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Waste Disposal Report



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Preamble

Effective waste management is crucial for maintaining a safe and sustainable environment, particularly in a large institution like Datta Meghe Institute of Higher Education and Research (DMIHER), which houses medical colleges, hospitals, and research centres. DMIHER generates three main types of waste: General Waste, Biomedical Waste, and Radioactive Waste, each requiring specialized handling to ensure safety and regulatory compliance. DMIHER have adopted the **Comprehensive Waste Disposal Policies notified by the Government of India** from time to time. This document is a compilation of these policies and guidelines prescribed by various statutory authorities.

This report outlines the Standard Operating Procedures (SOPs) for the collection, segregation, storage, and disposal of these waste categories. The institution is committed to minimizing environmental impact and adhering to national regulations, such as the Bio-Medical Waste Management Rules, 2016. Through systematic waste management practices, DMIHER ensures the health and safety of its community while promoting environmental sustainability.

HEALTH CARE WASTE & BIOMEDICAL WASTE

'Biomedical waste' (BMW) means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps.

A Common Bio-medical Waste Treatment and Disposal Facility (CBWTF) is a set up where biomedical waste generated from member health care facilities is imparted necessary treatment to reduce adverse effects that this waste may pose on human health and environment. The treated recyclable waste may finally be sent for disposal in a secured landfill or for recycling. According to the Bio-medical Waste Management Rules, 2016, "bio-medical waste treatment and disposal facility" means any facility wherein treatment, disposal of bio-medical waste or processes incidental to such treatment and disposal is carried out, and includes common biomedical waste treatment facilities and "operator of a common bio-medical waste treatment facility" means a person who owns or controls a Common Bio-medical Waste Treatment and

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Disposal Facility (CBWTF) for the collection, reception, storage, transport, treatment, disposal or any other form of handling of bio-medical waste.

In the context of these guidelines, the buffer zone represents a separation distance between the source of pollution in CBWTF and the receptor - following the principle that the degree of impact reduces with increased distance. The following parameters may be considered for ascertaining buffer distance on a case-to-case basis:

- 1. Potential for spread of infection from wastes stored in the premises.
- 2. Applicable standards for pollution control and the relative efficiency of the existing incinerators and emission control systems,
- 3. Potential of fugitive dust emission from incinerators,
- 4. Potential for discharge of wastewater
- 5. The potential for odor production,
- 6. The potential for noise pollution,
- 7. The risk posed to human health and safety due to exposure to emissions from incinerator,
- 8. The risk of fire Incidents.
- 9. Significance of the residual impacts such as bottom ash and fly ash.

As far as possible, the CBWTF shall be located near to its area of operation in order to minimize the transportation distance in waste collection, thus enhancing its operational flexibility as well as for ensuring compliance to the time limit for treatment and disposal of bio-medical waste as stipulated under the BMWM Rules (i.e., within 48 hours). Also, the location of the CBWTF should be in conformity to the CRZ Norms and other provisions notified under the Environment (Protection) Act, 1986. The location shall be decided in consultation with the State Pollution Control Board (SPCB)/ Pollution Control Committee (PCC).

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Health care waste: Health Care Facilities (HCFs) are primarily responsible for management of the healthcare waste generated within the facilities, including activities undertaken by them in the community. The health care facilities, while generating the waste are responsible for segregation, collection, in-house transportation, pre-treatment of waste and storage of waste, before such waste is collected by Common Bio-medical Waste Treatment Facility (CBWTF) Operator. Thus, for proper management of the waste in the healthcare facilities the technical requirements of waste handling are needed to be understood and practiced by each category of the staff in accordance with the BMWM Rules. The health care waste includes

- Biomedical waste
- General waste
- Other waste (e-waste, radio-active waste)

Categorization, Classification, and Disposal of Wastes in Health Care Facilities.



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BIOMEDICAL WASTE: Bio-medical waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps. Bio-Medical waste includes all the waste generated from the Health Care Facility which can have any adverse effect to the health of a person or to the environment in general if not disposed properly. All such waste which can adversely harm the environment or health of a person is considered as infectious and needs to be treated.

