ENVIS Newsletter

Need of Biomedical Waste Management System in HOSPITALS : AN EMERGING ISSUE

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Envis Centre

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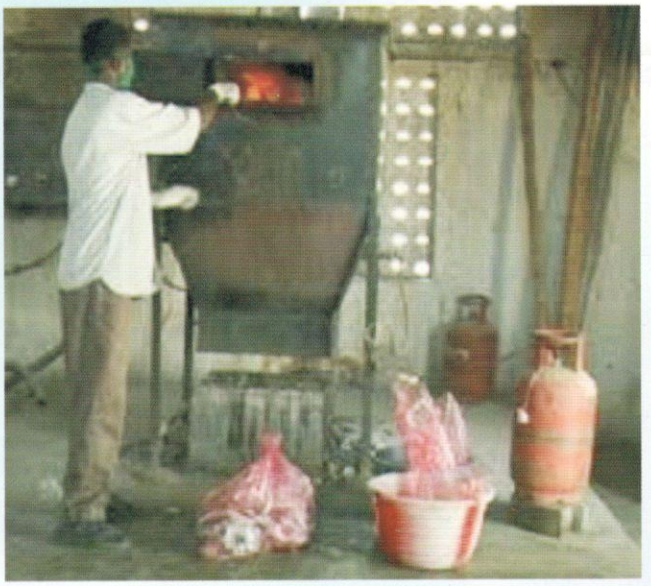
INTRODUCTION :- Biomedical waste, also known as infectious waste or medical waste, is defined as solid waste generated during the diagnosis, testing, treatment, research or production of biological products for humans or animals. Biomedical waste may also include waste associated with the generation of biomedical waste that visually appears to be of medical or laboratory origin (e.g., packaging, unused bandages, infusion kits, etc.), as well research laboratory waste containing bio molecules or organisms that are restricted from environmental release.



Biomedical waste may be solid or liquid. Examples of infectious waste include discarded blood, sharps, unwanted microbiological cultures and stocks, identifiable body parts, other human or animal tissue, used bandages and dressings, discarded gloves, other medical supplies that may have been in contact with blood and body fluids, and laboratory waste that exhibits the characteristics described above. Waste sharps include potentially contaminated used (and unused discarded) needles, scalpels, lancets and other devices capable of penetrating skin.

Biomedical waste is generated from biological and medical sources and activities, such as the diagnosis, prevention, or treatment of diseases. Common generators (or producers) of biomedical waste include hospitals, health clinics, nursing homes, medical research laboratories, offices of physicians, dentists, and veterinarians, home health care, and funeral homes. In healthcare facilities (i.e., hospitals, clinics, doctors offices, veterinary hospitals and clinical laboratories), waste with these characteristics may alternatively be called medical or clinical waste.

Biomedical waste is distinct from normal trash or general waste, and differs from other types of hazardous waste, such as chemical, radioactive, universal or industrial waste. Medical facilities generate waste hazardous chemicals and radioactive materials. While such wastes are normally not infectious, they require proper disposal. Some wastes are considered multi hazardous, such as tissue samples preserved in formalin.

SOURCES OF BIO-MEDICAL WASTE

Hospitals produce waste, which is increasing over the years in its amount and type. The hospital waste, in addition to the risk for patients and personnel who handle them also poses a threat to public health and environment

Major Sources

- Hospitals
- Labs
- Research Centres
- Animal Research
- Blood Banks
- Nursing Homes
- Mortuaries
- Autopsy Centres
- Production Unit

Minor Sources

- Clinics
- Dental Clinics
- Homecare
- Cosmetic Clinics
- Paramedics
- Funeral Services
- Institutions

PROBLEMS RELATED/ASSOCIATED WITH BIO-MEDICAL WASTE :-

A major issue related to current Bio-Medical waste management in many hospitals is that the implementation of Bio-Waste regulation is unsatisfactory as some hospitals are disposing of waste in a haphazard, improper and indiscriminate manner. Lack of segregation practices, result in mixing of hospital wastes with general waste making the whole waste stream hazardous. Inappropriate segregation ultimately results in an incorrect method of waste disposal.

Inadequate Bio-Medical waste management thus will cause environmental pollution, unpleasant smell, growth and multiplication of vectors like insects, rodents and worms and may lead to the transmission of diseases like typhoid, cholera, hepatitis and AIDS through injuries from syringes and needles contaminated with human.

