ASSESSMENT OF BIO-MEDICAL WASTE GENERATION IN UTTARAKHAND

UTTARAKHAND
UKPCB

PREPARED BY

UTTARAKHAND POLLUTION CONTROL BOARD

Gaura Devi Paryavaran Bhavan, 46B, IT Park,
Dehradun, Uttarakhand

CREDITS

Overall Guidance and Supervision

Mr. S.P. Subudhi, IFS
Member Secretary, UKPCB

Project Co-ordinator

Dr. Ankur Kansal
Environmental Engineer, UKPCB

Data collection and Compilation

Mr. Nitin Joshi
Junior Research Fellow

Mr. Deepak Gupta
Junior Research Fellow

Assistance and Contribution

Officers and Staff of:
Head Office, Dehradun
Regional Office, Dehradun
Regional Office, Roorkee
Regional Office, Haldwani
Regional Office, Kashipur

ASSESSMENT OF BIO-MEDICAL WASTE GENERATION IN UTTARAKHAND

Acknowledgement

First & foremost, we would like to sincerely thank with reverence to Sh. S.P. Subudhi, IFS, Member Secretary, Uttarakhand Pollution Control Board (UKPCB) for his support and guidance at various stages of the study.

We also wish to thank Dr. Ankur Kansal (Environment Engineer) for his guidance, especially in collecting and collating data. The counsel given by him has been a great help in achieving the desired outcome of the study.

We would also wish to thank Sh. Amit Pokhriyal, Regional Officer, Dehradun (I/c), Sh. Naresh Goswami, Regional Officer, Kashipur (I/c), Dr. R.K. Chaturvedi, Regional Officer (Haldwani), Sh. Rajendra Singh, ex. Regional Officer (Roorkee) for extending cooperation & assistance, especially in data collection.

We would also like to thank the staff of regional offices for extending their help to us during field visits. Assistance provided by Km. Swati Kalra (Junior Research fellow), Smt. Malti Danosi (Scientific Assistant), Sh. Ayush Negi (Scientific Assistant) & Sh. Chandra Ballabh Joshi (Monitoring Assistant) during field visit was greatly appreciated.

Last but not the least, we must thank to all those whom we have not mentioned but who have helped us directly or indirectly during the study.

BMW Inventory Team


BIOHAZARD
BIOHAZARD
BIOHAZARD
BIOHAZARD

EXECUTIVE SUMMARY

Bio-Medical Waste (BMW), generated from Health Care Facilities (HCFs), consists of solids, liquids, sharps, and laboratory waste etc. that are potentially hazardous in nature. If this waste is not disposed properly, it will enter into the food chain and ecosystem, severely affecting the health of living beings and environment. "Health care facility" means a place where diagnosis, treatment or immunization of human beings is provided irrespective of type and size of health treatment system and research activity pertaining thereto. As per the annual report 2020 of Uttarakhand Pollution Control Board (UKPCB) as submitted to CPCB, 4,442 HCFs have been reported in the state of Uttarakhand. A total of 7,383.94 kg/day Bio-Medical waste generation was reported by these HCFs, out of which 3,829.35 Kg/day waste was generated by Bedded HCFs, 803.18 Kg/day waste was generated by non-bedded HCFs & 2,751 Kg/day waste was COVID-19 waste. **The principal aim of the study is the analysis of BMW management (generation, storage, handling, treatment and disposal) & assessment of the quantum of waste generated in the state of Uttarakhand.**

In this report, basics of Bio-Medical waste including legal terms, types of bio-medical waste along with current status of Bio-Medical waste management in the state of Uttarakhand have been addressed. The report also brings out the current scenario of how HCFs generate, store, handle, treat and dispose biomedical waste. Primary data and information related to specialty, capacity and bio-medical waste generation among the total of 207 health care facilities from seven districts have been collected by random sampling method and compiled explicitly. The study has also assessed the average Bio-Medical waste generation from various bedded and non-bedded HCFs and based on the data analysis various BMW generation factors have been estimated for bedded & non-bedded HCFs. The highlight of this study is that the observations are reported directly from the field which tell us the actual scenario of Bio-Medical waste management in HCFs of Uttarakhand.

The report highlights the conclusion that has been drawn from the data analysis that clearly shows gap in waste generation and waste disposal especially for hilly districts in Uttarakhand. Further, presently there are only two Common Bio Medical Waste Treatment and Disposal Facilities (CBWTFs) in the state which are geographically situated in such a manner so as not catering to HCFs situated in hilly areas. Therefore, it is highly recommended to envisage establishment of additional CBWTFs along with other alternate technologies for Bio-Medical waste management.

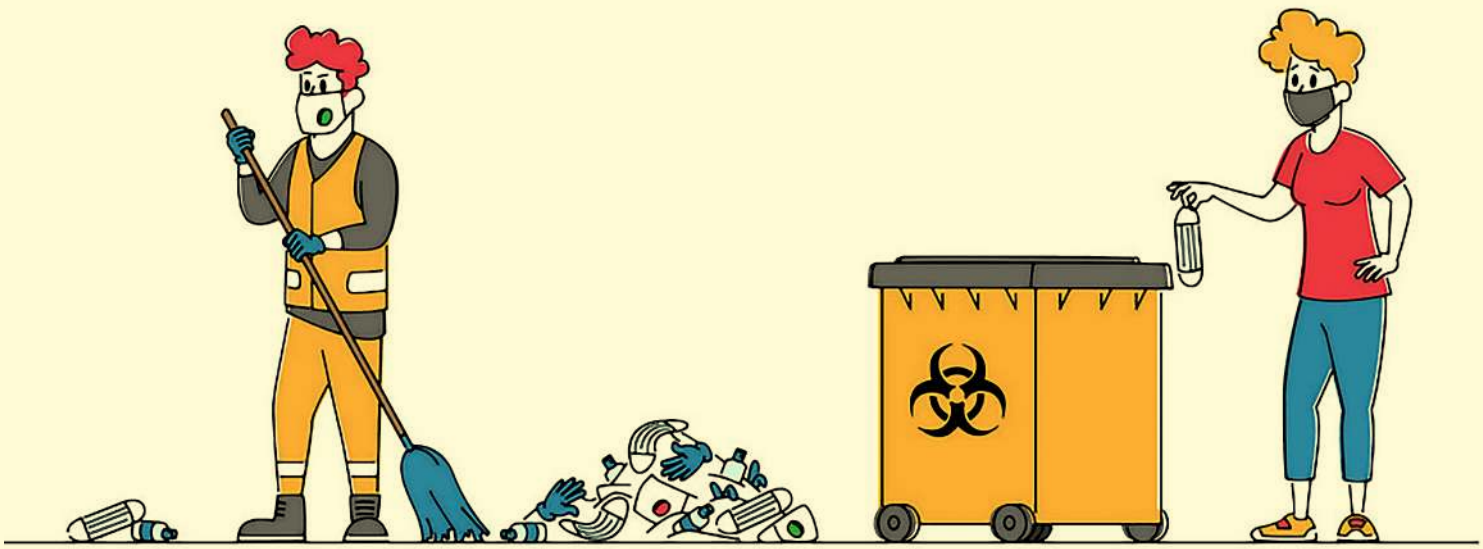
The ongoing COVID-19 pandemic has also created additional adversity in management of Bio-Medical waste in Uttarakhand. As per the annual report of UKPCB, 2,751 kg/day COVID waste was being generated in the state of Uttarakhand. Although, CBWTFs has permission to operate for 16 hours, but in the wake of COVID-19, it was extended to 20 hours/day. As per NGT order 72/2020, if the capacity of CBWTF gets exhausted then COVID-19 bio-waste can be directed towards additional incineration facilities in the state. In view of the above, it becomes explicitly incumbent to strongly explore the possibility of establishing additional CBWTFs for disposal of Bio-Medical Waste in Uttarakhand.

The report concludes with a set of strategies in the form of recommendations through which overall management of bio-medical waste within the state of Uttarakhand can be streamlined and strengthened.

BMW Inventory Team

CONTENTS

LIST OF TABLES



LIST OF FIGURES


HOSPITAL
COMMON BIOMEDICAL WASTE TREATMENT FACILITY (CBWTF)*
For incineration* at CBWTF
भस्मीकरण के लिए CBWTF भेजें
For treatment at CBWTF
उपचार के लिए CBWTF भेजें

ABBREVIATIONS & ACRONYMS

AYUSH	Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy
BMW	Bio-Medical Waste
CBWTF	Common Bio-Medical Waste Treatment Facility
CHC	Community Health Centre
COVID-19	Corona Virus Disease-2019
DB	Deep Burial
DGAFMS	Director General, Armed Forces Medical Services
ETP	Effluent Treatment Plant
GPS	Global Positioning System
HCF	Health Care Facilities
HCP	Health Care Personnel
MoEF&CC	Ministry of Environment, Forest and Climate change
MPCC	M/s Medical Pollution Control committee
PCC	Pollution Control Committee
PHC	Primary Health Centre
PPP	Public-Private partnership
PSU	Public Sector Unit
RO	Regional Office
SAD	State Allopathic Dispensary
SPCB	State Pollution Control Board
THDC	Tehri Hydro Development Corporation Limited
TSDF	Treatment, storage & disposal facility
UKPCB	Uttarakhand Pollution Control Board
WHO	World Health Organization

01
CHAPTER

INTRODUCTION

1.1 What is Bio-Medical waste

In the persuasion of the aim of reducing health problems, eradicating potential risks, and treating sick people, healthcare services inevitably create waste which itself may be hazardous to health. The waste produced in the course of healthcare activities carry a higher potential for infection and injury than any other type of waste. Inadequate and inappropriate knowledge of handling of healthcare waste may have serious health consequences and a significant impact on the environment as well. The Bio-Medical 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. The management of BMW follows cradle to grave approach which is characterization, quantification, segregation, storage, transport, and treatment.

As per WHO, only about 10%–25% of BMW is hazardous, and the remaining 75%–95% is non-hazardous. The hazardous part of the waste presents physical, chemical, and/or microbiological risk to the general population and health-care workers associated with handling, treatment, and disposal of waste. On an average, high income countries generate up to 0.5 kg of hazardous waste per bed per day when compared to the 0.2 kg generated in low-income countries. In the low-income countries, however, the real quantity of hazardous waste could be higher. This is because quite often they are not properly segregated into hazardous and non-hazardous waste and this mix results in contamination of the entire waste leading to the development of infections and resistant organisms. The basic principle of good BMW practice is based on the concept of 3Rs, namely, reduce, recycle, and reuse. The best BMW management methods aim at avoiding generation of waste or recovering as much as waste as possible, rather than disposing. Therefore, the various methods of BMW disposal, according to their desirability, are prevent, reduce, reuse, recycle, recover, treat, and lastly dispose. Hence, the Bio-Medical waste should be tackled at source rather than "end of pipe approach."

Amidst the widespread transmission of Corona Virus Disease 2019 (COVID-19) pandemic in India, significant growth of BMW has become a serious concern. The sudden surge in the Bio-Medical waste generation due to COVID-19 has become a threat to public health and the environment. In the above context, it is clear that the ongoing pandemic has aggravated the severity of challenges for the healthcare sector in India.

1.2. Rules & Regulations of Bio-Medical waste management

1.2.1 Background

Earlier, Bio-Medical waste management was not an essential part of the health care programme in India. The negligence on the part of health care waste management programme, in the past, was reflected in various articles in the newspapers and public litigations in various Courts including in the Hon'ble Supreme Court and this was also evident from the periodical epidemics experienced in different parts of the Country. On July 1998, first BMW rules were notified by Government of India, by the erstwhile Ministry of Environment and Forest under the Environment (Protection) Act, 1986. However, during 2002–2004, International Clinical Epidemiology Network explored the existing BMW practices, setup, and framework in primary, secondary, and tertiary health care facilities in India across 20 states. They found that around 82% of primary, 60% of secondary, and 54% of tertiary HCFs in India had no credible BMW Management system. In 2009, around 240 people in Gujarat, India contracted hepatitis-B following reuse of unsterilized syringes. This and many more studies show that despite India being among the first country to initiate measures for safe disposal of BMW, there was an urgent need to take action for strengthening the existing system capacity, increase the funding and commitment toward safe disposal of BMW. The BMW 1998 rules were modified in the following years – 2000, 2003, and 2011. The draft of BMW rules 2011 remained as draft and did not get notified because of lack of consent on categorization and standards. Finally, in supersession of the Bio-Medical Waste (Management and Handling) Rules, 1998 and further amendments made thereof, the Ministry of Environment, Forest and Climate change (MoEF&CC) vide G.S.R. 343(E) dated 28th March, 2016 published the Bio-Medical Waste Management Rules, 2016. These new rules increased the coverage, simplified the categorization and authorization while improving the segregation, transportation and disposal methods to decrease environmental pollution.