The quantity of such waste is around 10% to 15% of total waste generated from the Health Care Facility. This waste consists of the materials which have been in contact with the patient's blood, secretions, infected parts, biological liquids such as chemicals, medical supplies, medicines, lab discharge, sharps metallic and glassware, plastics etc.

Bio Medical Waste can be broadly classified into four categories based on the segregation pathway and colour code. They are

- Yellow category
- Red category
- White category
- Blue category

Table 1: Categories of Biomedical Waste

CATEGORY	TYPE OF WASTE		
YELLOW	Human Anatomical Waste		
	Human tissues, organs, body parts and fetus below the viability period		
	(as per the Medical Termination of Pregnancy Act 1971, amended from		
	time to time).		
	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.		
	Soiled Waste		

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	Items contaminated with blood, body fluids like dressings, plaster casts,				
	cotton swabs and bags containing residual or discarded blood and blood				
	components.				
	Discarded or Expired Medicine				
	Pharmaceutical waste like antibiotics, cytotoxic drugs including al				
	items contaminated with cytotoxic drugs along with glass or plastic				
	ampoules, vials etc.				
	Chemical Waste				
	Chemicals used in production of biological and used or				
	discarded disinfectants				
	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,				
	housekeeping and disinfecting activities, etc				
	Discarded linen, mattresses, beddings contaminated with blood or				
	body fluid, routine mask & gown.				
	Microbiology, Biotechnology and other clinical laboratory waste				
	(Pre-treated)				
	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.				
	Wastes generated from disposable items such as tubing, bottles,				
RED	intravenous tubes and sets, catheters, urine bags, syringes without				
	needles, fixed needle syringes with their needles cut, vacutainers and				
	gloves				

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	Needles, syringes with fixed needles, needles from needle tip cutter or
WHITE	burner, scalpels, blades, or any other contaminated sharp object that
	may cause puncture and cuts. This includes both used, discarded and
	contaminated metal sharps
	Broken or discarded and contaminated glass including medicine vials
BLUE	and ampoules except those contaminated with cytotoxic wastes.

Table 2: Storage of Biomedical Waste

Sr.	Category	Type of Waste	Colour & Type of Container
No			
1.	Yellow Category	 Human Anatomical Waste Animal Anatomical Waste Soiled Waste Soiled Waste Discarded or Expired Medicine Microbiology, Biotechnology and other clinical laboratory waste Chemical Waste (yellow-e) Chemical Liquid Waste 	Yellow coloured non-chlorinated Plastic Bags Note: (i) Chemical waste (yellow-e) comprising of un-used, residual, or date expired liquid chemicals including spent hypo of X-Ray, should be stored in yellow container

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2.	Red Category	Contaminated Waste	Red Coloured Non-Chlorinated
		(Recyclable)	Plastic Bags (having thickness equal
			to more than 50 p) and Containers
3.	White Category	Waste Sharps	White Coloured translucent,
		including metals	puncture proof, leak proof temper
			proof containers
4.	Blue Category	• Glassware	Puncture proof, leak proof boxes or
		• Metallic Body	containers with blue coloured
		Implants	marking

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Treatment Option for Bio-medical Waste

As per BMWM Rules, the treatment and disposal of BMW generated from the HCF must be carried out in accordance with Schedule I, and in compliance with the standards provided in Schedule II of BMWM Rules.

It is also emphasized in the rules that no healthcare facility shall establish on-site treatment and disposal facility for BMW, if a service of CBWTF is available within 75 kilometres of traveling distance of the facility. All the public healthcare facilities within 75 kilometres of CBWTF need to dispose of the BMW through such CBWTF only and are not allowed to establish its own treatment and disposal facility. For the public health care facilities especially in rural areas where there is no CBWTF within range of 75 kilometres, the disposal of BMW can still be made through a CBWTF who is willing to provide treatment services and authorized by the concerned SPCB/PCC to operate in an area beyond 75 Km radial distance. In case of no reach to any CBWTF, the BMW generated from HCFs should be disposed in captive treatment and disposal facility or by deep burial pit as authorized by the respective SPCB/and as specified in these guidelines

The collection, treatment, processing and disposal options for both the categories of healthcare facilities; having linkage with CBWTF or not having linkage with CBWTF, are detailed here as per Schedule I of BMWM Rules.