The Bio Medical Waste scattered in and around the hospitals invites flies, insects, rodents, cats and dogs that are responsible for the spread of communication disease like plague and rabies. Rag pickers in the hospital, sorting out the garbage are at a risk of getting tetanus and HIV infections. It becomes primary responsibility of Health administrators to manage hospital waste in most safe and eco-friendly manner

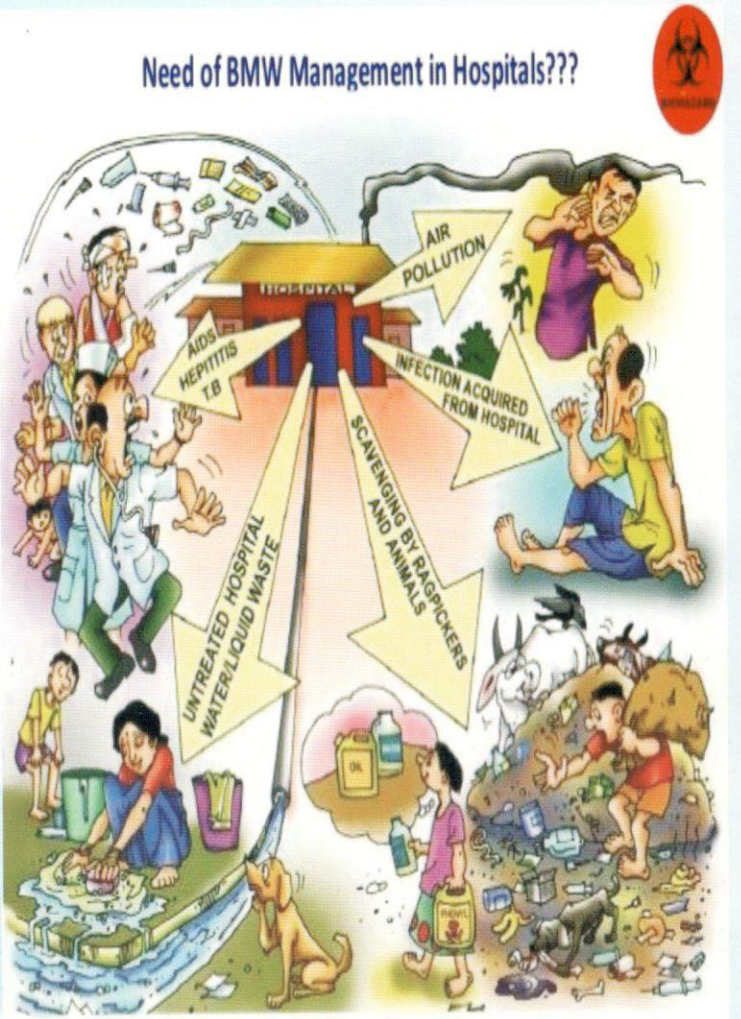
The problem of bio-medical waste disposal in the hospitals and other healthcare establishments has become an issue of increasing concern, prompting hospital administration to seek new ways of scientific, safe and cost effective management of the waste, and keeping their personnel informed about the advances in this area. The need of proper hospital waste management system is of prime importance and is an essential component of quality assurance in hospitals.

ORGANISM	DISEASES CAUSED	RELATED WASTE ITEM
VIRUSES HIV, Hepatitis B, Hepatitis A,C, Arboviruses, Enteroviruses	AIDS, Infectious Hepatitis, Infectious Hepatitis, Dengue, Japanese encephalitis, tick-borne fevers, etc.	Infected needles, body Fluids, Human excreta, soiled linen, Blood, body fluids,
BACTERIA Salmonella typhi, Vibrio cholera, Clostridium Tetani, Pseudomonas, Streptococcus	Typhoid, Cholera, Tetanus, Wound infections, septicaemia, rheumatic fever, endocarditis, skin and soft tissue infections	Human excreta and body fluid in landfills and hospitals wards, Sharps such as needles, surgical blades in hospital waste.
PARASITES Wucheraria Bancrofti, Plasmodium	Cutaneous leish maniasis, Kala Azar, Malaria	Human excreta, blood and body fluids in poorly managed sewage system of hospitals

NEED OF BIO-MEDICAL WASTE MANAGEMENT IN HOSPITALS:-

The reasons due to which there is great need of management of hospitals waste such as:

1. Injuries from sharps leading to infection to all categories of hospital personnel and waste handler.
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 time general public living in the vicinity of hospitals.
4. Risk associated with hazardous chemicals, drugs to persons handling wastes at all levels.
5. Disposable being repacked and sold by unscrupulous elements without even being washed.
6. Drugs which have been disposed off, being repacked and sold off to unsuspecting buyers.
7. Risk of air, water and soil pollution directly due to waste, or due to defective incineration emissions and ash



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

BIOMEDICAL WASTE MANAGEMENT PROCESS

The hospital waste like body parts, organs, tissues, blood and body fluids along with soiled linen, cotton, bandage and plaster casts from infected and contaminated areas are very essential to be properly collected, segregated, stored, transported, treated and disposed of in safe manner to prevent Nosocomial or hospital acquired infection.

