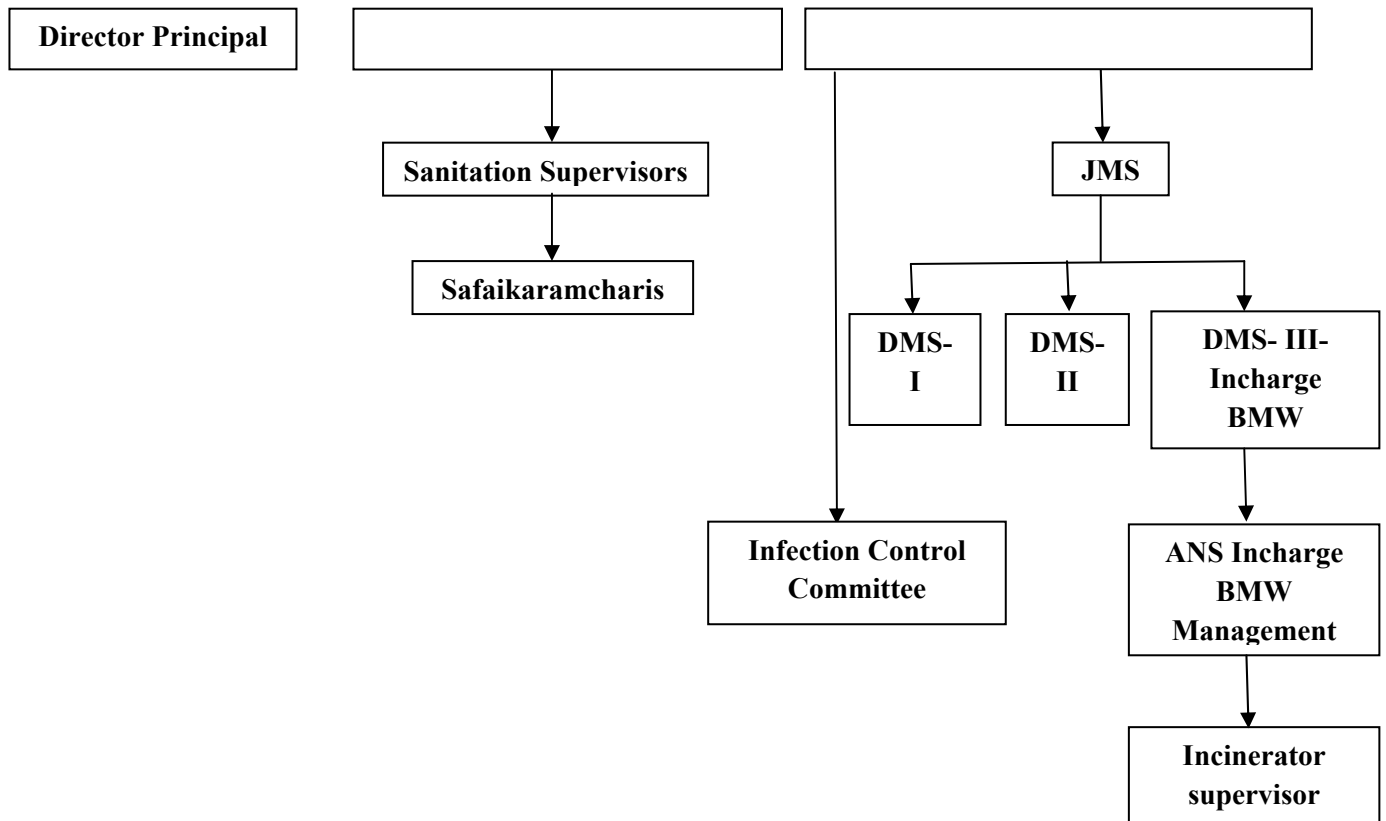
Name and Address :

Phone No.

Note :Label shall be non-washable and prominently visible.