The prescribed authority for enforcement of the provisions of these rules in respect of all the health care facilities located in the state is Uttarakhand Pollution Control Board (UKPCB). These rules stipulate duties of the Occupier or Operator of a Common Bio-Medical Waste Treatment Facility (CBWTF) as well as the identified authorities. According to these rules, every occupier or operator handling Bio-Medical waste, irrespective of the quantity is required to obtain authorization from the prescribed authority i.e., State Pollution Control Board.

1.2.2 Classification of Bio-Medical Waste

Bio-Medical Waste Management Rules, 2016 emphasize segregation of Bio-Medical waste at source of generation, Bio Medical Waste Management Rules, 2016, categorizes the Bio-Medical waste generated from the health Care Facilities into four broad categories based on the segregation pathway and color code. As per Schedule-I of the Bio-Medical Waste Management Rules, 2016, the Bio-Medical waste is classified into 10 types. Schedule II of the Rules gives the color coding for the containers, the category of waste that goes into each container and the treatment options. At the point of generation, waste is to be segregated into red, yellow, blue bags and in white puncture proof container for metal sharps produced in the HCF. The waste category, types of Bio-Medical waste, type of bag or container and treatment and disposal option is presented in the Table 1.1.

Table-1.1

Bio-Medical waste Categories and their segregation, collection, treatment, processing and disposal options

Category	Type of waste	Type of bag or container to be used	Treatment and disposal option
Yellow	**(a) 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). **(b) 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.	Yellow colored non-chlorinated plastic bags	Incineration or Plasma Pyrolysis or deep burial*
	(c) Soiled Waste: Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and bags containing residual or discarded blood and blood components.		Incineration or Plasma Pyrolysis or deep burial* In absence of above facilities, autoclaving or micro-waving/ hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery.
	(d) Expired or Discarded Medicines: Pharmaceutical waste like antibiotics, cytotoxic drugs including all items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc.	Yellow colored non-chlorinated plastic bags or containers	Expired cytotoxic drugs and items contaminated with cytotoxic drugs to be returned back to the manufacturer or supplier for incineration at temperature >1200^0 C or to CBWTF or hazardous waste treatment, storage and disposal facility for incineration at >1200^0 C or Encapsulation or Plasma Pyrolysis at >1200^0 C. All other discarded medicines shall be either sent back to manufacturer or disposed by incineration.
	(e) Chemical Waste: Chemicals used in production of biological and used or discarded disinfectants.	Yellow colored containers or non-chlorinated plastic bags	Disposed of by incineration or Plasma Pyrolysis or Encapsulation in hazardous waste treatment, storage and disposal facility.
	(f) 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, house-keeping and disinfecting activities etc.	Separate collection system leading to effluent treatment system	After resource recovery, the chemical liquid waste shall be pre-treated before mixing with other waste-water. The combined discharge shall conform to the discharge norms given in schedule-III
	(g) Discarded linen, mattresses, beddings contaminated with blood or body fluid, routine mask and gown.	Non-chlorinated Yellow plastic bags or suitable packing	Non-chlorinated chemical disinfection followed by incineration or Plasma Pyrolysis or for energy recovery. In absence of above facilities, shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent for energy recovery or incineration or Plasma Pyrolysis.
	(h) Microbiology, Biotechnology and other clinical laboratory waste: Blood bags, Laboratory cultures, stocks or specimens of micro - organisms, 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.	Autoclave or Microwave or Hydroclave safe plastic bags or containers	Pre-treat to sterilize with non-chlorinated chemicals on-site as per World Health Organisation guidelines on Safe management of wastes from health care activities and World Health Organisation (WHO) Blue Book, 2014 and thereafter sent for incineration.

*Disposal by deep burial is permitted only in rural or remote areas where there is no access to CBWTF. This will be carried out with prior approval from the prescribed authority and as per the Standards specified in BMW Management Rules, 2016.

Common Bio-Medical Waste Treatment facility

Category	Type of waste	Type of bag or container to be used	Treatment and disposal option
Red	**Contaminated Waste (Recyclable)** (a) Wastes generated from disposable items such as tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles and fixed needle syringes) and vaccutainers with their needles cut) and gloves.	Red colored non-chlorinated plastic bags or containers	Autoclaving or micro-waving / hydroclaving followed by shredding or mutilation or combination of sterilization and shredding. Treated waste to be sent to registered or authorized recyclers or for energy recovery or plastics to diesel or fuel oil or for road making, whichever is possible. Plastic waste should not be sent to landfill sites.
White (Trans-lucent)	**Waste sharps including Metals:** Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades, or any other contaminated sharp object that may cause puncture and cuts. This includes both used, discarded and contaminated metal sharps	Puncture proof, Leak-proof, tamper-proof containers	Autoclaving or Dry Heat Sterilization followed by shredding or mutilation or encapsulation in metal container or cement concrete; combination of shredding cum autoclaving; and sent for final disposal to iron foundries (having consent to operate from the State Pollution Control Boards or Pollution Control Committees) or sanitary landfill or designated concrete waste sharp pit.
Blue	**(a) Glassware:** Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes.	Puncture proof and leak proof boxes or containers with blue colored marking	Disinfection by soaking the washed glass waste after cleaning with detergent and Sodium Hypochlorite treatment) or through autoclaving or microwaving or hydroclaving and then sent for recycling.
	(b) Metallic Body Implants	Puncture proof and leak proof boxes or containers with blue colored marking	

02
CHAPTER

TERMS OF REFERENCE FOR STUDY

Over the years, there has been immense growth and advancement of health care facilities in Uttarakhand. As a consequence of this betterment and expansion of healthcare infrastructure, production of health care waste has seen an exponential upward trend. Management of BMW becomes essential as waste generated by a health care facility can be infectious. The infectious waste is hazardous and poses serious threat to patients, health care workers, public health, and the environment. However, the awareness regarding Bio-Medical waste management is continuously increasing amongst health personnel and due credit should be given to the continuous efforts being undertaken by the Uttarakhand Pollution Control Board (UKPCB).

Waste generation from individual health care facilities may vary based on the type or level of health care facility and location of health care facility, rural or urban. It may reflect upon the differences in the services provided, scale, organizational complexity, availability of resources, and the number of medical and other staff. Quantification of Bio-Medical waste generation can be used to establish baseline data on the rates of production in different medical areas. It also helps in planning, budgeting, calculating revenues from recycling, optimizing waste-management systems, and assessing environmental impact. The health care providers should also know the quantity of waste generated in their facility so that appropriate measures can be taken to reduce the waste generation in day-to-day work because, lesser amount of BMW means a lesser burden on waste disposal work and cost saving. **Therefore, the present study is designed to analyse the BMW management & quantum of BMW generation in the state of Uttarakhand.**

2.1. Terms of Reference (ToR)

The principal aim of the study is the assessment of the Bio-Medical waste management (generation, storage, handling, treatment and disposal) practice as it exists currently in Uttarakhand. The terms of reference for the study are:

1. **Review and analysis of secondary data on Bio-Medical waste management**

   Secondary data collected from Regional offices (ROs) of UKPCB has been considered for review and analysis. Accordingly, a review and analysis of the data have been carried out in this study.

2. **Carry out detailed field survey in randomly selected HCFs of various districts in the State**

   A detailed survey in representative HCFs of selected districts was carried out to assess the existing practices of collection, segregation, storage, transportation, and disposal of BMW & estimate the average Bio-Medical waste generated in the state of Uttarakhand. Survey Questionnaire format is enclosed as **Annexure-I.**

3. **To identify the current waste handling, management, treatment and disposal practices.**

4. **Promote awareness among personnel and staff working in HCFs regarding sound management & disposal of Bio-Medical waste and compliance of BMW management Rules, 2016.**

5. **Identification of improvement required in implementation of BMW management & recommendations for improvements.**


BIOHAZARD
HANDLE WITH CARE
For incineration
at CBWTF
भस्मीकरण के लिए
CBWTF में भेजें
INFECTED PLASTICS
संक्रमित प्लास्टिक
For treatment
at CBWTF
उपचार के लिए
CBWTF में भेजें

03
CHAPTER

Deep Burial Pit for Bio-Medical Waste Disposal

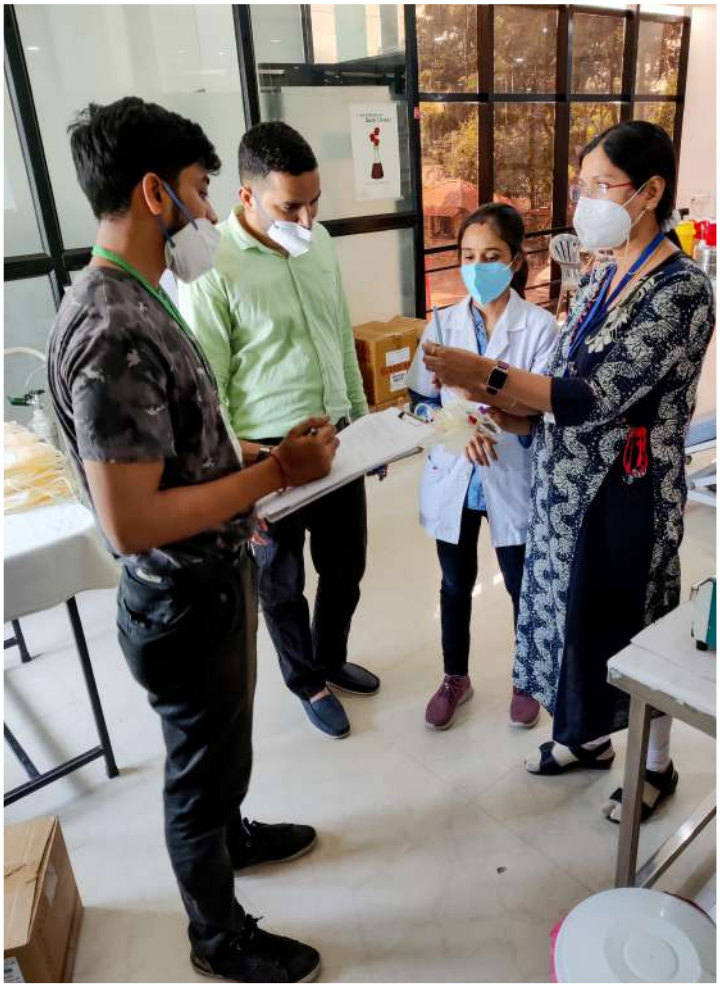
METHODOLOGY/SURVEY

For assessment of BMW management in HCFs of Uttarakhand, data collection formats were prepared referring to the BMW Rules and CPCB guidelines for gathering information related to management of BMW. A team was formed for primary data collection by field visits based on a random survey method. The study for BMW management and estimation of quantum of waste generation was conducted in Health care facilities (HCFs) of seven districts viz., Uttarkashi, Tehri Garhwal, Udham Singh Nagar, Nainital, Almora, Dehradun & Haridwar in the state of Uttarakhand from January 2021 to July 2021. A total of 207 HCFs were surveyed which included hospitals, nursing homes, clinics, veterinary institutions, pathological laboratories, Diagnostic centers, Blood banks, AYUSH Hospitals etc.

3.1. Data Collection

Before starting the survey, planning was done to carryout survey for each district. A structured questionnaire was prepared by the survey team which encompassed both quantitative and qualitative aspect for desired information required for the survey. Interview of HCF's staff member (that included both senior and junior staff who handle BMW); Visits to different sections of HCFs (to see BMW generation) and physical observations of back-of-the-house facilities (where BMW is sorted and stored), Questionnaire filling, data validation and review were used to gather maximum information about BMW management practices in the HCFs.

The survey team visited different areas of the HCFs such as Wards, ICUs, Emergency, Operation Theatre, Laboratories etc. to observe the process of BMW management at the site of generation. The emphasis was to see whether the segregation, quantification & storage of BMW at the site of generation was carried out as per the BMW Management Rules, 2016. The assessment of knowledge regarding management of BMW was carried out by asking a set of prepared questions individually to the health care personnel (HCP) by the survey team members.



The survey team also inspected the central BMW storage area of the HCFs. In the storage area, the waste was weighed and recorded in the questionnaire according to the colour code. The total BMW generated in kilogram per bed per day was calculated as follows: first, mean waste generated per day was calculated by dividing the total BMW produced (that is sum of waste in red bag + yellow bag + puncture proof white container + blue bag) per day. Further, the mean waste generated per day was divided by the number of occupied beds per day (average annual occupancy) to calculate the BMW generated in kilogram per bed per day. If the waste was already transported to CBWTF/disposed in deep burial site at the time of visit, then log book maintained by the HCFs and/or provided by the CBWTF to HCFs was referred to get the BMW generation in Kilogram per day. Moreover, GPS (Global Positioning System) location, photographs & contact details of concerned person from the surveyed HCFs were also recorded.