Waste collection
Segregation
Transportation and storage
Treatment & Disposal
Transport to final disposal site
Final disposal

TREATMENT AND DISPOSAL OF BIO-MEDICAL WASTE

Under the provision of The Bio Medical Waste (Management and Handling) Rules 1998, Bio Medical Waste shall be treated and disposed of in accordance with schedule 1 and in compliance with the standards prescribed in schedule V (Schedule V- Page no. 08)

SCHEDULE-1

(See Rule 5)

CATAGORIES OF BIOMEDICAL WASTE

[1][Waste Category No.]	Waste Category [2] [Type]	Treatment & Disposal [3][Option +]
Category No. 1	**Human Anatomical Waste** (Human tissues, organs, body parts)	Incineration[@]/deep burial*
Category No. 2	**Animal Waste** (Animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals colleges, discharge from hospitals, animal houses)	Incineration[@]/deep burial*
Category No. 3	**Microbiology & Biotechnology Waste** (Wastes from laboratory cultures, stocks or specimens of micro- organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures)	Local autoclaving/ micro-waving/ incineration[@]
Category No. 4	**Waste sharps** (Needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps)	disinfection (chemical treatment[@@] /autoclaving /microwaving and mutilation /shredding##

Category No. 5	**Discarded Medicines and Cytotoxic drugs** (Wastes comprising of outdated, contaminated and discarded medicines)	incineration[@]/destruction and drugs disposal in secured landfills
Category No. 6	**Soiled Waste** (Items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines beddings, other material contaminated with blood)	Incineration@ autoclaving/ microwaving
Category No. 7	**Solid Waste** (Wastes generated from disposable items other than the waste sharps such as tubings , catheters, intravenous sets etc).	disinfection by chemical treatment@@ autoclaving/ microwaving and mutilation/ shredding##
Category No. 8	**Liquid Waste** (Waste generated from laboratory and washing, cleaning, house- keeping and disinfecting activities).	disinfection by chemical treatment@@ and discharge into drains
Category No. 9	**Incineration Ash** (Ash from incineration of any bio-medical[5]waste)	disposal in municipal landfill
Category No. 10	**Chemical Waste** (Chemicals used in production of biologicals, chemicals used in disinfection, as insecticides, etc.)	Chemical treatment@@ and discharge into drains for liquids and secured landfill for solids

@@ Chemicals treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

Mutilation/shredding must be such so as to prevent unauthorized reuse.

@ There will be no chemical pretreatment before incineration. Chlorinated plastics shall not be incinerated.

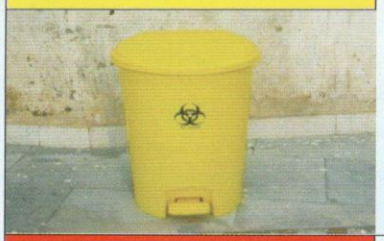
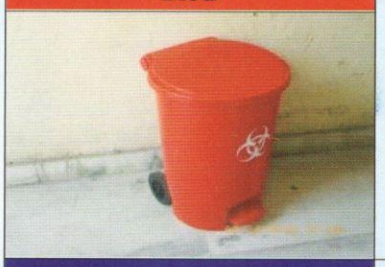
* Deep burial shall be an option available only in towns with population less than five lakhs and in rural areas.

[2][+ Options given above are based on available technologies. Occupier/operator wishing to use other State-of-the-art technologies shall approach the Central Pollution Control Board to get the standards laid down to enable the prescribed authority to consider grant of authorization].

SCHEDULE II

(see Rule 6)

COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTES

Colour Coding	Type of container	Waste category	Treatment options as per Schedule I
Yellow 	Plastic bag	Cat. 1, Cat. 2, Cat. 3, Cat. 6	Incineration/ deep burial
Red 	Disinfected container/plastic bag	Cat. 3, Cat. 6, Cat. 7,	Autoclaving/Micro waving/Chemical Treatment
Blue 	Plastic bag/ Puncture proof container	Cat. 4, Cat. 7,	Autoclaving/Micro waving/Chemical Treatment and destruction/shredding
Black 	Plastic bag	Cat. 5 and Cat. 9 and Cat. 10 (Solid)	Disposal in secured landfill

Notes :-

1. Colour coding of waste categories with multiple treatment options as defined in Schedule I, shall be selected depending on treatment option chosen, which shall be as specified in Schedule I.
2. Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
3. Categories 8 and 10 (liquid) do not require containers/bags
4. Category 3 if disinfected locally need not be put in containers/bags.