BIOMEDICAL WASTE MANAGEMENT AT GMCH

GMCH ORGANOGRAM: BIOMEDICAL WASTE MANAGEMENT PERSPECTIVE



Steps of Biomedical waste management:

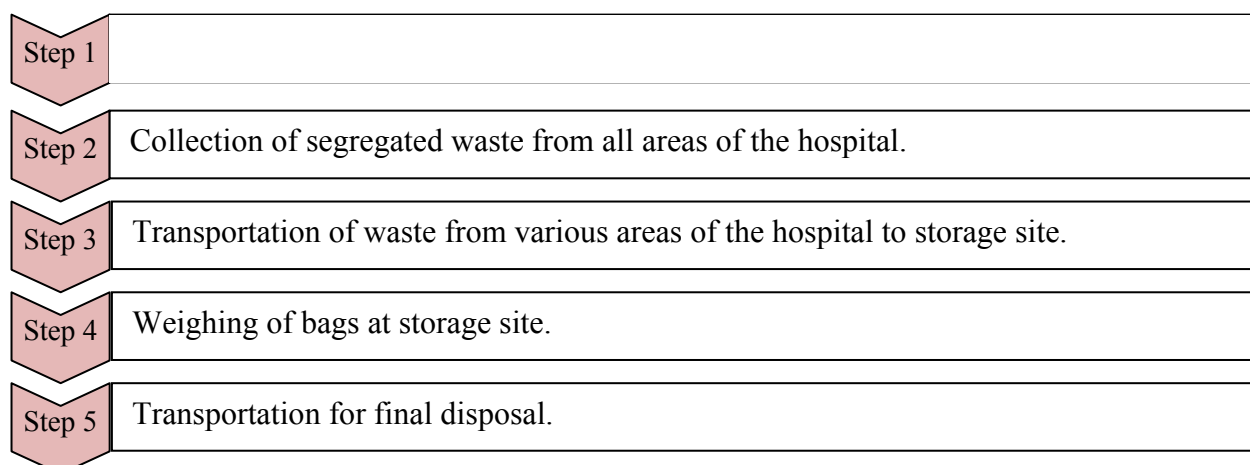


Figure 2: Steps of biomedical waste management

Segregation, pre-treatment, collection, storage and transportation are exclusive responsibility of healthcare facility. While treatment and disposal is primarily responsibility of CBWTF operator except for lab and highly infectious waste, which is pre-treated by the HCF.

Step 1: Segregation and pre-treatment of waste:

- ✓ Waste is segregated at the site of generation by the persons (nursing staff, attendants, technicians, doctors etc.) who are generating the waste as per the biomedical waste management rules, 2016 in color coded bags.
- ✓ Highly infectious and laboratory waste like needles & syringes (first cut in needle cutter), scalpels, blades, vials etc. are pretreated with 1% sodium hypochlorite and then disposed off in color coded bags/ bins at the site of generation.
- ✓ Posters detailing segregation list of items are displayed in each area of the hospital (**Figure 3**).
- ✓ Biomedical waste generated from any patient found positive for Hepatitis or HIV, is collected in a separate bag and is labelled as positive along with the area and date of generation (**Figure 4**).



Fig. 3: Poster displaying BMW management and handling rules, 2016



Fig. 4: HCV positive



Fig. 5: Separate bag for cytotoxic drug vials



Fig. 6: Yellow Waste



Fig. 7: Red Waste



Fig. 8: Blue Waste

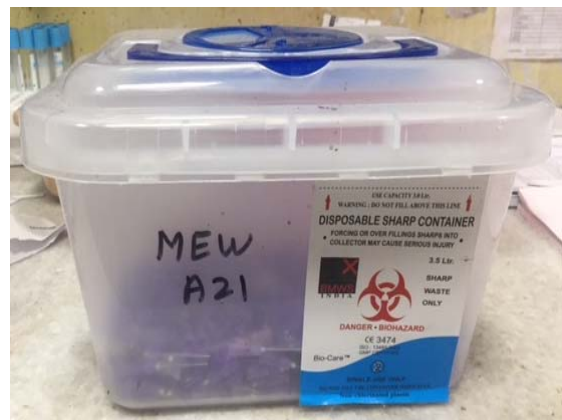


Fig. 9: White Waste



Fig. 10: Cutting needle tip



Fig. 11: Destroying syringe nozzle

Step 2: Collection of segregated waste:

Segregated waste is then collected from all over the hospital in waste trolleys. The frequency of waste collection is:

- ✓ Emergencies- 3 times/day.
- ✓ OPDs and Laboratories- 2 times/day.
- ✓ Wards- Once or twice per day depending on waste generated.
- ✓ Administrative area, Offices and Support services- Once a day.

Step 3: Transportation of collected waste:

- ✓ Waste collected from all over the hospital is transported to collection site in color coded waste trolleys.
- ✓ The workers transporting the waste use PPEs like boots, gloves, masks and aprons.
- ✓ The collected waste is not stored for more than 48hrs. at collection site.