The secondary data was collected from Regional offices of UKPCB as per the formats circulated to them. Regional Offices gathered the data in the prescribed format from the records available with them. Data analysis was carried out to get a summary status of BMW management in Uttarakhand, with respect to waste generation, its treatment, mode of disposal etc.

04
CHAPTER

PRESENT STATUS OF BIO-MEDICAL WASTE IN UTTARAKHAND

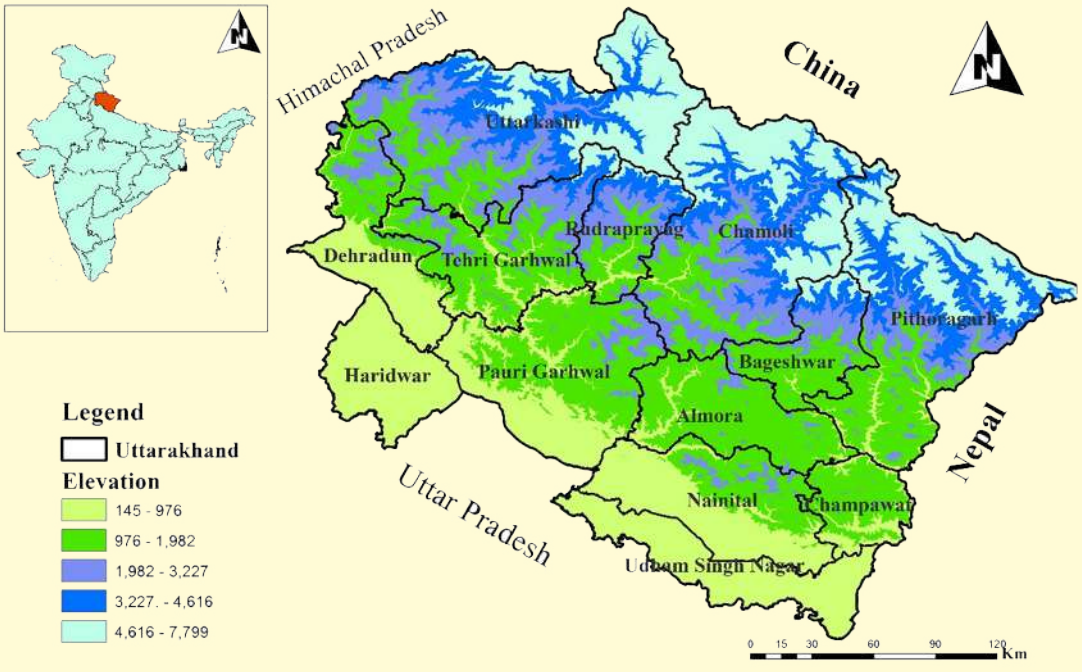
4.1. Preface

Uttarakhand state was formed on 9th November, 2000 as the 27th state of India. The newly formed hill state in the Indian Himalayan Region became a separate state, carved out of hill districts and sub-Himalayan regions of Uttar Pradesh. It has two divisions namely Garhwal and Kumaon and 13 districts namely, Chamoli, Pauri Garhwal, Tehri Garhwal, Uttarkashi, Dehradun, Haridwar and Rudraprayag in the Garhwal region and Nainital, Almora, Pithoragarh, Udham Singh Nagar, Champawat and Bageshwar in the Kumaon region (**Fig 4.1**). Of these 13 districts, four districts (Nainital, Haridwar, Dehradun and Udham Singh Nagar) have large areas in the plains, whereas the other nine districts comprise the hilly region of the state.

Dehradun is the capital of Uttarakhand which is one of the most beautiful resorts in the sub-mountain tracts of India. It is well known for its scenic surroundings. The town lies in the valley called Dun Valley, on the watershed of the Ganga and Yamuna rivers. The geographical location (30°43′ N to 31°27′ N and 79°34′ E to 81°02′ E) of Uttarakhand is unique and it borders the Tibet (Autonomous Region of China) in the north east. Nepal in the east, Uttar Pradesh in the south, Haryana in the west and Himachal Pradesh in the north west. Uttarakhand has a total geographical area of 53,483 Km^2, of which 93% is mountainous and 71% is forest area. Most of the northern parts of the state are part of Greater Himalaya ranges, covered by the high Himalayan peaks and glaciers, while the lower foothills are densely forested. The difference in altitude between the lowest parts and the highest part (snow peaks of Nanda Devi) is almost 7,800 m. Uttarakhand is one of the few states in India where a large section of people live quite close to the nature and it is one of the fastest growing Himalayan state of India. Although, the industrialization has generated employment and wealth in state with the implementation of Industrial and sector specific policies. However, increase in urbanization has also increased the demand of health care facilities in urban and rural areas, which consequently require constant attention for appropriate BMW management. The management of BMW is an important issue and it's also a challenging one for the developing hilly state of Uttarakhand.

Fig. 4.1

District map of Uttarakhand state



4.2. Brief of UKPCB : Responsibilities under The Bio-Medical Waste Management Rules 2016

Keeping in view the objective of complete protection of public health and the commitment towards solving the pollution problem by the Government of India, Uttaranchal Pollution Control Board was constituted in the year 2001. The State Pollution Control Board was entrusted with the responsibility of ensuring compliance with the provisions of various Environmental Acts & Rules made thereunder.

The Bio-Medical Waste Management Rules 2016 were promulgated under the Environment (Protection) Act, 1986. UKPCB is the apex agency to enforce these Rules in the state of Uttarakhand. The role of UKPCB under BMW Rules are as follows:

(i) Inventorisation of Occupiers and data on Bio-Medical waste generation, treatment & disposal.

(ii) Compilation of data and submission of the same in annual report to CPCB within the stipulated time period.

(iii) Grant and renewal, suspension or refusal, cancellation or of authorisation under these rules.

(iv) Monitoring of compliance of various provisions and conditions of authorisation.

(v) Action against health care facilities or CBWTFs for violation of these rules.

(vi) Organizing training programmes to staff of HCFs and CBWTFs and State Pollution Control Boards or Pollution Control Committees Staff on segregation, collection, storage, transportation, treatment and disposal of Bio-Medical wastes.

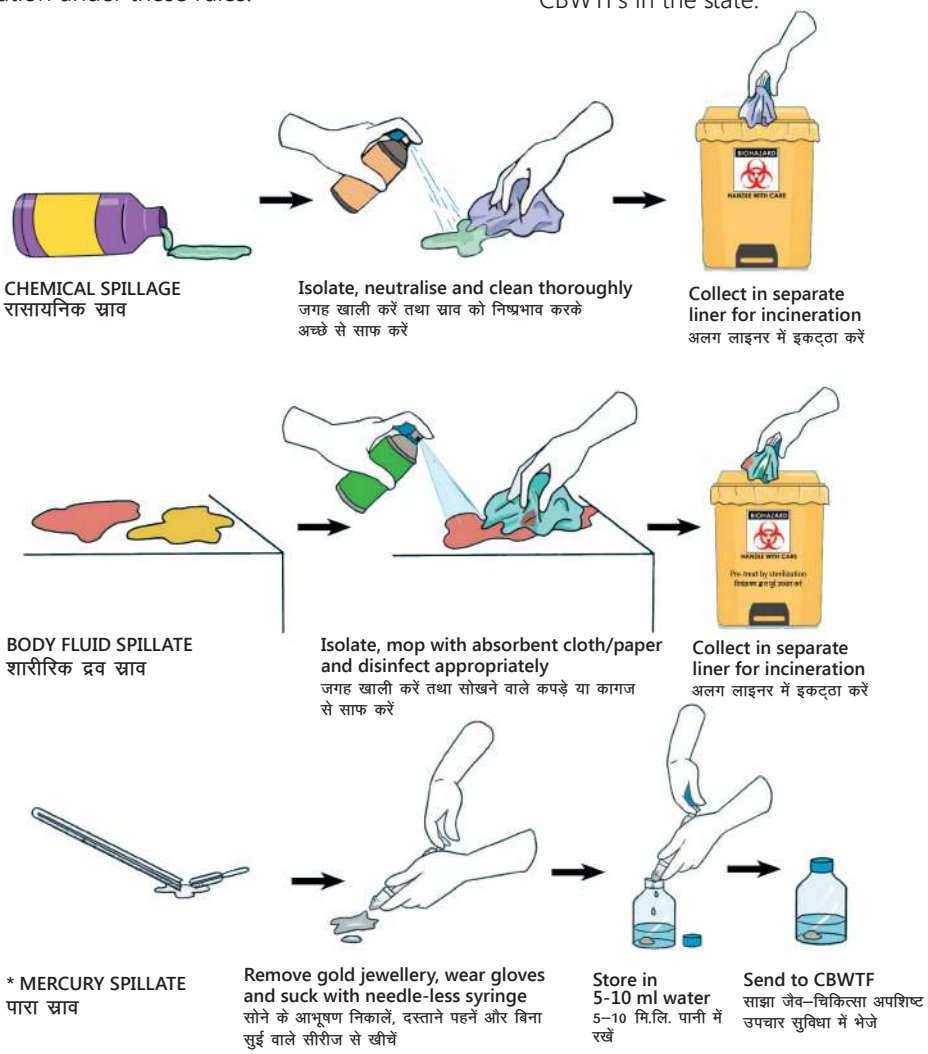
(vii) Undertake or support research or operational research regarding Bio-Medical waste management.

(viii) Any other function under these rules assigned by MoEF&CC or CPCB from time to time.

(ix) Implementation of recommendations of the Advisory Committee.

(x) Publish the list of Registered or Authorised (or give consent) Recyclers.

(xi) Undertake and support third party audits of the CBWTFs in the state.



* Use of mercury based equipments should be phased out from the healthcare sector
पारा आधारित उपकरणों का उपयोग स्वास्थ्य क्षेत्र से धीरे–धीरे हटाया जाना चाहिए

4.3. Bio-Medical Waste Management in Uttarakhand

UKPCB is taking various steps to ensure that bio medical waste generated from various HCFs are disposed off in safe and scientific manner in order to prevent disease and infections. As per the annual report 2020, UKPCB has recorded 4442 HCFs in the state of Uttarakhand. A total of 7383.94 kg/day Bio-Medical waste generation was recorded by these HCF's, out of which 3829.35 Kg/day waste was generated by Bedded HCFs, 803.18 Kg/day waste was generated by non-bedded HCFs & 2751 Kg/day waste was Covid waste.

In order to have effective decision-making process, the UKPCB has two tier system of working consisting of Head office & Regional Offices (ROs). There are four regional offices of UKPCB which have their own set of respective jurisdictions in various districts (**Table 4.1**).

Table-4.1

List of Regional Offices (ROs) and respective districts under them

Sl. No.	Regional Office (RO)	Districts Covered
1	RO Roorkee	Haridwar
2	RO Dehradun	Dehradun, Chamoli, Pauri Garhwal, Tehri Garhwal, Rudraprayag, Uttarkashi
3	RO Kashipur	Udham Singh Nagar
4	RO Haldwani	Nainital, Bageshwar, Almora, Pithoragarh, Champawat

As per the formats provided to the regional offices, data regarding BMW management recorded by ROs was collected and complied. Review and analysis of the data collected from ROs for the year 2020 has been given in **Table 4.2** & **4.3**