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YELLOW CATEGORY

(a) Human Anatomical Waste

Segregation

Human tissues, organs, body parts and fetus below the viability period. This includes, placenta and extracted tooth.

Type of bag and container

Collect the waste in yellow coloured non chlorinated plastic bag and store in yellow coloured container.

Treatment and Disposal:

For HCF having linkage with CBWTF

No treatment of waste is required to be carried out at the health care facility except pretreatment (sterilization) of Yellow (h) category waste by autoclaving/ microwaving/ hydroclaving or sterilize as per methods prescribed in WHO Blue book 2014. Yellow category waste along with pre-treated waste should be stored in central storage point and must be handed over to CBWTF. It is mandatory for each health care facility that dead fetus waste should be handed over to CBWTF in yellow bag with a copy of the official Medical Termination of Pregnancy (MTP) certificate from the Obstetrician or the Medical Superintendent/ SMO/ CMO of the HCF.

For HCF without linkage to CBWTF

This waste should be disposed through Plasma Pyrolysis unit or twin chambered compact incinerator with 2 seconds retention time in secondary combustion chamber and adequate air pollution control devices to comply with revised emission norms prescribed under BMW Management Rules.

Disposal of the waste in the deep burial pit should not be practiced unless the hospitals is located in a rural or remote isolated place. Use of deep burial pit should be as authorized by the respective SPCB/PCC.

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Copy of official MTP certificate from the MO I/C for fetus below the vitality period must be kept with the HCF.

(b) Animal Anatomical Waste

Segregation

This waste includes 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.

Type of bag and container

Collect the waste in yellow coloured non chlorinated plastic bag and store in yellow coloured container.

Treatment and Disposal:

For HCF having linkage with CBWTF

No treatment of waste is required to be carried out at veterinary hospital except pre-treatment (sterilization) of Yellow (h) category waste (if applicable) by autoclaving/ microwaving/ hydroclaving or sterilize as per methods prescribed in WHO Blue book 2014. Yellow category waste along with pre-treated waste should be stored in central storage point and must be handed over to CBWTF.

For HCF having own treatment and Disposal facility

Animal anatomical waste should be disposed through Plasma Pyrolysis unit or twin chambered compact incinerator with 2 seconds retention time in secondary combustion chamber and adequate air pollution control devices to comply with revised emission norms prescribed under BMW Management Rules, 2016.

Animal anatomical waste can also be disposed in captive deep burial pits only in case of those veterinary hospitals located in rural or remote isolated place. Use of deep burial pit should be as authorised by SPCB/PCC.

(c) Soiled Waste

Segregation:

Items contaminated with blood/body fluids like dressings, plaster casts, cotton swabs and bags containing residual or discarded blood and blood components. This includes used infectious

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material such as caps, shoe-cover, blotting paper/gauze, wooden swab stick, paraffin blocks, indicators tapes and disposable (single use non-linen based) masks and gowns.

Type of bag and container: Collect the waste in yellow coloured non chlorinated plastic bag and store in yellow coloured container

Treatment and Disposal:

For HCF having linkage with CBWTF

No treatment of waste is required to be carried out at the health care facility. Waste must be handed over to CBWTF

For HCF having own treatment and Disposal facility

Soiled waste should be disposed through Plasma Pyrolysis unit or in twin chambered compact incinerator with 2 seconds retention time in secondary combustion chamber and adequate air pollution control devices to comply with revised emission norms prescribed under BMW Management Rules, 2016. In absence of above, soiled waste can also be treated by autoclaving or micro-waving/ hydroclaving followed by shredding or mutilation or combination of sterilization and shredding for ultimate disposal through waste to energy plants.

Soiled waste can also be disposed in captive deep burial pits only in case of the hospitals located in rural or remote isolated place. Use of deep burial pit should be as authorised by SPCB/PCC.

(d) Expired and Discarded Medicine

Segregation:

Pharmaceutical waste like antibiotics, cytotoxic drugs including all items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc.. This includes cytotoxic drugs dispensed in dextrose / saline bottles and disposables used in delivery of cytotoxic drugs.