Fig. 12: Transportation of yellow waste



Fig. 13: Transportation of Red waste

Step 4: Weighing of waste bags:

At the collection/ storage site, bags are weighed before transportation for final disposal. Waste collected per day from all over the hospital is approximately:

- Yellow waste: 300-400 Kg
- Red waste: 80-110 Kg
- White waste: 7-8 Kg
- Blue waste: 2-3 Kg
- General waste: 1500-2000 Kg (3-4 municipal bins)



Fig. 14: Weighing Yellow waste



Fig. 15: Weighing Red Waste

Step 5: Transportation for final disposal

- **Yellow waste:** Yellow waste is transported by M/s Alliance Enviro-care Pvt. Ltd., Chandigarh which is authorised by Chandigarh Pollution Control Committee as CBMWTF. It transports the waste to M/s Rainbow Environments Pvt. Ltd., SAS Nagar, Punjab for final treatment and disposal. Record of the same is being maintained on daily basis (**Figure 17**).



Fig. 16: Loading for final disposal

Bio-Medical waste sent to M/s Rainbow
Village Bhojpur, Mohali, Punjab

Date	Weight	Time	Received from	Verified
01-3-18	149 kg	02:30 PM	Butt Khan	Monika D
02-3-18	4172 kg	02:30 PM	Butt Khan	Monika D
03-3-18	490 kg	03:10 PM	Butt Khan	Monika D
04-3-18	Sunday	X	X	X
05-3-18	402 kg	02:40 PM	Butt Khan	Monika D
06-3-18	142 kg	02:10 PM	Butt Khan	Monika D
07-3-18	151 kg	02:45 PM	Butt Khan	Monika D
08-3-18	122 kg	02:10 PM	Butt Khan	Monika D
09-3-18	1410 kg	02:15 PM	Butt Khan	Monika D
10-3-18	148 kg	02:55 PM	Gulab Singh	Monika D
11-3-18	Sunday	X	X	X
12-3-18	360 kg	02:50 PM	Butt Khan	Monika D
13-3-18	182 kg	02:10 PM	Butt Khan	Monika D
14-3-18	155 kg	02:20 PM	Butt Khan	Monika D
15-3-18	110 kg	02:15 PM	Butt Khan	Monika D
16-3-18	162 kg	02:30 PM	Butt Khan	Monika D
17-3-18	370 kg	02:30 PM	Butt Khan	Monika D
18-3-18	Sunday	X	X	X
19-3-18	500 kg	02:30 PM	Gulab Singh	Monika D
20-3-18	250 kg	03:10 PM	Butt Khan	Monika D
21-3-18	220 kg	02:10 PM	Butt Khan	Monika D
22-3-18	220 kg	02:10 PM	Butt Khan	Monika D
23-3-18	220 kg	02:15 PM	Butt Khan	Monika D
24-3-18	280 kg	02:50 PM	Butt Khan	Monika D
25-3-18	Sunday	X	X	X
26-3-18	220 kg	02:30 PM	Butt Khan	Monika D

Fig. 17: Yellow Waste documentation

- Red waste:**

- ✓ Red waste is first shredded in an in-house shredder.
- ✓ GMCH has 02 no. shredders, 80kg and 100kg capacity.
- ✓ The shredded waste is then transported to M/s Alliance Enviro-care Pvt. Ltd., Chandigarh which is authorised by Chandigarh Pollution Control Committee.
- ✓ Record of weight of plastics, sharps, gloves and glasses sent for disposal is maintained (**Figure 21**).



Fig. 18: Shredder



Fig.19: Shredding of Red waste



Fig. 20: Shredded waste

PLASTIC SHREDDER WASTE
MATERIAL SENT FOR DISPOSE
IN ALLIANCE SANITOLAKE CO.-PVT.LTD.