SCHEDULE III

(See rule 6)

LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS

BIO HAZARD SYMBOL

BIOHAZARD

CYTOTOXIC HAZARD SYMBOL

CYTOTOXIC

Handle With Care

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

SCHEDULE-V

(See Rule 5 and Schedule 1)

STANDARDS FOR TREATMENT AND DISPOSAL OF BIO-MEDICAL WASTES

STANDARDS FOR INCINERATORS:

All incinerators shall meet the following operation and emission standards:

A. Operating Standards

1. Combustion efficiency (CE) shall be at least 99.00%
2. The Combustion efficiency is computed as follows:

$$C.E.= \frac{\%CO_2}{\%CO_2 + \%CO} \times 100$$

3. The temperature of the primary chamber shall be 800 50c°.
4. The secondary chamber gas residence time shall be at least 1 (one) second at 1050 50c°, with minimum 3% Oxygen in the stack gas.

B. Emission Standards

Parameters		Concentration mg/Nm^3 at (12% CO_2 correction)
(1)	Particulate matter	150
(2)	Nitrogen Oxides	450
(3)	HCI	50

(4) Minimum stack height shall be 30 meters above ground.

(5) Volatile organic compounds in ash shall not be more than 0.01%.

Note:

- Suitably designed pollution control devices should be installed/retrofitted with the incinerator to achieve the above emission limits, if necessary.
- Wastes to be incinerated shall not be chemically treated with any chlorinated disinfectants.
- Chlorinated plastics shall not be incinerated.
- Toxic metals in incineration ash shall be limited within the regulatory quantities as defined under the Hazardous Waste (Management and Handling) Rules, 1989.
- Only low sulphur fuel like L.D.O./L.S.H.S./Diesel shall be used as fuel in the incinerator.

STANDARDS FOR WASTE AUTOCLAVING:

The autoclave should be dedicated for the purposes of disinfecting and treating bio-medical waste,

(I) When operating a gravity flow autoclave, medical waste shall be subjected to:

(i) a temperature of not less than 121°C and pressure of 15 pounds per square inch (psi) for an autoclave residence time of not less than 60 minutes; or

(ii) a temperature of not less than 135°C and pressure of 31 psi for an autoclave residence time of not less than 45 minutes; or

(iii) a temperature of not less than 149°C and a pressure of 52 psi for an autoclave residence time of not less than 30 minutes.

(II) When operating a vacuum autoclave, medical waste shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. The waste shall be subjected to the following:

(i) a temperature of not less than 121°C and pressure of 15 psi per an autoclave residence time of not less than 45 minutes; or

(ii) a temperature of not less than135°C and a pressure of 31 psi for an autoclave residence time of not less than 30 minutes;

(III) Medical waste shall not be considered properly treated unless the time, temperature and pressure indicators indicate that the required time, temperature and pressure were reached during the autoclave process. If for any reasons, time temperature of pressure indicator indicates that the required temperature, pressure or residence time was not reached, the entire load of medical waste must be autoclaved again until the proper temperature, pressure and residence time were achieved.

(IV) **Recording of operational parameters**

Each autoclave shall 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.

(V) **Validation test:**

Spore testing:

The autoclave should completely and consistently kill approved biological indicator at the maximum design capacity of each autoclave unit. Biological indicator for autoclave shall be

Bacillus stearothermophilus spores using vials or spore strips, with at least $1x10^4$ spores per milliliter. Under no circumstances will an autoclave have minimum operating parameters less than a residence time of 30 minutes, regardless of temperature and pressure, a temperature less than 121°C or a pressure less than 15 psi.

(VI) Routine Test

A chemical indicator strip/tape that changes colour when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip one strip over the waste package at different location to ensure the inner content of the package has been adequately autoclaved.

STANDARDS FOR LIQUID WASTE:

The effluent generated from the hospital should conform to the following limits:

PARAMETERS	PERMISSIBLE LIMITS
pH	**6.5-9.0**
Suspended solids	**100 mg/l**
Oil and grease	**10 mg/l**
BOD	**30 mg/l**
COD	**250 mg/l**
Bio-assay test	**90% survival of fist after 96 hours in 100% effluent**

These limits are applicable to those hospitals which are either connected with sewers without terminal sewage treatment plant or not connected to public sewers. For discharge into public sewers with terminal facilities, the general standards as notified under the Environment (Protection) Act, 1986 shall be applicable.

STANDARDS OF MICROWAVING:

1. Microwave treatment shall not be used for Cytotoxic, hazardous or radioactive wastes, contaminated animal carcasses, body parts and large metal items.
2. The microwave system shall comply with the efficiency test/routine tests and a performance guarantee may be provided by the supplier before operation of the unit.
3. The microwave should completely and consistently kill the bacteria and other pathogenic organisms that is ensured by approved bio-logical indicator at the maximum design capacity of each microwave unit. Biological indicators for microwave shall be Bacillus Subtilis spores using vials or spore strips with at least $1x\ 10^4$ spores per milliliter.