Type of bag and container: Collect all the expired and discarded medicines except for cytotoxic drugs waste in a separate yellow colored non chlorinated plastic bag (different form being used for human anatomical waste) and store in yellow colored container.

All the cytotoxic drugs including all items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc must be collected in separate yellow colored non chlorinated plastic bag labeled as cytotoxic hazard.

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For HCF having linkage with CBWTF

No treatment of waste is required to be carried out at the health care facility. As per BMW Rules, 2016 all the expired and discarded medicines including cytotoxic drugs expired `cytotoxic drugs are either returned back to the manufacturer or are handed over to the CBWTF to be disposed of through incineration at temperature > 1200oC.

For healthcare facilities where there is no established system for returning the drugs to the manufacturer it is recommended that the expired and discarded medicines are handed over only to CBWTF for disposing of through incineration.

For HCF having own treatment and Disposal facility

Expired and discarded medicines are required to be sent back to manufacturer or can be disposed though nearest common biomedical Waste or Hazardous waste incinerators with prior intimation to SPCBs. /PCCs.

This waste can also be disposed through twin chambered captive incinerator with 2 seconds retention time in secondary combustion chamber, which can withstand a temperature of 1200oC and having adequate air pollution control devices to comply with emission norms.

(e) Chemical Waste

Segregation:

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. Leftover, unused, residual or date expired liquid chemicals shall not be discharged as chemical liquid waste.

Type of bag and container: Not applicable since this liquid waste containing waste chemicals is collected and pre-treated prior to disposal through Effluent Treatment Plant. However, recyclable liquid chemicals such as spent X-ray hypo should be collected in yellow containers and sold or given to only authorised recyclers for resource recovery.

Treatment and Disposal:

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As per the BMWM Rules 2016, the chemical liquid waste of the hospital must be collected through a separate collection system for pre-treatment. Hospitals with large standalone labs shall install separate drainage system leading to pre-treatment unit prior to mixing the same with rest of the wastewater from hospital for further treatment. For middle and small healthcare facilities having no system of separate drainage/collection system, the liquid waste is required to collected on-site in containers for pre-treatment before mixing the same with other wastewater. Silver X ray film developing fluid should be given or sold to the authorized recyclers for resource recovery, else it should be handed over to CBWTF as yellow(e) chemical waste.

Depending on type of chemical effluent generated, pre-treatment should comprise of neutralization/precipitation, followed by disinfection prior to mixing with rest of the wastewater from hospital. Prior to mixing with rest of the hospital effluent, disinfection should be done preferably by passing the effluent through UV sterilizer rather than using disinfecting chemicals since use of chemicals may affect performance of biological treatment in downstream.

(f) Discarded Linen, Mattresses, beddings contaminated with Blood, body fluids, routine mask and gown.

Segregation:

This includes discarded linen from bedsheets, beddings, re-usable routine masks and gowns.

Type of bag and container:

Collect the waste in yellow coloured non-chlorinated plastic bag and store in yellow coloured container

Treatment and Disposal:

For HCF having linkage with CBWTF

Disinfect the waste linen with non-chlorinated chemical disinfection and hand over to the CBWTF operator for final disposal by incineration. The waste mattresses should be cut into pieces and disinfected and can be sent to the CBWTF operator for final disposal by incineration. Alternatively, waste mattresses can be cut into pieces and disinfected with non-chlorinated

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chemicals for disposal as general waste (dry-waste) for energy recovery in cities having waste to energy plants or RDF (Refuse Derived Fuel) plants.

The waste mattresses shall not be sold or auctioned. Used bed sheets that are not soiled and reusable can be sold or auctioned only after washing and disinfection. Disposable (single use non-linen based) masks and gowns, after use shall be treated as yellow-c (soiled waste).

For HCF having own treatment and Disposal facility

The waste mattresses after cutting into pieces and disinfected with non-chlorinated chemicals and can be incinerated in captive incinerator or can be disposed as General waste in dry bins in cities having RDF or waste to Energy Plants.