Table-4.2

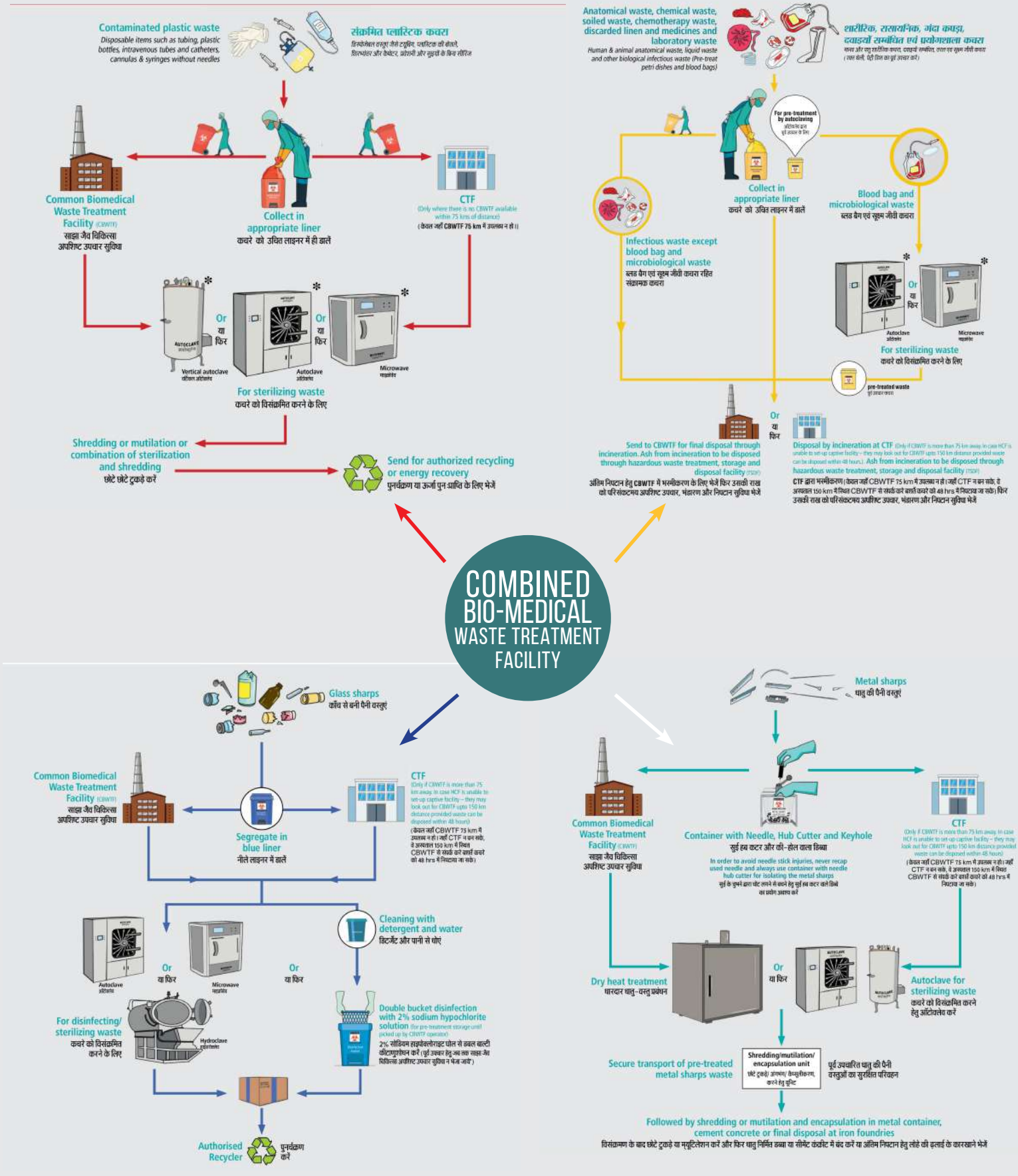
Summary of HCFs/occupiers in Uttarakhand (Year 2020)

Sl. No.	Total no. of occupier/ HCF	Regional Office				Total
		Haldwani	Kashipur	Roorkee	Dehradun	
1	Bedded Hospitals and Nursing Homes (bedded)	456	220	220	472	1368
2	Clinics/dispensaries	572	184	171	1063	1990
3	Veterinary institutions	119	23	17	1	160
4	Animal houses	0	0	0	0	0
5	Pathological laboratories/ Diagnostic Centre	56	65	90	151	362
6	Blood banks	4	0	2	1	7
7	Clinical establishment	0	2	0	0	2
8	Research Institutions/Pharma units/ Transporter agency	1	0	5	17	23
9	AYUSH	217	22	37	251	527
10	Homeopathic	0	0	3	0	3
	Total	**1425**	**516**	**545**	**1956**	**4442**

Table-4.3

Details of Status of Authorization (Year 2020)

Sl. No.	Total no. of occupier/ HCF	Regional Office				Total
		Haldwani	Kashipur	Roorkee	Dehradun	
1	Total number of Occupiers applied + under scrutiny for authorization	1404	403	482	1632	3921
2	Total number of Occupiers granted authorization	1237	377	452	1372	3438
3	Total number of applications under consideration	167	25	30	260	482
4	Total number of applications rejected	0	1	0	0	1
5	Total number of Occupiers not applying for authorization	21	113	63	324	521


COMBINED
BIO-MEDICAL
WASTE TREATMENT
FACILITY
Contaminated plastic waste
Disposable items such as tubing, plastic bottles, intravenous tubes and catheters, cannulas & syringes without needles
संक्रमित प्लास्टिक कचरा
डिस्पोजेबल वस्तुएं जैसे ट्यूबिंग, प्लास्टिक की बोतलें, शिरापरक और कैथेटर, कैनुलस और सुइयों के बिना सीरिंज
Common Biomedical Waste Treatment Facility (CBWTF)
साझा जैव चिकित्सा अपशिष्ट उपचार सुविधा
Collect in appropriate liner
कचरे को उचित लाइनर में ही डालें
CTF
(Only where there is no CBWTF available within 75 kms of distance)
(केवल जहाँ CBWTF 75 km में उपलब्ध न हो।)
Or
या फिर
Vertical autoclave
Autoclave
Microwave
For sterilizing waste
कचरे को विसंक्रमित करने के लिए
Shredding or mutilation or combination of sterilization and shredding
छोटे छोटे टुकड़े करें
Send for authorized recycling or energy recovery
पुनर्चक्रण या ऊर्जा पुनः प्राप्ति के लिए भेजें
Anatomical waste, chemical waste, soiled waste, chemotherapy waste, discarded linen and medicines and laboratory waste
Human & animal anatomical waste, liquid waste and other biological infectious waste (Pre-treat petri dishes and blood bags)
शारीरिक, रासायनिक, गंदा कपड़ा, दवाइयाँ सम्बंधित एवं प्रयोगशाला कचरा
For pre-treatment by autoclaving
Collect in appropriate liner
कचरे को उचित लाइनर में डालें
Blood bag and microbiological waste
ब्लड बैग एवं सूक्ष्म जीवी कचरा
Infectious waste except blood bag and microbiological waste
ब्लड बैग एवं सूक्ष्म जीवी कचरा रहित संक्रामक कचरा
Autoclave
Microwave
For sterilizing waste
कचरे को विसंक्रमित करने के लिए
pre-treated waste
Send to CBWTF for final disposal through incineration. Ash from incineration to be disposed through hazardous waste treatment, storage and disposal facility (TSDF)
अंतिम निपटान हेतु CBWTF में भस्मीकरण के लिए भेजें फिर उसकी राख को परिसंकटमय अपशिष्ट उपचार, भंडारण और निपटान सुविधा भेजें
Disposal by incineration at CTF (Only if CBWTF is more than 75 km away. In case HCF is unable to set-up captive facility – they may look out for CBWTF upto 150 km distance provided waste can be disposed within 48 hours.) Ash from incineration to be disposed through hazardous waste treatment, storage and disposal facility (TSDF)
CTF द्वारा भस्मीकरण (केवल जहाँ CBWTF 75 km में उपलब्ध न हो। जहाँ CTF न बन सके, वे अस्पताल 150 km में स्थित CBWTF से संपर्क कर वर्तित कचरे को 48 hrs में निपटाय जा सके।) फिर उसकी राख को परिसंकटमय अपशिष्ट उपचार, भंडारण और निपटान सुविधा भेजें
Glass sharps
कॉच से बनी पैनी वस्तुएं
Common Biomedical Waste Treatment Facility (CBWTF)
साझा जैव चिकित्सा अपशिष्ट उपचार सुविधा
Segregate in blue liner
नीले लाइनर में डालें
CTF
(Only if CBWTF is more than 75 km away. In case HCF is unable to set-up captive facility – they may look out for CBWTF upto 150 km distance provided waste can be disposed within 48 hours)
(केवल जहाँ CBWTF 75 km में उपलब्ध न हो। जहाँ CTF न बन सके, वे अस्पताल 150 km में स्थित CBWTF से संपर्क कर वर्तित कचरे को 48 hrs में निपटाय जा सके।)
Autoclave
Or
या फिर
Microwave
Or
या फिर
Cleaning with detergent and water
डिटर्जेंट और पानी से धोएं
For disinfecting/ sterilizing waste
कचरे को विसंक्रमित करने के लिए
Hydroclave
Double bucket disinfection with 2% sodium hypochlorite solution (for pre-treatment storage until picked up by CBWTF operator)
2% सोडियम हाइपोक्लोराइट घोल से डबल बाल्टी कीटाणुशोधन करें (पूर्व उपचार हेतु जब तक साझा जैव चिकित्सा अपशिष्ट उपचार सुविधा न भेज जावें)
Authorised Recycler
पुनर्चक्रण करें
Metal sharps
धातु की पैनी वस्तुएं
Common Biomedical Waste Treatment Facility (CBWTF)
साझा जैव चिकित्सा अपशिष्ट उपचार सुविधा
Container with Needle, Hub Cutter and Keyhole
सुई हब कटर और की-होल वाला डिब्बा
In order to avoid needle stick injuries, never recap used needle and always use container with needle hub cutter for isolating the metal sharps
सुई के चुभने द्वारा चोट लगने से बचने हेतु सुई हब कटर वाले डिब्बे का प्रयोग अवश्य करें
CTF
(Only if CBWTF is more than 75 km away. In case HCF is unable to set-up captive facility – they may look out for CBWTF upto 150 km distance provided waste can be disposed within 48 hours)
(केवल जहाँ CBWTF 75 km में उपलब्ध न हो। जहाँ CTF न बन सके, वे अस्पताल 150 km में स्थित CBWTF से संपर्क कर वर्तित कचरे को 48 hrs में निपटाय जा सके।)
Dry heat treatment
धारदार धातु-वस्तु उपचयन
Or
या फिर
Autoclave for sterilizing waste
कचरे को विसंक्रमित करने हेतु ऑटोक्लेव करें
Secure transport of pre-treated metal sharps waste
Shredding/mutilation/ encapsulation unit
छोटे टुकड़े/ अंगभंग/ कैप्सूलीकरण, करने हेतु यूनिट
पूर्व उपचारित धातु की पैनी वस्तुओं का सुरक्षित परिवहन
Followed by shredding or mutilation and encapsulation in metal container, cement concrete or final disposal at iron foundries
विसंक्रमण के बाद छोटे टुकड़े या म्यूटिलेशन करें और फिर धातु निर्मित डब्बा या सीमेंट कंक्रीट में बंद करें या अंतिम निपटान हेतु लोहे की ढलाई के कारखाने भेजें

Analysis of the BMW data available from annual reports (2017-2020) revealed that there was a significant increase in the number of Bedded HCFs in Uttarakhand from 2017 to 2020. Further, no. of available beds (assuming 100%, 70% & 50% bed occupancy) was estimated for each year as per annual report (2017-2020) given in **Table 4.4**. Moreover, BMW generated (kg/bed/day) assuming 100%, ,70% & 50% occupancy was presented in graphical manner in **Fig 4.2**.

Table-4.4

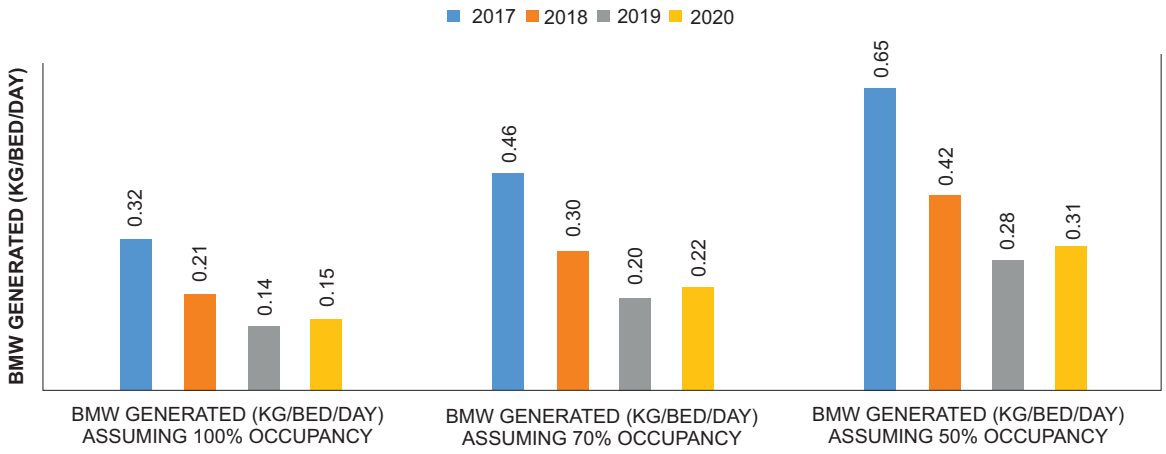
BMW generation per bed (assuming 100%, 70% & 50% occupancy) for year 2017-2020

Year	No. of Bedded HCFs	BMW generated (Kg/day)	Total No. of beds available	BMW generated (kg/bed/day)	No. of beds available (assuming 70% occupancy)	BMW generated (kg/bed/day)	No. of beds available (assuming 50% occupancy)	BMW generated (kg/bed/day)
2017	849	2946	9109	0.32	6376	0.46	4555	0.65
2018	1015	4111	19765	0.21	13835	0.30	9883	0.42
2019	1121	3186.44	22807	0.14	15965	0.20	11404	0.28
2020*	1368	3829.35	24908	0.15	17435	0.22	12454	0.31

* Not included COVID-19 BMW.