MONTH OF MARCH-2018

DATE	WEIGHT OF PLASTIC	SHRED	GLASS	TIME	RECEIVED PERSON	VERIFIED
01-3-2018	116 KG	5 KG	24 KG	03:50 PM	Anil Kumar	Handwritten
02-3-18	X	4.40 KG	10 KG	X	X	Handwritten
03-3-18	228 KG	8 KG	35 KG	03:46 PM	Anil Kumar	Handwritten
04-3-18	Sunday	X	X	X	X	Handwritten
05-3-18	232 KG	7 KG	88 KG	03:50 PM	Anil Kumar	Handwritten
06-3-18	119 KG	5 KG	X	03:45 PM	Anil Kumar	Handwritten
07-3-18	122 KG	4 KG	X	03:30 PM	Anil Kumar	Handwritten
08-3-18	126 KG	3 KG	42 KG	03:40 PM	Anil Kumar	Handwritten
09-3-18	109 KG	2 KG	X	03:35 PM	Anil Kumar	Handwritten
10-3-18	118 KG	3 KG	24 KG	03:10 PM	Anil Kumar	Handwritten
11-3-18	Sunday	X	X	X	X	Handwritten
12-3-18	240 KG	6 KG	13 KG	03:40 PM	Anil Kumar	Handwritten
13-3-18	128 KG	5 KG	15 KG	03:40 PM	Anil Kumar	Handwritten
14-3-18	107 KG	4 KG	9 KG	03:30 PM	Anil Kumar	Handwritten
15-3-18	114 KG	3 KG	13 KG	03:40 PM	Anil Kumar	Handwritten
16-3-18	122 KG	4 KG	12 KG	03:30 PM	Anil Kumar	Handwritten
17-3-18	117 KG	3 KG	X	03:15 PM	Anil Kumar	Handwritten
18-3-18	SUNDAY	X	X	X	X	Handwritten
19-3-18	216 KG	7 KG	21 KG	03:20 PM	Anil Kumar	Handwritten
20-3-18	113 KG	4 KG	8 KG	03:20 PM	Anil Kumar	Handwritten
21-3-18	120 KG	4 KG	9 KG	03:30 PM	Anil Kumar	Handwritten
22-3-18	123 KG	3 KG	9 KG	03:30 PM	Anil Kumar	Handwritten
23-3-18	129 KG	5 KG	8 KG	03:25 PM	Anil Kumar	Handwritten

Fig. 21: Red waste documentation

- **White waste:**

- ✓ Needles are destroyed, put in a sealed container and then transported to M/s Alliance Enviro-care Pvt. Ltd., Chandigarh for further disposal.
- ✓ Other white waste like syringes (nozzles are mutilated), scalpels, blades are treated with 1% sodium hypochlorite and sent to M/s Alliance Enviro-care Pvt. Ltd., Chandigarh for final treatment and disposal.

- **Blue waste:** Blue waste is first treated with sodium hypochlorite at the site of generation and then transported to M/s Alliance Enviro-care Pvt. Ltd.

- **General waste:** Collected by Municipal Corporation, Chandigarh.



Fig. 22: Vehicle for transporting Biomedical Waste

RESPONSIBILITIES OF VARIOUS CATEGORIES OF STAFF IN REGARD TO BMW MANAGEMENT

S. No.	BMW management activity	Functional Responsibility	Overall Responsibility
1.	Segregation at source	Nursing staff, attendants, Technicians, Doctors (all employees involved in generation of BMW)	DMS-III
2.	Collection	Housekeeping staff	Sanitation supervisor
3.	Transportation to storage site	Housekeeping staff	Sanitation supervisor
4.	Weighing of Bags	Housekeeping staff	Incinerator Supervisor
5.	Transportation for final disposal (CBMWTF)	M/s Alliance Enviro-care Pvt. Ltd., Chandigarh	M/s Alliance Enviro-care Pvt. Ltd., Chandigarh
6.	Final Disposal	M/s Alliance Enviro-care Pvt. Ltd., Chandigarh	M/s Alliance Enviro-care Pvt. Ltd., Chandigarh
7.	Maintenance of Biomedical waste register	Incinerator Supervisor	DMS-III
8.	Monitoring of activities of BMW and updating annual report on website	ANS, Incharge BMW	DMS-III

ANNEXURES

Annexure I

Form I- Accident reporting

1. Date and time of accident:
2. Type of Accident:
3. Sequence of events leading to accident:
4. Has the Authority been informed immediately:
5. The type of waste involved in accident:
6. Assessment of the effects of the accident on human health and the environment:
7. Emergency measures taken:
8. Steps taken to alleviate the effects of accidents:
9. Steps taken to prevent the recurrence of such an accident:
10. Does your facility have an Emergency Control policy? If yes give details:

Date:

Signature

Place:

Designation.....