(g) <u>Microbiology, Biotechnology and Other Clinical Laboratory Waste:</u>

Segregation:

Microbiology, Biotechnology and other clinical laboratory waste, waste blood bags (containing date expired or contaminated blood), Laboratory cultures, stocks or specimen of microorganisms, live or attenuated vaccines, human cell cultures used in research, industrial laboratories, production of biological, residual toxins, dishes and devices used for cultures. This includes plastic culture plates and other highly infectious wastes.

Type of bag and container: Collect the waste in yellow coloured non chlorinated plastic bag and store in yellow coloured container

Treatment and Disposal:

For HCF having linkage with CBWTF

Pre-treatment by disinfection before handing over the waste to CBWTF operator. Pre-treatment can be done by autoclave / microwave / Hydroclave. Pre-treatment can also be done by using non-chlorinated chemical disinfectants like aldehydes, lime based powders or solutions, ozone gas, ammonium salts and phenolic compounds.

The pre-treated waste bags should be handed over to CBWTF operator on daily basis.

For HCF having own treatment and Disposal facility

Pre-treated waste should be disposed off by a HCF by installing twin chambered compact incinerator with 2 seconds retention time in secondary combustion chamber and adequate air

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pollution control devices to comply with revised emission norms prescribed under BMW Management Rules, 2016.

Pre-treated waste can be disposed in captive deep burial pits in case of the hospitals located in remote in rural or isolated places. Use of deep burial pit should be as authorised by SPCB/PCC.



RED CATEGORY

Segregation:

Red category waste is contaminated recyclable waste containing primarily plastics generated from disposable items such as tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles and fixed needle syringes with their needles cut), vacutainers and gloves. This includes waste pipette tips, plastic pipette, rubber teats, drains, oxygen mask, thick plastic splash proof gowns, rubber apron, ICT test cards, ELISA plate and vials not containing blood samples.

Type of bag and container: Collect the waste in red coloured non chlorinated plastic bag and store in red coloured container

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Treatment and Disposal:

For HCF having linkage with CBWTF

Contaminated recyclable waste containing mainly plastics and rubber shall be put in red coloured non chlorinated plastic bags and containers. Syringes after removing/cutting the needles should also be put in this category. Vacutainers/vials with blood samples should be pre-treated as given at section 3.1.1.h and disposed as yellow-h category waste.

No onsite treatment of Red category waste is required. All such waste is needed to be sent to CBWTF for final treatment and disposal

For HCF having own treatment and Disposal facility

All the recyclable waste generated from the HCF must be sterilised using autoclaving/microwaving / hydro-calving followed by shredding or mutilation or combination of sterilisation and shredding. Recyclable waste must never be disposed of along with general waste in dry stream and same is required to be disposed of only through registered or authorised recyclers or to waste to energy plants or plastics to diesel or fuel oil or for road making, whichever is possible



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WHITE CATEGORY

Segregation

This waste comprises of 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 waste sharps such as lumbar puncture needle, trocar cannula, IABP cannula, arthroscopy blade, insulin pen needle, lancet needle, removac needle, eye needle, Cardioplegia needle and surgical stab knife

Type of bag and container:

Collect the waste in white translucent, puncture proof, leak-proof, tamper-proof container.

Treatment and Disposal:

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After collection in puncture proof, leak-proof, tamper-proof container, handover the waste to CBWTF without any alteration or onsite treatment.



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BLUE CATEGORY

(a) Glassware

Segregation:

Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes. This includes glass slides and glass pipettes.

Type of bag and container:

Puncture proof, leak proof boxes or containers with blue coloured marking

Treatment and Disposal:

For HCFs having linkage with CBWTF

Dispose of the empty glass bottles by handing over to CBWTF without any onsite treatment. The residual chemicals in glass bottle should be collected as chemical waste in yellow coloured container / bags and over to CBWTF as yellow(e) waste.

For HCFs having own treatment and Disposal facility

The waste glass bottles / broken glass has to be sterilized or disinfected (either by autoclaving or microwaving or hydroclaving or by Sodium Hypochlorite Solution) followed by soaking & washing with detergent prior to sending it for recycling. Broken glass should also be disinfected and if the same cannot be given/or sold for recycling it can be disposed in sharps pit. The residual chemical in glass bottle should be collected as chemical waste in yellow coloured container/bags as yellow(e) waste and send the same to either a CBWTF or common hazardous waste Treatment and Disposal Facility.