Fig. 4.2

Trend of BMW Generation (2017-2020)



Note: Bio-Medical waste generated per bed is calculated by assuming 100%, 70% & 50% bed occupancy. In general, 70% occupancy is taken in account as it is closer to the actual average bed occupancy.

From **Fig. 4.2,** the trend of BMW generated per bed per day assuming 100%, 70% & 50% occupancies can be easily visualised as decreasing slightly, although, the no. of HCFs recorded were increasing. This trend could be attributed to proper management of BMW (segregation & storage) and increased awareness by hospital managements over the years. However, there are other variables too which tend to affect BMW generation per bed per day, that are further discussed in this report.

05
CHAPTER

BIO-MEDICAL WASTE GENERATION ASSESSMENT

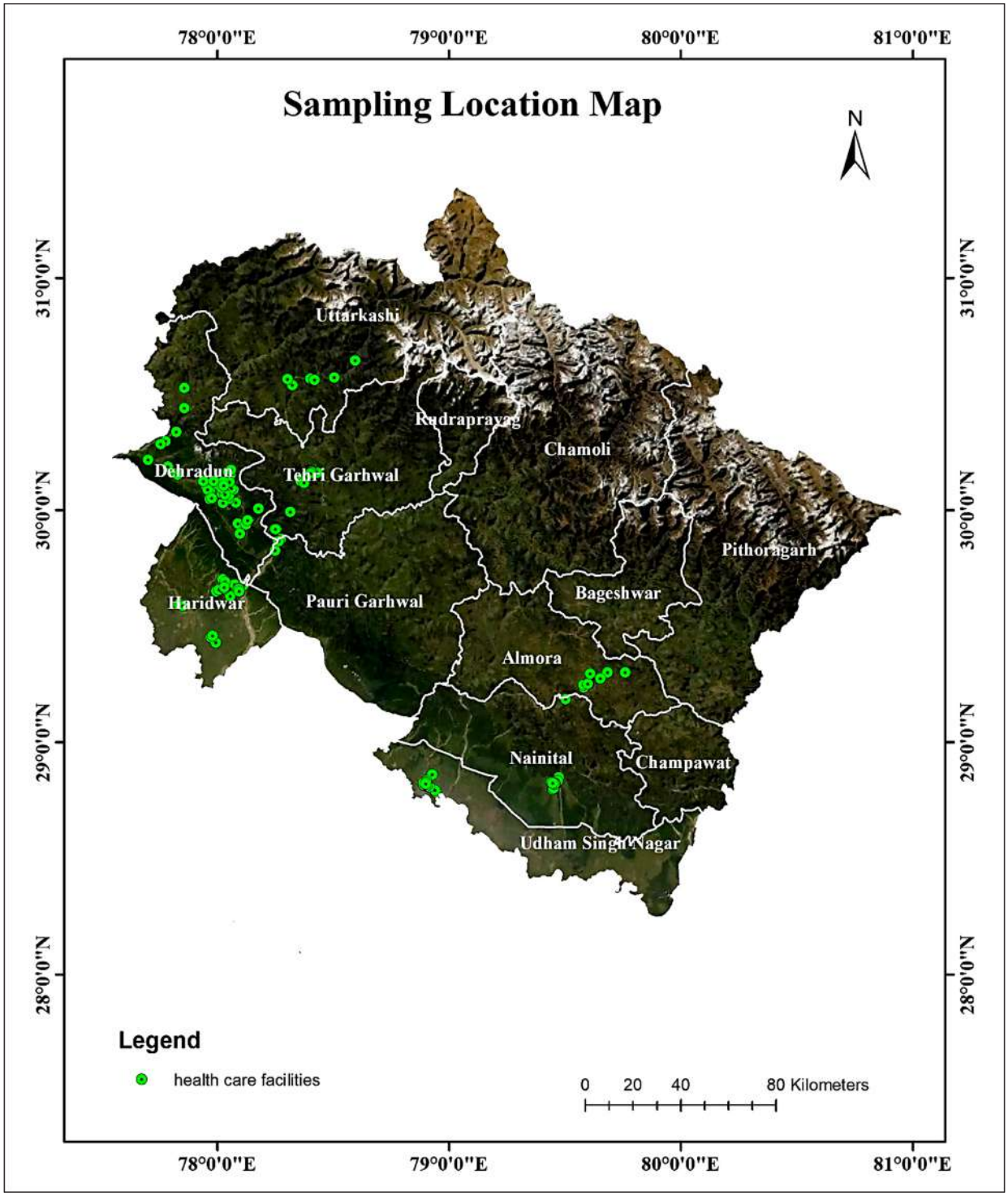
As per the Term of References (ToRs), a field survey was carried out at selected HCFs in various districts of Uttarakhand for primary data collection regarding BMW management. A detailed survey in representative HCFs was carried out to assess the existing practices of collection, segregation, storage, transportation, and disposal of BMW. Further, the quantity of BMW generated from health care facilities was also recorded. The generation of BMW depend upon various factors such as facilities provided by HCFs, Speciality of HCFs, total number of beds and occupancy of HCFs etc. In bedded HCFs, details of annual occupancy of beds and total quantity of BMW generated per day was collected and based on the data collected on BMW generation and occupancy of beds in health care facilities, the average generation of BMW for bedded HCFs (kg/bed/day) was calculated. Similarly, for non-bedded HCFs, the average generation of BMW per patient per day (kg/patients/day) was calculated and for veterinary hospitals/institutes/clinics, the average generation of BMW per animal per day (kg/animal/day) was calculated.

5.1. Bio-Medical Waste generation in Bedded HCFs

A total of 207 HCFs were surveyed in seven districts of Uttarakhand viz., Uttarkashi, Tehri Garhwal, Udham Singh Nagar, Almora, Nainital, Dehradun & Haridwar. Identification of HCFs was undertaken in discussion with the Nodal officer & respective ROs in a district-wise manner. For the purpose of survey, HCFs, were selected based on ownership (Govt, Pvt, Trust/PSU/PPP), based on number of beds, based on type (Allopathic, Ayurvedic & Veterinary), based on speciality etc. The GPS location was recorded by the survey team at each HCF visited, a sampling location map based on the GPS data is shown in **Fig. 5.1**

Fig. 5.1

Map showing location of HCFs visited during field survey in Uttarakhand



Out of 207 surveyed HCFs, 99 were bedded, 108 were non-bedded HCFs. Out of 99 Bedded HCFs, 9 didn't provide BMW generation data. The successfully surveyed bedded HCFs were classified into two categories:

i. HCFs with >50 Beds

ii. HCFs with ≤50 Beds

Table-5.1

Quantum of Bio-Medical waste generation in surveyed HCFs (>50 Beds)

Sl. No.	Code	Name of HCF	Type (ownership)	District	No. of Beds	Annual occupancy of beds	BMW generation (Kg/bed/day)
1	UT/4	District Hospital Uttarkashi	Govt	Uttarkashi	158	8480	2.75
2	TG/20	District Hospital, Bauradi	PPP	Tehri Garhwal	100	400	4.20
3	NA/2	Brij Lal hospital	Pvt	Nainital	100	780	2.65
4	NA/3	Bombay hospital	Pvt	Nainital	65	307	3.98
5	NA/4	Krishna hospital	Pvt	Nainital	150	6022	3.53
6	NA/9	Central hospital (trauma & heart care center)	Pvt	Nainital	150	6120	3.79
7	NA/20	Sushila Tiwari hospital	Govt	Nainital	650	40576	1.43
8	NA/25	Sai hospital	Pvt	Nainital	100	12775	0.50
9	AL/2	GTR base hospital	Govt	Almora	200	183	4.41
10	AL/6	Hargovind pant district hospital	Govt	Almora	56	1982	1.00
11	US/2	Shri Krishna Hospital	Pvt	US Nagar	100	5340	1.94
12	US/3	LD Bhatt govt hospital	Govt	US Nagar	95	8296	0.72
13	DD/1	Max superspeciality hospital	Pvt	Dehradun	200	45744	1.00
14	DD/2	AIIMS Rishikesh	Govt	Dehradun	960	118255	0.33
15	DD/5	Himalayan ayurvedic medical college & hospital	Pvt	Dehradun	120	1448	0.35
16	DD/35	Velmed hospital	Pvt	Dehradun	150	3487	2.85
17	DD/52	Synergy institute of medical sciences	Pvt	Dehradun	140	1020	0.06
18	DD/53	Himalayan hospital	Trust	Dehradun	750	555	0.59
19	DD/54	Kailash hospital	Pvt	Dehradun	150	113	0.46
20	DD/55	CMI hospital	Govt	Dehradun	100	5854	1.50
21	DD/56	Coronation hospital	Govt	Dehradun	100	8068	0.67
22	HA/1	SDH Roorkee	Govt	Haridwar	106	7041	1.60
23	HA/9	Harmilap hospital	Govt	Haridwar	70	3624	0.49
24	HA/12	Metro hospital	Pvt	Haridwar	150	4800	2.18
25	HA/13	BHEL hospital	PSU	Haridwar	180	5492	0.49
		Average					**1.74 (0.82*)**

Note: **average calculated after eliminating values >2.0 kg/bed/day*

From the above table, the average BMW generation per bed per day was found to be 1.74 Kg/bed/day. However, as per CPCB, studies carried out in India, shows generation of Bio-Medical waste in the range of 0.3 to 1.0 kg/bed/day[1]. Further, to understand the trends of any system put in place, it is very important to have standard data/values with which future and past comparisons can be made to have. These standard data/values allow assessment of the scenario and pave way for guidelines to be formulated which could accentuate achieving of the desired outcome. Therefore, elimination of values depicting >2.0 kg/bed/day waste generation, was made to get rid of the probable bias/ deviation of high values obtained due to improper segregation and/or management of waste in respective HCFs. Out of 25 HCFs, a total of 16 bedded HCFs (>50 beds) came into this sub-category and **average BMW generation per bed per day for bedded HCFs (>50 Beds) was found to be 0.82 Kg/bed/day.**

[1] CPCB, (2014) Bio-Medical waste management: an overview, ENVIS Newsletter (ENVIS Centre-01): Control of pollution water, Air & Noise.

Table-5.2

Quantum of Bio-Medical waste generation in surveyed HCFs (≤50 Beds)

Sr. No.	Code	Name of HCF	Type (ownership)	District	No. of Beds Available/ average occupancy	BMW generation (Kg/bed/day)
1	UT/12	PHC Bhatwadi	Govt	Uttarkashi	300	0.32
2	UT/16	PHC, Dunda	Govt	Uttarkashi	144	0.82
3	TG/12	PHC, Fakot	Govt	Tehri Garhwal	60	3.98
4	TG/14	Christian Hospital (messiah)	Pvt	Tehri Garhwal	850	0.51
5	NA/1	CHC Suyalbadi	Govt	Nainital	70	0.14
6	NA/7	Kalyan hospital	Pvt	Nainital	180	0.43
7	NA/8	Aggarwal clinic & nursing home	Pvt	Nainital	50	0.69
8	NA/14	Vivekananda hospital	Pvt	Nainital	169	2.75
9	NA/19	Neelkanth hospital	Pvt	Nainital	538	3.08
10	NA/28	Tiwari maternity care and nursing home	Pvt	Nainital	641	0.40
11	AL/3	Victor Mohan Joshi female hospital	Govt	Almora	1998	0.46
12	AL/4	APHC Panuwanaula	Govt	Almora	480	0.78
13	AL/5	PHC Barechina	Govt	Almora	2724	2.58
14	AL/8	Anjali hospital	Pvt	Almora	3154	0.49
15	US/1	Chamunda hospital	Pvt	US Nagar	94	0.30
16	US/9	Aggarwal ortho care & Trauma	Pvt	US Nagar	150	3.55
17	US/11	Kasturi Devi hospital	Pvt	US Nagar	260	1.90
18	US/23	Global specialty hospital	Pvt	US Nagar	1980	1.21
19	US/24	Utkarsh heart care center	Pvt	US Nagar	320	0.43
20	US/25	Sirohi bone hospital	Pvt	US Nagar	100	2.23
21	US/29	Dr Veena joshi hospital	Pvt	US Nagar	50	1.68
22	DD/3	CHC Doiwala	Govt	Dehradun	800	3.89
23	DD/9	CHC Raipur	Govt	Dehradun	150	0.59
24	DD/11	Healing touch	Pvt	Dehradun	36	3.92
25	DD/14	Doon public hospital	Govt	Dehradun	600	3.19
26	DD/15	Govind hospital	Pvt	Dehradun	1529	1.05
27	DD/25	Luthra nursing home	Pvt	Dehradun	2106	2.40
28	DD/26	Bloom medicity	Pvt	Dehradun	150	1.88
29	DD/27	Sunanda medical center	Pvt	Dehradun	30	0.87
30	DD/28	Belwal maternity center	Pvt	Dehradun	661	2.05
31	DD/32	Vohra hospital	Pvt	Dehradun	480	3.01
32	DD/34	St. Paul hospital	Pvt	Dehradun	162	2.91
33	DD/36	Health care hospital	Pvt	Dehradun	127	3.05
34	DD/37	Surya hospital	Pvt	Dehradun	126	0.40
35	DD/38	Kanishk hospital	Pvt	Dehradun	100	3.73
36	DD/39	KRISHNA MEDICAL CENTRE	Pvt	Dehradun	138	1.10
37	DD/40	CHC Sahaspur	Pvt	Dehradun	384	0.70
38	DD/41	Joshi multispecialty hospital	Pvt	Dehradun	643	1.99
39	DD/42	PHC Selaqui	Govt	Dehradun	480	0.07
40	DD/43	State combined hospital Premnagar	Govt	Dehradun	83	0.33