STANDARDS FOR DEEP BURIAL

1. A pit of trench should be dug about 2 meters deep. It should be half filled with waste, then covered with time within 50 cm of the surface, before filling the rest of the pit with soil.
2. It must be ensured that animals do not have any access to burial sites. Covers of galvanized iron/wire meshes may be used.
3. On each occasion, when wastes are added to the pit, a layer of 10 cm of soil shall be added to cover the wastes.
4. Burial must be performed under close and dedicated supervision.
5. The deep burial site should be relatively impermeable and no shallow well should be close to this site.

6. The pits should be distant from habitation, and sited to as to ensure that no contamination occurs of any surface water or groundwater. The area should not be prone to flooding or erosion.
7. The location of the deep burial site will be authorized by the prescribed authority.
8. The institution shall maintain a record of all pits for deep burial.

BIO-MEDICAL WASTE MANAGEMENT IN UTTARAKHAND

Uttarakhand Environment Protection & Pollution Control Board (UEPPCB) is taking various steps to ensure that Bio Medical Waste generated from various Hospitals/Nursing Homes and other Health Care Units are disposed off in safe and scientific manner in order to prevent disease and infections.

State Board has identified 708 Health Care Facilities. 2531.53 kg/day waste is being generated in these HCF's, these hospitals are having 14551 beds.

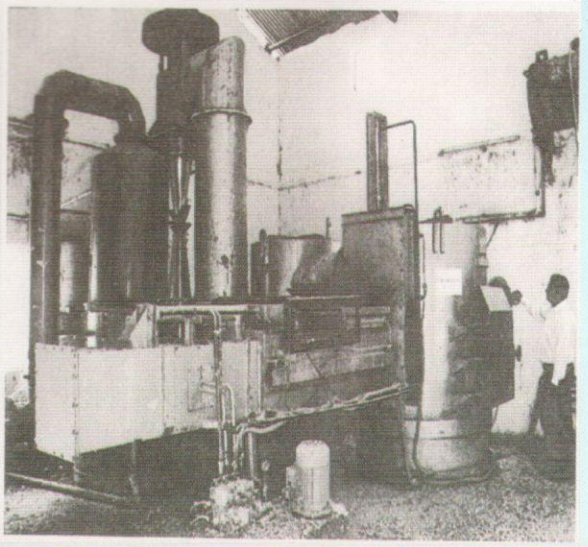
There are 05 incinerators operational in Uttarakhand namely details

1) Sushila Tiwari Government Hospital, Rampur Road Haldwani;
2) Medical Pollution Control Committee (MPCC), Mandawar, Roorkee-Dehradun Road, Roorkee, Distt Haridwar
3) Global Environment Solution, Lamba Khera, Khanpur, Gadarpur;
4) BHEL, Hospital, Ranipur, Haridwar and
5) Ramakrishna Mission Sevashrama, Kankhal, Haridwar.

M/s Global Environment Solutions, Khasra no 560, Lambakhera, Khanpur, Gadarpur And M/s Medical Pollution Committee (MPCC), M/s Medical Pollution Control Committee (MPCC), Mandawar, Roorkee-Dehradun road, Roorkee, Distt Haridwar are functioning as the Common Bio-medical waste treatment facility in Uttarakhand.
HCFs of Uttarakhand has provided various facilities at the hospital for waste disposal like provision of needle destroyer and different coloured bins for collection of different kind of waste for segregation at source.

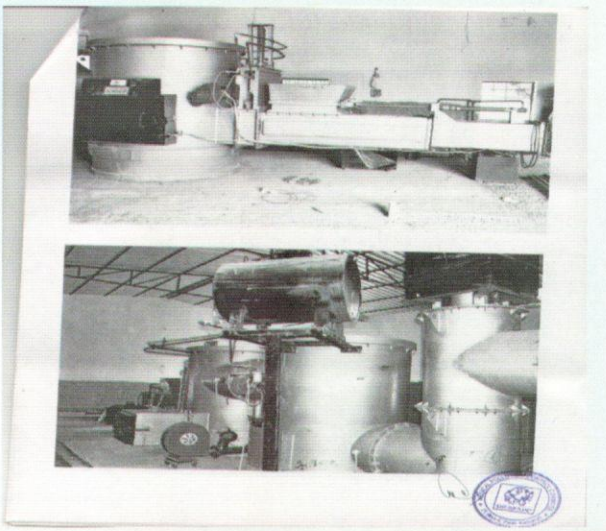
Small nursing homes and Indian Medical Association has engaged service providers i.e. MPCC and Global Environment Solution to transport their incinerable waste. These service providers collect the waste from each Nursing Home/Hospital/Clinic and Other Health Care Units to ensure proper handling and disposal of bio-medical waste in scientific manner, in compliance to the Bio-Medical Waste Rules, 1998.