Glass vials with positive controls should be pre-treated and disposed as yellow(h) waste.

(b) Metallic Body Implants

Segregation

Implants used for orthopedic surgeries. This include metal sternal wire, Gigli saw wire and Orthopaedic Splint.

Type of bag and container:

Puncture proof, leak proof boxes or containers with blue coloured marking.

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Treatment and Disposal:

Dispose of the waste by handing over to CBWTF. In case of no access to CBWTF, metallic body implants should be disinfected (either by autoclaving or microwaving or hydroclaving or by Sodium Hypochlorite Solution) and later washed with detergent prior to sending/sold to metal recyclers.



Month	Yellow (Kg)	Red (Kg.)	Blue (Kg)	White (Kg.)	Total
Jan-23	2929.94	3235.4	1688.58	155.79	8009.71
Feb-23	4326.7	3352.06	2165.62	160	10004.38
Mar-23	5132.4	3663.1	2209.83	145.28	11150.61
Apr-23	5498.06	4225.19	1816.65	224.98	11764.88
May-23	6815.84	5230.85	1943.48	230.89	14221.06
Jun-23	5461.69	4718.59	1764.3	202.5	12147.08
Jul-23	5899.78	4815.82	1857.09	221.93	12794.62
Aug-23	4643.28	3870.99	1546.23	206.24	10266.74
Sep-23	5612.8	4470.28	1875.73	269.51	12228.32
Oct-23	6514.93	5084.73	2092.01	346.5	14038.17
Nov-23	6252.34	4766.03	1974.31	324.9	13317.58
Dec-23	3881.5	3124.1	1143.9	52	8201.5

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BIO MEDICAL WASTE COLLECTION







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GENERAL WASTES:

General waste consists of all the waste other than bio-medical waste and which has not been in contact with any hazardous or infectious, chemical or biological secretions and does not includes any waste sharps. This waste consists of mainly:

- 1. Newspaper, paper and card boxes (dry waste)
- 2. Plastic water bottles (dry waste)
- 3. Aluminium cans of soft drinks (dry waste)
- 4. Packaging materials (dry waste)
- 5. Food Containers after emptying residual food (dry waste)
- 6. Organic / Biodegradable waste mostly food waste (wet waste)
- 7. Construction and Demolition wastes

As per Bio Medical Waste Management Rules 2016, the general waste generated from the healthcare facility must be disposed of in accordance with the provisions of Solid Waste Management Rules, 2016.

SOLID WASTE

Health care facilities must ensure that the general solid waste generated from the facility is segregated and collected in separate bins filled in with non-chlorinated bags and shall not be mixed up with the BMW generated in the facility. Requirements of HCFs in management of solid waste are given below:

- Collect segregated waste in two separate streams namely bio-degradable waste and drywaste. Green bins shall be provided for biodegradable wastes and blue bins for dry wastes. Colour coded bins may be either painted or labeled with a particular color.
- Plastic sheets provided inside the bins shall be of minimum 50mm thick as required under plastic waste management Rules, 2016. In case of bio-degradable waste collection bins, it is recommended to use compostable plastic bags of any thickness.
- Waste collected in bins shall be handed over to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time;
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- HCFs having more than 5,000 sqm area should set-up on-site compost plants as far as possible.
- Used sanitary waste like diapers, sanitary pads etc. generated from hospitals should preferably be wrapped in the pouches provided by the manufacturers or brand owners of these products or in a suitable wrapping material and disposed along with soiled waste (yellow c) category waste for incineration.
- To store horticulture waste and garden waste generated from his premises separately in their own premises and dispose of as per the directions of the local body (local authorities) from time to time.
- General waste shall not be thrown or burnt on streets, open public spaces outside the premises or in the drain or water bodies.
- HCFs shall pay user fee for solid waste management, as may be specified in the byelaws of the local body.
- HCFs shall hand over segregated waste to authorized waste collectors or agencies as specified by the local body.
- General waste should not be stored in central waste storage area meant for Bio Medical Waste generated for the facility, but is stored separately, till it is handed over to authorized waste picker of local bodies or corporations or Gram Panchayats
- Any BMW generated should not be mixed with the general waste. To ensure the same, health care facilities have to train all the staff of HCF to segregate general wastes and they shall also caution or advise the visitors in HCFs to follow the same.