Sr. No.	Code	Name of HCF	Type (ownership)	District	No. of Beds Available/ average occupancy	BMW generation (Kg/bed/day)
41	DD/44	Nanda Hospital	Pvt	Dehradun	2087	0.55
42	DD/45	CHC Chakrata	Govt	Dehradun	454	0.47
43	DD/46	CHC Shaiya	Govt	Dehradun	50	0.29
44	DD/48	Kalindi hospital	Pvt	Dehradun	3605	0.42
45	DD/49	Devbhoomi hospital and nursing home	Pvt	Dehradun	1020	1.03
46	DD/50	Dr Chauhan hospital	Pvt	Dehradun	245	0.66
47	HA/2	Mother and child hospital	Pvt	Haridwar	838	0.41
48	HA/3	Metro city hospital	Pvt	Haridwar	100	2.04
49	HA/4	Arpit hospital	Pvt	Haridwar	5453	0.85
50	HA/5	Kalavati hospital	Pvt	Haridwar	495	0.15
51	HA/6	Shakuntala nursing home	Pvt	Haridwar	413	0.46
52	HA/8	IIT Roorkee hospital	Govt	Haridwar	404	0.70
53	HA/10	Chainrai zila mahila chikitsalaya	Govt	Haridwar	179	3.75
54	HA/16	Sushrut trauma center	Pvt	Haridwar	700	0.38
55	HA/17	Matracharya medical center	Pvt	Haridwar	1807	0.76
56	HA/18	CITY hospital	Pvt	Haridwar	261	2.68
57	HA/22	Swami ramprakash charitable hospital	Pvt	Haridwar	947	2.33
58	HA/23	CHC Bhadarabad	Govt	Haridwar	1111	2.75
59	HA/27	Laxmi memorial and Shatabdi hospital	Pvt	Haridwar	135	0.46
60	HA/28	Vinayak hospital	Pvt	Haridwar	2111	3.33
61	HA/30	Raja ram hospital	Pvt	Haridwar	4800	1.99
62	HA/31	CHC Laksar	Govt	Haridwar	15	2.49
63	HA/34	Kabir wellness center	Pvt	Haridwar	444	0.76
64	HA/36	Aggarwal medical center	Pvt	Haridwar	539	0.87
65	HA/37	Sanjeevani hospital	Pvt	Haridwar	48	2.87
		Average				**1.53 (0.73*)**

Note: **average calculated after eliminating values >2.0 kg/bed/day*

Table 5.2 clearly show that waste generation in HCFs with >50 beds is high as compared to ≤ 50 beds Hospitals. The mean BMW generated per day per bed for ≤ 50 beds HCFs is 1.53 kg/bed/day. Similar to **Table 5.1**, those HCFs having BMW generation higher than >2.0 kg/bed/day were eliminated to reduce probable bias/deviation of reporting higher waste generation per bed due to lack of segregation and/or management of BMW. Out of 65 HCFs, 42 HCFs were in this sub-category, **an average BMW for bedded HCFs (<50 Beds) of 0.73 kg/bed/day.**

5.2 Bio-Medical Waste generation in Non-Bedded HCFs

A total of 108 non-bedded HCFs were surveyed, however, 9 HCFs didn't provide adequate BMW data. Average quantity of BMW generated in non-bedded HCFs was calculated as average BMW generated per patients per day (kg/patient/day). In case of veterinary hospitals, BMW was calculated as BMW generated per Animal per day (kg/patient/day).

Successfully surveyed HCFs were classified into three categories:

I. Veterinary Hospitals/Clinics
II. Dental/Path Labs/Diagnostic centres
III. AYUSH Hospitals

Table-5.3

Quantum of Bio-Medical waste generation in Veterinary Hospitals/Clinics

Sr. No.	Code	Name of HCF	Type (ownership)	District	Animals/ Day	BMW generation (Kg/ Animal/ day)
1	UT/8	State Veterinary Hospital, Gyansu	Govt	Uttarkashi	6	0.022
2	UT/13	State Veterinary Hospital, Bhatwadi	Govt	Uttarkashi	10	0.008
3	TG/3	State Veterinary Hospital, Tehri	Govt	Tehri Garhwal	5	0.003
4	TG/10	State Veterinary Hospital	Govt	Tehri Garhwal	4	0.000
5	TG/14	State Veterinary Hospital	Govt	Tehri Garhwal	6	0.042
6	TG/25	State veterinary Hospital	Govt	Tehri Garhwal	4	0.025
7	NA/15	State Veterinary Hospital	Govt	Nainital	5	0.100
8	US/15	State Veterinary Hospital Kashipur	Govt	US Nagar	10	0.004
9	DD/4	State Veterinary Hospital Doiwala	Govt	Dehradun	10	0.001
10	DD/7	State Veterinary Dispensary, Bhaniyawala	Govt	Dehradun	5	0.001
11	DD/13	State Veterinary Hospital Balawala	Govt	Dehradun	2	0.040
12	DD/16	State Animal dispensary, Nehru Gram	Govt	Dehradun	7	0.000
13	DD/19	Raahat Animal Hospital	Trust	Dehradun	30	0.030
14	HA/14	State Veterinary Hospital	Govt	Haridwar	8	0.125
15	HA/24	State Veterinary Hospital Bhadarabad	Govt	Haridwar	10	0.010
		Average				**0.027**

The **average total BMW generated per animal was found to be 0.027 Kg/animal/day.** However, most of the surveyed Veterinary hospitals were not segregating BMW properly as per color codes. Further, BMW was often seen mixed with general waste.

Table-5.4

Quantum of Bio-Medical waste generation in Dental clinics/ Pathological Labs/diagnostic center

Sr. No.	Code	Name of HCF	Type (ownership)	District	Patients/ day	BMW generation (Kg/patients/ day)
1	UT/1	Prasad Pathology	Pvt	Uttarkashi	4	0.044
2	UT/2	Dental Town	Pvt	Uttarkashi	2	0.005
3	UT/5	Sanjyoti Dental care	Pvt	Uttarkashi	4	0.003
4	UT/6	Vinayak path lab	Pvt	Uttarkashi	5	0.004
5	TG/4	Maxwhite Dental	Pvt	Tehri Garhwal	4	0.100
6	TG/5	Dr. Lal Path Lab (collection center)	Pvt	Tehri Garhwal	3	0.358
7	TG/16	Dental health care	Pvt	Tehri Garhwal	6	0.042
8	TG/17	H.M. Path (collection center)	Pvt	Tehri Garhwal	6	0.006
9	TG/19	Dental clinic	Pvt	Tehri Garhwal	5	0.010
10	TG/22	Dr. Prashant dental clinic	Pvt	Tehri Garhwal	10	0.060
11	TG/23	Chauhan medical and pathological center	Pvt	Tehri Garhwal	4	0.013
12	NA/6	Smile dental care	Pvt	Nainital	10	0.040
13	NA/10	Dr Lal path lab	Pvt	Nainital	50	0.185
14	NA/11	Perfect imaging and ultrasound center	Pvt	Nainital	15	0.035

Sr. No.	Code	Name of HCF	Type (ownership)	District	Patients/ day	BMW generation (Kg/patients/ day)
15	NA/12	Chandan diagnostic center (Dr Lal path)	Pvt	Nainital	100	0.004
16	NA/13	Maxcare diagnostics center	Pvt	Nainital	16	0.089
17	NA/16	SBR Path labs	Pvt	Nainital	30	0.023
18	NA/17	City dental & Himalaya clinic	Pvt	Nainital	15	0.006
19	NA/18	Tooth planet	Pvt	Nainital	6	0.017
20	NA/21	Dr Lal path lab, ITI	Pvt	Nainital	8	0.019
21	NA/22	Prakash dental hospital	Pvt	Nainital	15	0.009
22	NA/23	SRL diagnostic center (garv diagnostic center)	Pvt	Nainital	20	0.201
23	NA/26	Maxface clinic	Pvt	Nainital	3	0.041
24	NA/27	Dr. Negi dental	Pvt	Nainital	10	0.005
25	US/4	A to Z diagnostic center	Pvt	US Nagar	35	0.008
26	US/5	Dr Goel Kidney care center	Pvt	US Nagar	5	0.367
27	US/6	Dr. Goel diagnostics	Pvt	US Nagar	5	0.308
28	US/10	Jeevan Rekha MRI & Skin center	Pvt	US Nagar	60	0.002
29	US/17	Dr Lal path lab (FPSC, Spectrum mall)	Pvt	US Nagar	10	0.006
30	US/18	Badrish dental care	Pvt	US Nagar	8	0.031
31	US/20	Shiv diagnostics & maternity center	Pvt	US Nagar	15	0.011
32	US/28	Surya diagnostics	Pvt	US Nagar	35	0.000
33	US/30	YK X-Ray & Pathology	Pvt	US Nagar	30	0.029
34	DD/20	Aesthetic dental care	Pvt	Dehradun	2	0.054
35	DD/22	Ghanshala dental care	Pvt	Dehradun	5	0.010
36	DD/30	Ahuja Imaging care	Pvt	Dehradun	35	0.013
37	DD/31	Ahuja pathology lab	Pvt	Dehradun	300	0.022
38	DD/33	Swati diagnostics	Pvt	Dehradun	15	0.023
39	HA/7	Neelkanth pathology lab	Pvt	Haridwar	10	0.002
		Average				**0.056**

For Dental clinics/Pathological Labs/diagnostic center, the estimated average total BMW generated per patient was found to be 0.056 Kg/patient/day.

For AYUSH non-bedded HCFs, a total of 10 HCFs were surveyed and only 3 HCFs found/disclosed to be generating BMW in a very negligible amount. However, as per field survey most of the AYUSH HCFs regardless of being bedded or non-bedded don't generate any BMW, as there is no specialty of any minor and major surgery which generate BMW. Further, in context of AYUSH HCFs (bedded & non-bedded) managed by State Government, there is no generation of BMW too. However, if surgical facilities will be established in aforementioned HCFs in future, BMW can be generated.

06
CHAPTER

Bio-Medical Waste Transporting Vehicle

SUMMARY & RECOMMENDATIONS

The aim of the study was to assess status of BMW generation in bedded & non-bedded HCFs of Uttarakhand district. Seven districts were surveyed viz., Uttarkashi, Tehri Garhwal, Udham Singh Nagar, Almora, Nainital, Dehradun & Haridwar in the state of Uttarakhand. The summary of the information collected about the BMW management from the survey is provided in this chapter along with recommendations.