State board has prosecuted CHC, Vikasnagar and Jwala Nursing Home, Dehradun into special designated court because these hospitals are not complying BMW Rules since a long time.

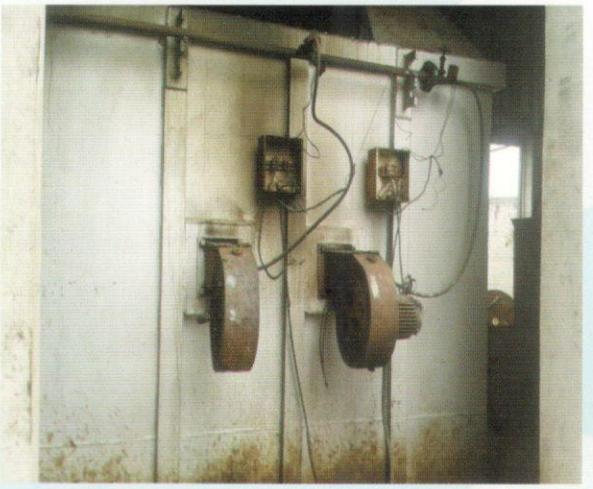


M/s H.N.B. Base Hospital, Srinagar

M/s Himalayan Hospital, Dehradun



Incinerator installed by BMW Transporter M/s M.P.C.C. Mandawar, Roorkee



BMW Status (From Year 2013 to July 2015)

Year Wise	Toal No. Of Hospitals	Total No. Of beds	Total No. Of Waste Generated (Kg/day)	Total No. Of Waste Treated (Kg/day)	Authorization Issued
Year 2013					
Dehradun	338	7490	1355	1355	122
Roorkee	137	2408	185.41	185.41	28
Haldwani	77	2570	470	470	63
Kashipur	121	1565	221-225	221-225	63
Total	**673**	**14033**	**2235.41**	**2235.41**	**276**
Year 2014					
Dehradun	358	7706	1426	1426	132
Roorkee	149	2790	208.82	208.82	84
Haldwani	81	2255	516	516	57
Kashipur	128	1810	390-395	390-395	56
Total	**716**	**14561**	**2545.82**	**2545.82**	**329**
Year 2015					
Dehradun	351	7681	1408	1408	12
Roorkee	146	2786	212.53	212.53	16
Haldwani	81	2255	516	516	12
Kashipur	130	1829	391-395	391-395	31
Total	**708**	**14551**	**2531.53**	**2531.53**	**71**

Status of Pathology Labs/Private Hospitals/Veterinary Hospitals/ Govt. Hospitals (Year 2013)

HCFs	Total No.	Authorization Issued	Total No. Of Waste Generated(Kg/Day)	Total Waste treated(Kg/Day)	Treatment Facilty	Transporter Name
Dehradun						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	54	37	71.7	71.7	CBWTF/Deep Burial	MPCC/Pehal
No. Of Private Hospitals(Beded)	153	92	719.6	719.6	CBWTF/Deep Burial	MPCC/Pahal
No. Of Veterinary Hospitals	02	-	2.5	2.5	CBWTF/Deep Burial	MPCC/Pahal
No. Of Govt. Hospitals	129	17	561.15	561.15	CBWTF/Deep Burial	MPCC/Pahal
Total	**338**	**146**	**1354.95**	**1354.95**		
Roorkee						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	23	09	10.90	10.90	CBWTF/Self	MPCC/Pahal
No. Of Private Hospitals(Beded)	80	18	107.67	107.67	CBWTF/Self	MPCC/Pahal
No. Of Veterinary Hospitals	01	00	1.13	1.13	Self	
No. Of Govt. Hospitals	33	01	66.52	66.52	CBWTF/Self	MPCC
Total	**137**	**28**	**186.22**	**186.22**		
Haldwani						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	05	05	04	04	Transporter/Deep Burial	Global Environment Solution
No. Of Private Hospitals(Beded)	39	39	211	211	Transporter/Deep Burial	Global Environment Solution
No. Of Veterinary Hospitals	0	0	0	0		
No. Of Govt. Hospitals	33	33	281	281	Transporter/Deep Burial	Global Environment Solution
Total	**77**	**77**	**496**	**496**		
Kashipur						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	32	19	12-15	12-15	GES/Pahal/DB	GES/Pahal/DB
No. Of Private Hospitals(Beded)	71	41	205-210	205-210	GES/Pahal/DB	GES/Pahal/DB
No. Of Veterinary Hospitals	NILL	NILL	NILL	NILL	NILL	NILL
No. Of Govt. Hospitals	18	03	15-20	15-20	GES/Pahal/DB	GES/Pahal/DB
Total	**121**	**63**	**245 (approx.)**	**245 (approx.)**		