Compost

After the collection of the general waste Organic waste is segregated from the non-organic and recyclable Waste and processed in a Composter Machine and Compost is prepared. This Compost is then used in the plants and gardening purpose. On an average 750 kg Compost is being prepared on a daily basis.

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General Waste Tracking on Daily Basis

Total Daily Generation :2700Kg (Approx)



Waste Segregation Depending on Type of Waste

General Waste Tracking				
Sr. No.	Particulars	Weight (Kgs) (approx)	Final Procedure	
			Collect & send to composter Plant for	
a.	Wastage produce in a day	2700	Segregation	
b.	plant Machine organic Manure	742.5	compost	
		1015	Segregation for Recycled Material by	
с.	% Recycled in to Manure	1215	Outsource Agency	
	General waste send to Nagar		Send to Inzapur for further procedure	
d.	Parishad Inzapur Wardha	742.5	through our outsource Agency	

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Waste Collection from Different Locations





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Waste Water generated in hospitals is more complex than normal sewage. As such hospital waste water treatment is also more complex. Large hospitals have laundry, operation theaters and laboratories; which discharge substantial quantities of toxic waste water. Any liquid adversely affecting quality during provision of healthcare services which might contain some solids disposed by staffs and patients or during other healthcare related processes such as cooking, cleaning or laundry.

Black water (Sewage)

Heavily polluted wastewater containing high concentration of fecal matter and urine, food residues, toxic chemicals.

Gray water (Sullage)

Low polluted wastewater with residues from washing, bathing, laboratory process, laundry, or technical processes such as cooling water or rinsing of X-ray films.

Storm water

Technically not wastewater, but consist of rainfall collected on hospital roofs, grounds and paved surfaces. It may seep into groundwater or be used for irrigation of hospital grounds or toilet flushing.

Hospital sewage or wastewater treatment plant process:

Compact or packaged sewage treatment plant for hospitals is done in series of steps. Conventional treatment processes involved to remove impurities from the influent are listed below.

- 1. Preliminary Stage or Pretreatment: As a first stage, preliminary treatment process is essential in most of the sewage treatment plant (STP). It removes items such as sticks, rags and other large debris and heavy inorganic solids contained in the hotel influent through bar screens. Removal of these materials protects plant's equipments from damage. The inorganic settled is called as grit which is removed using grit chamber.
- 2. Primary Treatment Stage: This is the second step in sewage treatment system. Physical separation of solids and greases from wastewater is done in this stage. Now, water flows into primary filter or clarifiers for few hours to allow solid particles to settle
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down and lighter particles will float to the top will be skimmed off from the tank. The settled solid is called as primary sludge or primary effluent contains about 60-70% of solids. Partly treated wastewater is now subjected to next treatment level.

- **3.** Secondary Treatment Stage: It is a biological treatment process removes dissolved inorganic materials present in soluble and colloidal form from the wastewater. Here, bacteria are used convert the colloidal and dissolved organic matter. Now the partially treated wastewater from primary tank flows into the aeration tank and air is supplied through air blower to provide oxygen for microbes. When wastewater flows into a secondary clarifier, where solids settle down which is called as secondary sludge and part of it is recycled for activated sludge process and remaining is mixed with primary sludge which will be sent to sludge digestion tank and then disposed off. This stage removes about 90% of inorganic solids.
- 4. Tertiary or Advanced Treatment Stage: This is the last stage in most of the STP's. This stage removes the suspended solids and organic matter which was not removed in secondary treatment. The pathogenic microorganisms which were not removed during the biological treatment process will get removed by the process called disinfection. Several disinfection agents can be used depending on wastewater condition (pH, clarity etc). It is achieved by means of physical or chemical disinfectants like chlorine, UV light, ozone etc. Now, disinfected wastewater is suitable for disposal or reuse.