6.1. Summary of Surveyed Districts

6.1.1. Type of HCFs Based on Ownership

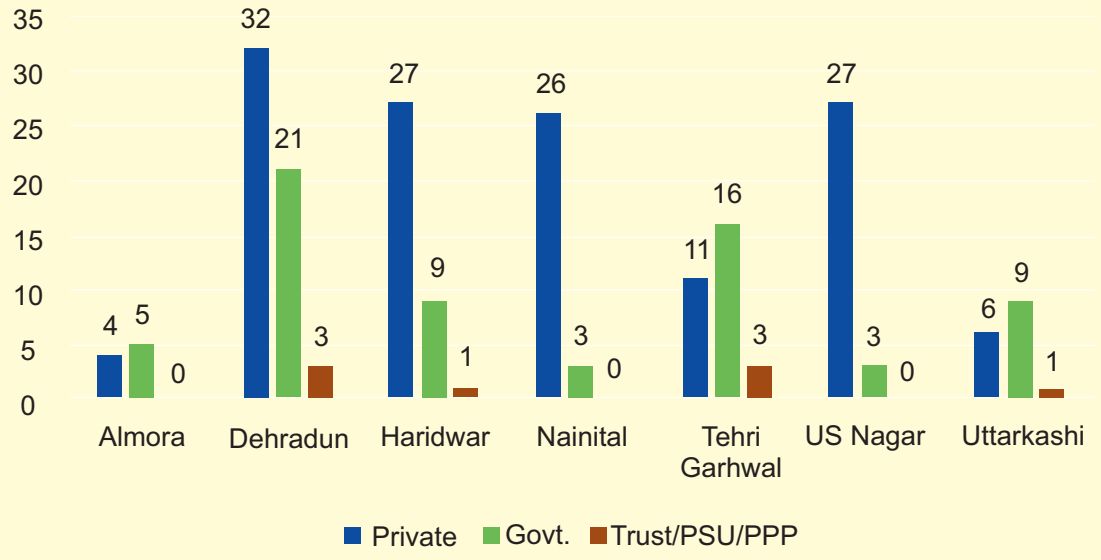
Table-6.1

Type of HCFs Based on ownership

Sl. No.	Types of HCFs (Based on ownership)	No. of HCFs						
		Almora	Dehradun	Haridwar	Nainital	Tehri Garhwal	US Nagar	Uttarkashi
1	Private	4	32	27	26	11	27	6
2	Govt	5	21	9	3	16	3	9
3	Trust/PSU/PPP	0	3	1	0	3	0	1
	Total	**9**	**56**	**37**	**29**	**30**	**30**	**16**

Fig. 6.1

Type of Surveyed HCFs Based on ownership



6.1.2. Waste management in HCFs

Apart from quantifying the waste generation during the survey, the waste management practices were also observed and recorded in the survey questionnaire by the survey team during field visit at each HCF. Waste management practices in surveyed HCFs categorised into >50 Beds, ≤50 Beds & Non-Bedded HCFs is provided in **Table 6.2** below:

Table-6.2

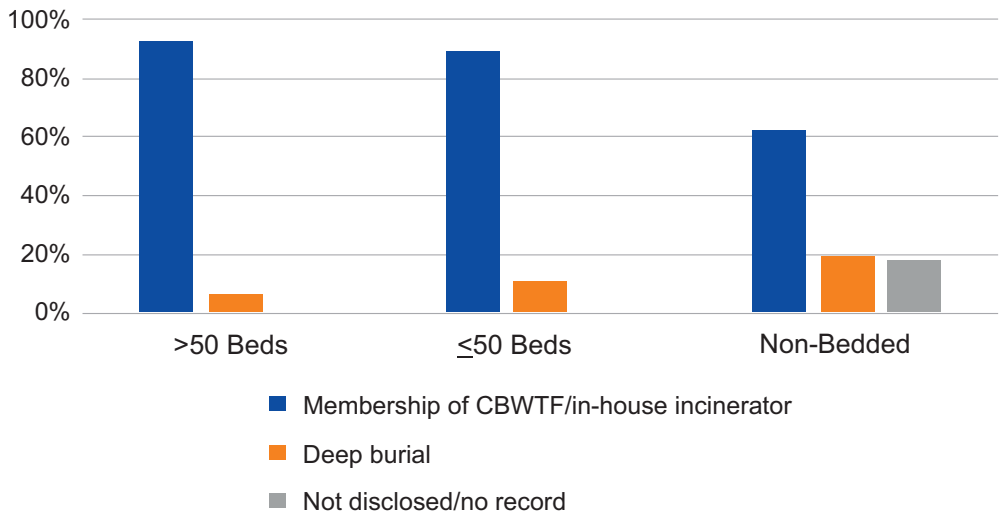
Waste management practices in surveyed HCFs (>50 Beds, ≤50 Beds & Non-Bedded HCFs)

Sr. No.	Bio-Medical waste management		Types of HCFs		
			>50 Beds	≤50 Beds	Non-Bedded
1	Proper waste segregation		93%	71%	50%
2	Waste disposal practices	Membership of CBWTF/ in-house incinerator	93%	89%	62%
		Deep burial	7%	11%	17%
		Not disclosed/no record	0%	0%	21%
3	Frequency of waste collection	Daily	50%	5%	2%
		Alternate day	11%	20%	12%
		Irregular	28%	65%	48%
		Not disclosed/other methods	11%	0%	38%
4	Use of non-chlorinated plastic bag		100%	86%	66.6%
5	Training		96%	69%	30.7%

From the above data, it could be perceived that BMW management is more likely be followed best in large multispeciality HCFs (>50 Beds). This could be attributed to high or average level of awareness in the big hospitals, which are more likely to adopt good BMW management practices. HCFs with average to low levels of awareness, like non-bedded HCFs, have higher chances of ending up with poor BMW management system. Thus, raising awareness amongst HCF staff should be a key thrust area in UKPCB's agenda. Waste disposal practices as shown in **Fig. 6.2** depicts that non-bedded HCFs are lagging in proper scientific waste disposal although the quantity of waste generation is comparatively less than bedded HCFs. Detailed information about BMW management in surveyed HCF is provided in **Annexure-II**.

Fig. 6.2

Waste disposal practices used by HCFs

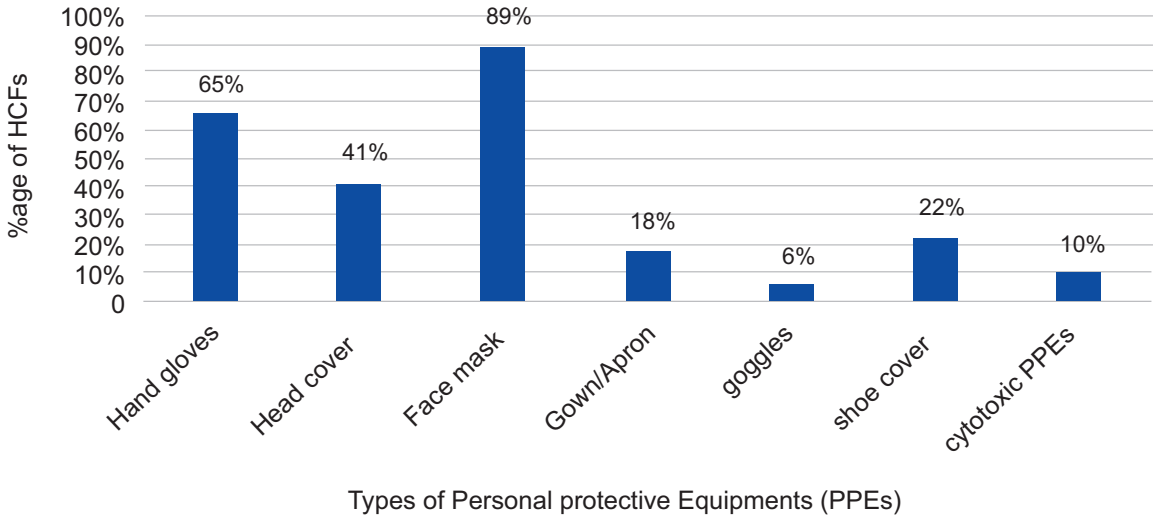


6.1.3. Personal protective equipment

Personal Protective Equipment (PPEs) like hand gloves, head cover, face mask, apron, goggles, shoe cover, etc. are required during handling of BMW. The survey covered the information as to whether PPEs are provided to BMW handlers in HCFs. The PPEs used by BMW handlers to handle the BMW within the premises of HCFs are mainly face mask and hand gloves which were provided in 89 % and 65 % of HCFs respectively. The details of PPEs provided to waste handlers in HCFs is shown in **fig. 6.3** below.

Fig. 6.3

PPEs provided to Bio-Medical waste handlers in HCFs



6.2. Observations

The observation from the survey conducted are as follows:

- In bedded HCFs, average total BMW generated per bed varied from 0.06 Kg/day/bed to 4.41 Kg/ bed/ day. The generation of higher BMW in some HCFs can be attributed to their inefficiency to segregate BMW with general waste. On enquiry, it was revealed that even non–contaminated waste (general waste) was disposed off/mixed along with BMW. Further, use of more disposable items can also give rise to high BMW generation in HCFs, especially private ownership multispeciality hospitals.
- HCFs having bed no.s >50 were having average BMW generated per bed per day as 1.74 Kg/ bed/ day. Moreover, we eliminated those values depicting >2.0 kg/ bed/day waste generation, to eliminate the probable bias of high values obtained due to improper segregation and/or management of waste in respective HCFs. Out of 25 HCFs, a total of 16 bedded **HCFs (>50 beds)** came into this sub category and average BMW generation per bed per day was found to be **0.82 Kg/bed/day**.
- **HCFs having beds ≤50** were having average BMW generated per bed per day as 1.53 Kg/ bed/ day. Those HCFs having BMW generation higher than >2.0 kg/ bed/day were eliminated to reduce probable bias of reporting higher waste generation per bed due to lack of segregation and/or management of BMW. Out of 65 HCFs, 42 HCFs were in this sub-category generating an average BMW of **0.73 kg/bed/day.**
- A weak negative correlation (-0.07) exists between the nos. of beds and BMW generated/bed/day which implies that there is no substantial relationship in generation of more BMW from big bedded HCFs
- **In non-bedded HCFs (Path Labs/Diagnostic Centre/ Dental clinic) & Veterinary Hospitals/ clinics average total BMW generated was 0.056 Kg/ patient/ day & 0.027 Kg/ Animal/ day respectively.**
- **Form AYUSH hospitals, negligible Bio-Medical waste is being generated (<10 gm/patient/day).**
- In many HCFs, particularly those generating less amount of waste (e.g., clinics) there is lack of awareness regarding the use of specific color-coded bags for segregation and ultimate disposal of waste as mentioned in the Rules. The category-wise weight of BMW generation is not being recorded in many HCFsespecially non-bedded.

Some Govt. hospitals appear to have a better system on the ground BMW management compared to Private HCFs. e.g., CHC Sahiya (Dehradun), CHC Sahaspur (Dehradun), GTR Base hospital (Almora).

- The frequency of waste collection by the CBWTF is irregular in many districts, especially those having hilly terrain.
- Most of the multi-specialty and bedded hospitals maintain a register or log-book for recording date, time and quantity of waste collection. However, such practice was often missing in small HCFs and non-bedded HCFs.
- Effective BMW management is usually dependent on the awareness of the lowest rung of staff (including nursing staff and ward boys). Most of HCFs did not provide periodic training to its staff pertaining to handling and management of Bio-Medical waste.
- Staff responsible for handling of BMW within HCFs premises mainly used Face mask & hand gloves PPE.
- There is no mechanism of periodic review for improvement of the BMW management in the health care facilities.
- Lack of training/awareness about BMW management among hospital staff/Health care workers was found to be a significant concern.

6.3. BMW generation factors

BMW database generated from a long-term analysis can be used to develop **BMW generation factors** (which may include BMW generated/bed/day and BMW generated/ patient/day for bedded & non-bedded HCFs respectively. HCFs should be encouraged to use these generation factors as standard while filling up BMW authorization application form for the first time. Such criteria need to be category specific and typical for a type of HCF. **Table 6.3** indicate few of the BMW generation factors developed as per this study for bedded & non-bedded HCFs.

Table-6.3

BMW generation factors for bedded & non-bedded HCFs

Sl. No.	Type of HCF	BMW generation factor
Bedded HCFs		
1	Bedded HCF (>50 Beds)	0.82 kg/bed/day
2	Bedded HCF (≤50 Beds)	0.73 Kg/bed/day
Non-bedded HCFs		
3	Path Labs/Diagnostic Centre/ Dental Clinic	0.056 Kg/ patient/ day
4	Veterinary Hospitals/Clinics	0.027 Kg/ animal/ day
5	AYUSH hospitals/Clinics	<10 gm/ patient/ day

In view of the above, the BMW generation factors (for bedded & Non-Bedded HCFs) estimated in this study are used to compute BMW generated in Uttarakhand based on secondary data collected from four regional offices as per latest annual report.

Table 6.4 indicate total amount of BMW calculated for bedded HCFs (kg/bed/day) as well as for non-bedded (kg/ patient/day or kg/animal/day) as per the BMW generation factors developed in this study.