Status of Pathology Labs/Private Hospitals/Veterinary Hospitals/ Govt. Hospitals (Year 2014)

HCFs	Total No.	Authorization Issued	Total No. Of Waste Generated(Kg/Day)	Total Waste treated(Kg/Day)	Treatment Facilty	Transporter Name
Dehradun						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	78	39	136	136	CBWTF/Deep Burial	MPCC/Pehal
No. Of Private Hospitals(Beded)	148	85	725.6	725.6	CBWTF/Deep Burial	MPCC/Pahal
No. Of Veterinary Hospitals	02		2.5	2.5	CBWTF/Deep Burial	MPCC/Pahal
No. Of Govt. Hospitals	129	08	561.15	561.15	CBWTF/Deep Burial	MPCC/Pahal
Total	**357**	**132**	**1425.25**	**1425.25**		
Roorkee						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	26	15	09.07	09.07	CBWTF/Self	MPCC/Pahal
No. Of Private Hospitals(Beded)	89	57	116.709	116.709	CBWTF/Self	MPCC/Pahal
No. Of Veterinary Hospitals	01	00	1.13	1.13	Self	
No. Of Govt. Hospitals	33	12	81.91	81.91	CBWTF/Self	MPCC
Total	**149**	**84**	**208.819**	**208.819**		
Haldwani						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	05	04	04	04	Transporter/Deep Burial	Global Environment Solution
No. Of Private Hospitals(Beded)	43	44	236	236	Transporter/Deep Burial	Global Environment Solution
No. Of Veterinary Hospitals	00	00	00	00		
No. Of Govt. Hospitals	33	33	304	304	Transporter/Deep Burial	Global Environment Solution
Total	**81**	**81**	**544**	**544**		
Kashipur						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	35	13	41-45	41-45	GES/DB	GES/DB
No. Of Private Hospitals(Beded)	75	40	340-345	340-345	GES/DB	GES/DB
No. Of Veterinary Hospitals	NILL	NILL	NILL	NILL	NILL	NILL
No. Of Govt. Hospitals	18	03	15-20	15-20	GES/DB	GES/DB
Total	**128**	**56**	**410**	**410**		

Status of Pathology Labs/Private Hospitals/Veterinary Hospitals/ Govt. Hospitals (Upto July 2015)

HCFs	Total No.	Authorization Issued	Total No. Of Waste Generated(Kg/Day)	Total Waste treated(Kg/Day)	Treatment Facilty	Transporter Name
Dehradun						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	78	00	136	136	CBWTF/Deep Burial	MPCC/Pehal
No. Of Private Hospitals(Beded)	147	09	711	711	CBWTF/Deep Burial	MPCC/Pahal
No. Of Veterinary Hospitals	02	00	2.5	2.5	CBWTF/Deep Burial	MPCC/Pahal
No. Of Govt. Hospitals	124	03	558.5	558.5	CBWTF/Deep Burial	MPCC/Pahal
Total	351	12	1408	1408		
Roorkee						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	25	08	10.36	10.36	CBWTF/Self	MPCC/Pahal
No. Of Private Hospitals(Beded)	87	08	119.961	119.961	CBWTF/Self	MPCC/Pahal
No. Of Veterinary Hospitals	01	00	1.13	1.13	Self	-
No. Of Govt. Hospitals	33	00	81.08	81.08	CBWTF/Self	MPCC
Total	146	16	212.531	212.531		
Haldwani						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	05	02	04	04	Transporter/Deep Burial	Global Environment Solution
No. Of Private Hospitals(Beded)	43	06	236	236	Transporter/Deep Burial	Global Environment Solution
No. Of Veterinary Hospitals	00	00	00	00		
No. Of Govt. Hospitals	33	04	304	304	Transporter/Deep Burial	Global Environment Solution
Total	81	12	544	544		
Kashipur						
No. Of (Pathology labs/Diagnostic centres/OPD/medical centre/Pharma)	35	07	41-45	41.45	GES/DB	GES/DB
No. Of Private Hospitals(Beded)	77	24	341-345	341-345	GES/DB	GES/DB
No. Of Veterinary Hospitals	NILL	NILL	NILL	NILL	NILL	NILL
No. Of Govt. Hospitals	18	00	15-20	15-20	GES/DB	GES/DB
Total	130	31	410 (approx.)	410 (approx.)		