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TREATED WATER TANK

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Statistics of the Water Recycling

STP (600KLD)				
SR.No	Month	Inlet(In lakhs)	Outlet(In lakhs)	
1	Jan-23	25.90	20.64	
2	Feb-23	19.00	16.66	
3	Mar-23	30.75	24.48	
4	Apr-23	39.05	34.97	
5	May-23	33.11	31.60	
6	Jun-23	33.64	31.32	
7	Jul-23	45.48	41.00	
8	Aug-23	46.74	40.38	
9	Sep-23	33.92	28.09	
10	Oct-23	42.13	32.92	
11	Nov-23	41.72	33.24	
12	Dec-23	49.10	40.80	
	Total	440.54	376.10	

Sewage Water Treatment Plant

OTHER WASTES

Other wastes consist of used electronic wastes, used batteries, and radio-active wastes which are not covered under biomedical wastes but have to be disposed as and when such wastes are generated as per the provisions laid down under E-Waste (Management) Rules, 2016, Batteries (Management & Handling) Rules, 2001, and Rules/guidelines under Atomic Energy Act, 1962 respectively.

Management of Used Batteries

As per the provisions under Batteries (Management & Handling) Rules, 2001, used lead acid batteries generated from health care facilities (HCFs) should be sold/auctioned/sent only to the authorised dealers, designated collection centres or authorised recyclers or any authorised agency. In no case the used batteries will be handed over to an unauthorized person. Hospital having purchased more than 100 batteries should maintain records of number of batteries purchased, and number of used batteries sent to registered recyclers/authorised dealers/designated collection centres/any other agency as per Form-VIII of Batteries Rules,

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2001 and the returns shall be filed half yearly i.e. by 30th June and 31st December of every year to the concerned State Pollution Control board.

Management of Radioactive Wastes

The Atomic Energy Regulatory Board (AERB) has been mandated by the Central Government, as the Competent Authority as per Atomic Energy (safe Disposal of Radioactive Wastes) Rules, 1987 notified under the Atomic Energy Act 1962. It exercises regulatory control over nuclear installations and the use of radioactive substances and radiation generating plants outside such installations.

AERB also empowered to perform the functions as stipulated under sections 10(1) (powers of entry) and 11(1) (powers to take samples) of Environmental (Protection) Act, 1986 and Rule 12 (agency to which information on excess discharge of pollutants to be given) of the Environmental (Protection) Amendment Rules, 1987 with respect to radioactive substances. As per provisions of Atomic Energy (safe Disposal of Radioactive Wastes) Rules, 1987, no person shall dispose of radioactive waste (a) unless he has obtained an authorization from the competent authority under these rules; (b) in any manner other than in accordance with the terms and conditions specified in the authorization; and (d) in quantities exceeding those specified in the authorization.

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Health Care Facilities generating radionuclides waste from treatment of Cancer patients and end-of-life equipment containing radio radionuclides shall obtain authorization from AERB for its disposal. As per the policy of AERB, radionuclides wastes are required to be re-exported back to the manufacturer. It was recommended that such generators shall ensure arrangement with manufacturer at the time of purchase of such equipment. Waste disposal facilities of AERB are regulated by Waste Disposal Agency (Division) of AERB.



Highly Security Storage of Radioactive Waste

Management of E-Wastes

As per provisions under E-Waste (Management) Rules, 2016, as amended every generator of end of life electrical and electronic equipment (EEE) listed under Schedule-I are required to ensure that such E-Waste is sent to an authorized E-Waste dismantling or recycling facility or an authorized collection center of the Producer of EEE or through designated take back service providers of Producers or registered Producer Responsibility Organization (PRO) of a

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Producer. E-waste can be auctioned only to authorized E-Waste Recyclers/ Dismantlers/ PRO of a Producer. Records of E-Waste transfer/sale should be maintained records in Form -2 for verification of the SPCBs/PCCs and Annual returns as per Form-3 of E-Waste (Management) Rules, 2016, as amended should be submitted to SPCBs/PCCs by June 30th of every year. E-Waste generated from hospital equipment not listed in Schedule-I should also be sold/ transferred to only the authorized E-Waste Recyclers/Dismantlers.

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