Annexure II

List of prescribed authorities and the corresponding duties

S.No.	Authority	Corresponding Duties
1.	Ministry of Environment, Forest and Climate Change, Government of India	<p>(i) Making Policies concerning bio-medical waste Management in the Country including notification of Rules and amendments to the Rules as and when required.</p> <p>(ii) Providing financial assistance for training and awareness programmes on bio-medical waste management related activities to for the State Pollution Control Boards or Pollution Control Committees.</p> <p>(iii) Facilitating financial assistance for setting up or up-gradation of common bio-medical waste treatment facilities.</p> <p>(iv) Undertake or support operational research and assessment with reference to risks to environment and health due to bio-medical waste and previously unknown disposables and wastes from new types of equipment.</p> <p>(v) Constitution of Monitoring Committee for implementation of the rules.</p> <p>(vi) Hearing Appeals and give decision made in Form- V against order passed by the prescribed authorities.</p> <p>(vii) Develop Standard manual for Trainers and Training.</p> <p>(viii) Notify the standards or operating parameters for new technologies for treatment of bio medical waste other than those listed in Schedule- I.</p>
2.	Central or State Ministry of Health and Family Welfare, Central Ministry for Animal Husbandry and Veterinary or State Department of Animal Husbandry and Veterinary	<p>(i) Grant of license to health care facilities or nursing homes or veterinary establishments with a condition to obtain authorisation from the prescribed authority for biomedical waste management.</p> <p>(ii) Monitoring, Refusal or Cancellation of license for health care facilities or nursing homes or veterinary establishments for violations of conditions of authorisation or provisions under these Rules.</p> <p>(iii) Publication of list of registered health care facilities with regard to bio-medical waste generation, treatment and disposal.</p> <p>(iv) Undertake or support operational research and assessment with reference to risks to environment and health due to bio-medical waste and previously unknown disposables and wastes from</p>

		<p>new types of equipment.</p> <p>(v) Coordinate with State Pollution Control Boards for organizing training programmes to staff of health care facilities and municipal workers on bio-medical waste.</p> <p>(vi) Constitution of Expert Committees at National or State level for overall review and promotion of clean or new technologies for bio-medical waste management.</p> <p>(vii) Organizing or Sponsoring of trainings for the regulatory authorities and health care facilities on bio-medical waste management related activities.</p> <p>(viii) Sponsoring of mass awareness campaigns in electronic media and print media.</p>
3.	Ministry of Defence	<p>(i) Grant and renewal of authorisation to Armed Forces health care facilities or common bio-medical waste treatment facilities.</p> <p>(ii) Conduct training courses for authorities dealing with management of bio-medical wastes in Armed Forces health care facilities or treatment facilities in association with State Pollution Control Boards or Pollution Control Committees or Central Pollution Control Board or Ministry of Environment, Forest and Climate Change.</p> <p>(iii) Publication of inventory of occupiers and bio-medical waste generation from Armed Forces health care facilities or occupiers</p> <p>(iv) Constitution of Advisory Committee for implementation of the rules.</p> <p>(v) Review of management of bio-medical waste generation in the Armed Forces health care facilities through its Advisory Committee.</p> <p>(vi) Submission of annual report to Central Pollution Control Board within the stipulated time period.</p>
4.	Central Pollution Control Board	<p>(i) Prepare Guidelines on bio-medical waste Management and submit to the Ministry of Environment, Forest and Climate Change.</p> <p>(ii) Co-ordination of activities of State Pollution Control Boards or Pollution Control Committees on bio-medical waste.</p> <p>(iii) Conduct training courses for authorities dealing with management of bio-medical waste.</p> <p>(iv) Lay down standards for new technologies for treatment and disposal of bio-medical waste and prescribe specifications for treatment and disposal of bio-medical wastes.</p> <p>(v) Lay down Criteria for establishing common bio-medical waste treatment facilities in the Country.</p>