PENALTY FOR CONTRAVENTION OF THE PROVISIONS OF THE ACT AND THE RULES, ORDERS AND DIRECTIONS

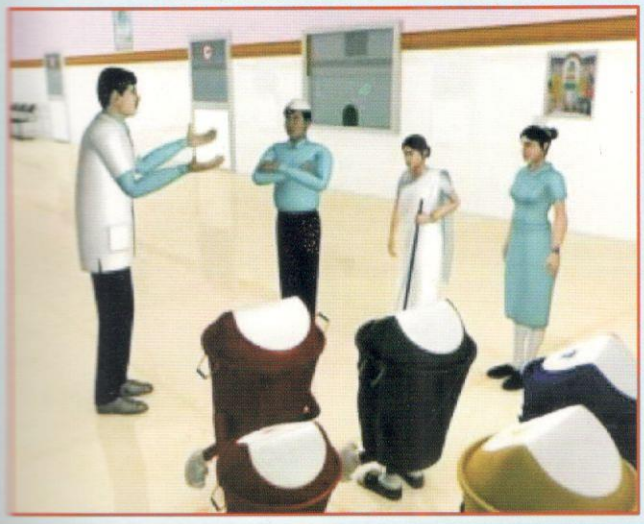
(1) Whoever fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued there under, shall, in 278 respect of each such failure or contravention, be punishable with imprisonment for a term which may extend to five years with fine which may extend to one lakh rupees, or with both, and in case the failure or contravention continues, with additional fine which may extend to five thousand rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention.

(2) If the failure or contravention referred to in sub-section (1) continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to seven years.

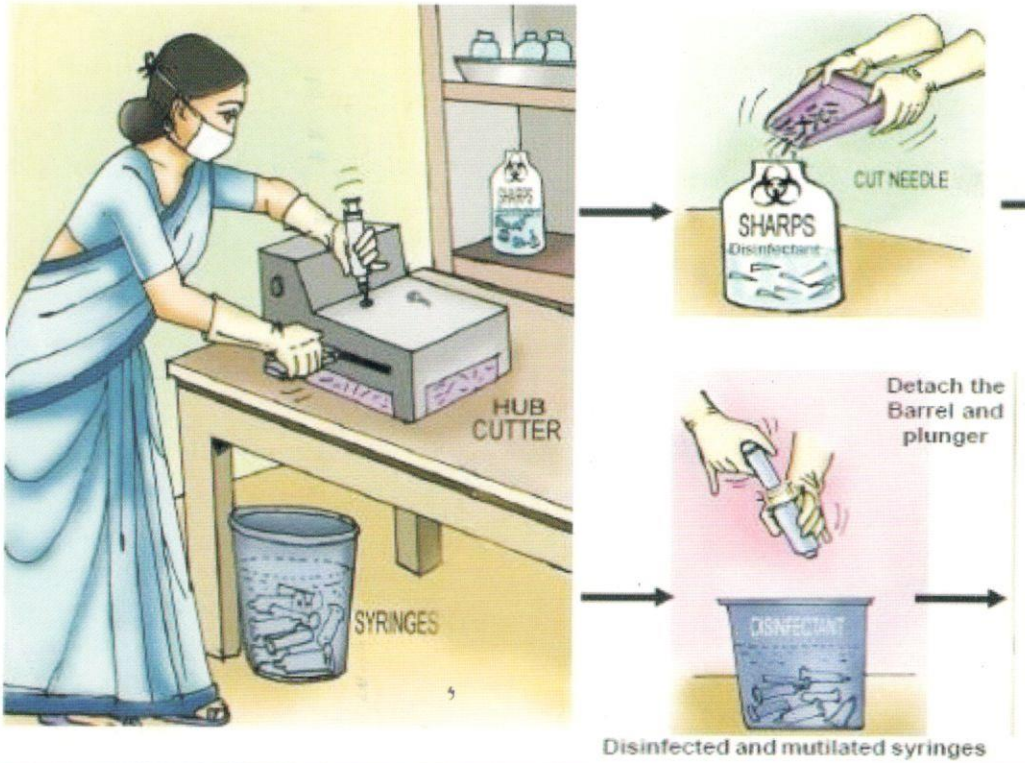
RECOMMENDATIONS

HCFs should ensure that segration of Bio-Medical Waste should be noted at the point of generation in accordance with these rules :

1. Training should be given to staff of HCFs by Health Department and State Pollution Control Board for the proper implementation of BMW Rules..
2. Every HCFs should also train their staff for te proper implementation of BMW Rules.
3. Each HCFs should designate one person for the management of BMW Rules.
4. State Pollution Control Board should also designate separate official at Head Office and each Regional Office for the regulation of BMW Rules..
5. Bio-medical waste should not be allowed to mix with other Municipal Solid Waste.
6. Housekeeping staff wear protective devices such as gloves, face masks, gowned, while handling the waste.



Disposable Syringes



Disinfected and mutilated syringes

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