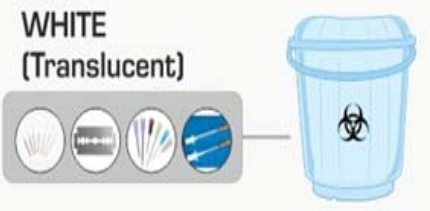
		<p>(vi) Random inspection or monitoring of health care facilities and common bio-medical waste treatment facilities.</p> <p>(vii) Review and analysis of data submitted by the State Pollution Control Boards on bio-medical waste and submission of compiled information in the form of annual report along with its observations to Ministry of Environment, Forest and Climate Change.</p> <p>(viii) Inspection and monitoring of health care facilities operated by the Director General, Armed Forces Medical Services.</p> <p>(ix) Undertake or support research or operational research regarding bio-medical waste.</p>
5.	State Government of Health or Union Territory Government or Administration	<p>(i) To ensure implementation of the rule in all health care facilities or occupiers.</p> <p>(ii) Allocation of adequate funds to Government health care facilities for bio-medical waste management.</p> <p>(iii) Procurement and allocation of treatment equipments and make provision for consumables for bio-medical waste management in Government health care facilities.</p> <p>(iv) Constitute State or District Level Advisory Committees under the District Magistrate or Additional District Magistrate to oversee the bio-medical waste management in the Districts.</p> <p>(v) Advise State Pollution Control Boards or Pollution Control Committees on implementation of these Rules.</p> <p>(vi) Implementation of recommendations of the Advisory Committee in all the health care facilities.</p>
6.	State Pollution Control Boards or Pollution Control Committees	<p>(i) Inventorisation of Occupiers and data on bio-medical waste generation, treatment & disposal.</p> <p>(ii) Compilation of data and submission of the same in annual report to Central Pollution Control Board within the stipulated time period.</p> <p>(iii) Grant and renewal, suspension or refusal cancellation or of authorisation under these rules.</p> <p>(iv) Monitoring of compliance of various provisions and conditions of authorisation.</p> <p>(v) Action against health care facilities or common biomedical waste treatment facilities for violation of these rules.</p> <p>(vi) Organizing training programmes to staff of health care facilities and common bio-medical waste treatment facilities and State Pollution Control Boards or Pollution Control Committees Staff on segregation, collection, storage,</p>

		<p>transportation, treatment and disposal of biomedical wastes.</p> <p>(vii) Undertake or support research or operational research regarding bio-medical waste management.</p> <p>(viii) Any other function under these rules assigned by Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.</p> <p>(ix) Implementation of recommendations of the Advisory Committee.</p> <p>(x) Publish the list of Registered or Authorised (or give consent) Recyclers.</p> <p>(xi) Undertake and support third party audits of the common bio-medical waste treatment facilities in their State.</p>
7.	Municipalities or Corporations, Urban Local Bodies and Gram Panchayats	<p>(i) Provide or allocate suitable land for development of common bio-medical waste treatment facilities in their respective jurisdictions as per the guidelines of Central Pollution Control Board.</p> <p>(ii) Collect other solid waste (other than the bio-medical waste) from the health care facilities as per the Municipal Solid Waste (Management and handling) Rules, 2000 or as amended time to time.</p> <p>(iii) Any other function stipulated under these Rules.</p>

Annexure III

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

 <p>YELLOW</p>	<p>a) Human Anatomical Waste b) Animal Anatomical Waste c) Soiled Waste d) Expired or Discarded Medicines & 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 फूदे, प्लास्टर सांचा और खून की थैलियां), माइक्रोबायोलॉजिकल, जैव प्रौद्योगिकी, फार्मास्यूटिकल, साइटोटॉक्सिक अपशिष्ट (और सभी साइटोटॉक्सिक दूषित वस्तुएं) गढ़े या बिस्तर।</p>
 <p>RED</p>	<p>Contaminated Waste (Recyclable) Vacutainers, tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves.</p>	<p>दूषित अपशिष्ट</p> <p>उपयोग कर फेंकने लायक वस्तुएं: शीशियां, बोतलें, IV सेट्स, कैथेटर, वेवयुटेनर्स, मूत्र बैग, सिरिज और दस्तानें।</p>

	<p>Waste sharps including Metal sharps-Needles, Syringes with fixed needles, Needles from needle tip cutter/burner, Scalpels, Blades</p>	<p>धातुओं सहित नोकदार अपशिष्ट सुइयां, फिक्स्ड सुइयों वाली सिरीज, छुरी, ब्लेड, निडल टिप कटर/बर्नर से निकली सुइयां, खराब तेजधारयुक्त अपशिष्ट ।</p>
	<p>Broken/ discarded glass- Medicine vials & ampoules except those contaminated with cytotoxic wastes. Metallic Body Implants</p>	<p>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 ।</p>

ABBREVIATIONS

BMW	Biomedical waste
CBMWTF	Common biomedical waste treatment facility
CPCB	Central pollution control board
HCF	Healthcare facility
NACO	National AIDS control organisation
PPE	Personal protective equipments
SPCC	State pollution control committee
WHO	World health organisation