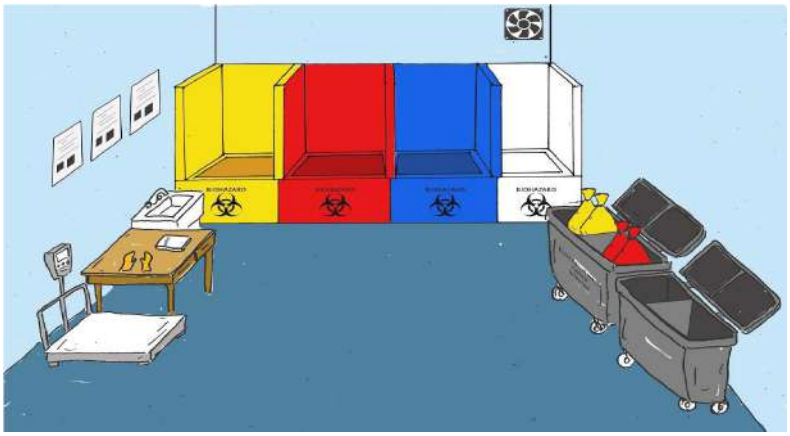


Table-6.4

Computation of Bio-Medical waste generated in kg/day (as per BMW generation factor) for Bedded & non-Bedded HCFs

District	Bedded HCFs*						Non-Bedded HCFs						
	HCFs ≤50 beds	no. of beds	waste generated in Kg/day (as per BMW generation factor)	HCFs >50 beds	no. of beds	waste generated in Kg/day (as per BMW generation factor)	HCFs Veterinary	waste generated in Kg/day (as per BMW generation factor)	HCFs path lab/ diagnostic center/ dental	waste generation in Kg/ day (as per BMW generation factor)	HCFs AYUSH	waste generated in Kg/day (as per BMW generation factor)	Total waste generation Kg/day (3+6+8+10+12)
	1	2	3	4	5	6	7	8	9	10	11	12	13
US Nagar	207	2889	2109.0	11	1072	879.0	23	3.1	97	27.2	22	0.11	3018
Almora	85	546	398.6	3	361	296.0	36	4.9	6	1.7	7	0.04	701
Bageshwar	38	235	171.6	1	60	49.2	12	1.6	12	3.4	11	0.06	226
Champawat	19	141	102.9	1	60	49.2	14	1.9	2	0.6	10	0.05	155
Nainital	145	1475	1076.8	9	1650	1353.0	30	4.1	47	13.2	8	0.04	2447
Pithoragarh	63	555	405.2	2	182	149.2	28	3.8	25	7.0	5	0.03	565
Haridwar	223	2759	2014.1	23	2283	1872.1	17	2.3	87	24.4	16	0.08	3913
Chamoli	46	315	230.0	1	75	61.5	24	3.2	3	0.8	10	0.05	296
Dehradun	211	2838	2071.7	57	4437	3638.3	30	4.1	246	68.9	48	0.24	5783
Pauri Garhwal	127	881	643.1	3	736	603.5	40	5.4	7	2.0	2	0.01	1254
Rudraprayag	51	297	216.8	0	0	0.0	15	2.0	3	0.8	0	0.00	220
Tehri Garhwal	75	607	443.1	1	100	82.0	38	5.1	5	1.4	6	0.03	532
Uttarkashi	38	246	179.6	1	108	88.6	25	3.4	12	3.4	4	0.02	275
			10062.3			**9121.7**		**44.8**		**154.6**		**0.75**	**19384 (19 MT)**

Note: *BMW generation for non-bedded HCFs is calculated based on the assumption of 5 patients/day*

**waste generation in bedded HCFs is based on the assumption of 100% occupancy of beds*

6.4. Recommendations

6.4.1. Present Treatment Capacity & Additional Requirement

At present there are 02 Common Bio Medical Waste Treatment and Disposal Facilities in the Sate namely M/s Medical Pollution Control Committee situated at Vill.- Mandawar, Roorkee, Haridwar & M/s Global Environmental Solutions situated at Kh-560, Lambakhera, P.O. Khanpur, Tehsil-Gadarpur, Udham Singh Nagar. Present status along with the treatment capacity, beds/ HCFs covered and area catered by CBWTFs is given in **Table 6.5** as follows:

Table-6.5

Details of CBWTF & their waste disposal capacities

Sl. No.	Name of CBWTF	Treatment Facilities and capacity	Area covered	No of HCFs covered	No of Bed covered
1	M/s Medical Pollution Control Committee	Incinerator 100 Kg capacity (operating permission for 16 hours/ day in normal conditions except during COVID)	Dist Dehradun, Pauri Garhwal*, Haridwar, Tehri Garhwal*, Chamoli*, Rudraprayag*, Uttarkashi*	1863	7640
2	M/s Global Enviro Solutions	Incinerator 100 Kg capacity (operating permission for 16 hours/day)	Dist Nainital*, U.S. Nagar, Almora*	787	4980

Note: ***** *These Districts are not fully covered by the CBWTF and only the large Hospitals/HCFs are covered by the CBWTFs.*

As it is evident from **Table 6.4**, it is estimated waste generation is 19 MTD (Metric ton per day). However as per annual report 2020 waste generation is 7.38 MTD. This shows a clear gap in generation & disposal of BMW in Uttarakhand. Further, there is a strong requirement of additional CBWTFs, not only in the hilly areas but even in the Plain areas as well. It is apparent that waste collection is very less and irregular as compare to the waste generation. This is due to the fact that there is weak or no accessibility of CBWTF in the hilly areas. Most of the deep burial practices adopted by Hilly HCFs are not as per the standards specified in BMW Management Rules, 2016, therefore, should be stopped and the facility of CBWTFS shall be explored in these areas.

As per the data provided in **Table 6.4**, there are a total of 12,317 beds in District Haridwar and Dehradun alone. However CBWTF working in this area is catering 7640 Beds **(Table 6.5)** Therefore, a CBWTF may be allowed in this region as no. of Beds are more than 10,000[1]. In rest of Garhwal region, there are 3,365 Beds as reported in the annual report of UKPCB. Therefore, a CBWTF may be allowed for the hilly areas of the Garhwal region to fully cover the hill districts.

Similarly, there are a total of 9,226 Beds reported in Kumaon region. However, the existing facility at District U.S. Nagar is serving only in District U.S. Nagar, and parts of Nainital and Almora. Therefore, there is also a need of another CBWTF in Kumaon region to cover entire area.

6.4.2. Appropriate Bio-Medical Waste Management

Proper management of biomedical waste generated in an HCF is one of the most important step as it prevents risk to humanity and our ecosystem. Additionally, improper management could lead to initiation of legal proceedings against employees and administrative authorities of the hospital. For instance, most of the survey Veterinary Hospitals were not segregating the BMW and further, the BMW was mixed with general waste. BMW segregation not only ensures reduction of waste at the initial level but it also checks its mixing with municipal waste which can reduce the risk of infection. It should be ensured that every HCF exercises proper scientific segregation practices.

As per the rules, to ensure timely collection BMW, it is mandatory for the CBWTF to lift the BMW within 48 hours from the HCF. However, as per the survey findings, many HCFs were facing irregular frequency of waste collection by CBWTFs. Moreover, even in most accessible districts like Haridwar & US Nagar, the waste collection frequency was irregular in many HCFs especially small non-bedded HCFs.

Although, disposal of BMW by deep burial is permitted in rural and remote areas where there is no access to CBWTF. The management of most of these pits is not upto the standards specified in the rules. There is a need to enforce proper management practices for existing deep burial pits or alternate technology for BMW disposal should be envisaged.

One of the main challenges as came into notice during survey, the government hospitals (Allopathic, Veterinary & Ayurvedic) are facing is lack of funds for proper implementation of BMW 2016 rules. To procure non-chlorinated plastic bags, color-coded bins, barcode system, etc., the cost is very high and monetary assistance is needed in a timely manner. Necessary actions should be taken by the competent authority to ensure improved BMW management in government hospitals.

6.4.3. COVID-19 Pandemic & Bio-Medical Waste Management

The ongoing COVID-19 pandemic has created significant problem of Bio-Medical waste management in the whole country as well as in Uttarakhand. In order to deal with COVID-19 pandemic, State and Central Governments have initiated various steps, which include setting up of quarantine centers/camps, isolation wards, sample collection centers, laboratories, dedicated COVID hospitals, dedicated COVID health center and dedicated COVID center. As per the annual report of UKPCB, 2,751 kg/day COVID waste was being generated in the state of Uttarakhand. Common-Bio Medical Waste Treatment Facility has permission to operate for 16 hours/day, but in the wake of COVID-19, it was extended to 20 hours/day. As per NGT order 72/2020, if the capacity of CBWTF gets exhausted then COVID bio-waste can be directed towards incineration facility of Treatment, storage and disposal facility (TSDF) in the state. M/s Bharat Oil and Waste Management Ltd (TSDF) has the additional capacity to receive approximately 3 MT/day of waste. UKPCB has issued instructions to TSDF for keeping its surplus treatment capacity available to receive COVID-19 Bio-Medical waste. In view of the above, it becomes explicitly incumbent to strongly explore the possibility of establishing additional CBWTF along with other alternate technology for Bio-Medical waste management.

[1]Central Pollution Control Board. (2016). Revised Guidelines for Common Bio-medical Waste Treatment and Disposal Facilities.

6.4.4. Conduct Awareness & Training Programmes

Arrangement should be made for periodic awareness programs through SPCB & district level monitoring committee to raise awareness amongst key stakeholders viz., HCFs, CBWTF operators and transporters as well as common public understand the risk associated with BMW management. UKPCB has already carried out various awareness programs for this purpose in scattered manner, a need is felt to consolidate these by having a more synergistic approach.

ANNEXURES


BIODEGRADABLE WASTE
BIOHAZARD
HANDLE WITH CARE
GLASS SHARPS
BIOHAZARD
HANDLE WITH CARE
INFECTED PLASTICS
BIOHAZARD
HANDLE WITH CARE
INFECTIOUS WASTE
For pre-treatment by autoclaving
ऑटोक्लेव द्वारा पूर्व उपचार के लिए
BIOHAZARD
HANDLE WITH CARE
METAL SHARPS
BIOHAZARD
HANDLE WITH CARE

ANNEXURE-I : SURVEY QUESTIONNAIRE

SURVEY QUESTIONNAIRE

HEAD OFFICE

UTTARAKHAND POLLUTION CONTROL BOARD
46 B, IT PARK SEHSTRADHARA ROAD, DEHRADUN
(UTTARAKHAND)

उत्तराखण्ड प्रदूषण नियंत्रण बोर्ड
४६ बी,आई.टी.पार्क, सहस्त्रधारा रोड, देहरादून
(उत्तराखण्ड)

Date of Survey:			**Form No:**	
Assessment made by				
Name of the interviewee				
GPS coordinates of HCF				
Section: [A] General Information of Health Care Facility (HCF)				
Name of HCF:				
Address of HCF:				
City/Village				
Taluka/ Sub-District		District		
Type of Organization	Govt.		Private	
	Trust		Other (Specify)	
Type of HCF	Hospital		Nursing Home/ Maternity	
	Laboratory		Clinic/Dispensary	
	Blood Bank		Research Center	
	Other (Specify)			
Specialty of HCF	Multi-specialty*		Surgical	*(In case of multi-specialty hospital specify the specialties)
	Nursing Home/ Maternity		Dermatology	
	Gynae		Orthopedic	
	Pathological		Dental	
	Other (Specify):			
Capacity of HCF	Bedded	Number of Beds	With OT	
			Without OT	
	Average Occupancy of Beds per Year:			
	Non-Bedded	Average Number of patients per day:		

Section: [B] Details of Bio-Medical Waste generated at HCF Quantity Wise

Total Quantity of Incinerable (Yellow Bag) Bio-Medical Waste generated at HCF (Kg/day)	Annual Average	
	Peak Month Average	
Total Quantity of Non-Incinerable (Blue/Other bag) Bio-Medical Waste Generated at HCF (Kg/day)	Annual Average	
	Peak Month Average	
Total Quantity of Bio-Medical Waste Generated at HCF (Kg/day)		

Details of Incinerable Bio-Medical Waste

Category of Incinerable Bio-Medical Waste	In which color bags is it stored?	Treated onsite? If yes, specify treatment given	Total Quantity of Waste generated (Kg/day)	Total Quantity of waste treated at HCF (Kg/day)	Total Quantity of Waste sent for disposal (Kg/day)	Observations/ Comments of Surveyor
Human Anatomical Waste (Y)						
Animal Anatomical Waste (Y)						
Soiled Waste (Y)						
Expired or Discarded Medicines (Y)						
Chemical Waste (Y)						
Chemical Liquid Waste (Y-ETP)						
Discarded Linen, mattresses, beddings etc. (Y)						
Microbiology, Biotechnology & another clinical laboratory waste (Y-a/m/h)						

Details of Non-Incinerable Bo-Medical Waste

Category of Non-Incinerable Bio-Medical Waste	In which color bags is it stored?	Treated onsite? If yes, specify treatment given	Total Quantity of Waste generated (Kg/day)	Total Quantity of waste treated at HCF (Kg/day)	Total Quantity of Waste sent for disposal (Kg/day)	Observations/ Comments of Surveyor
Contaminated Waste (Disposable Items) (R)						
Waste Sharps including metals (W)						
Glassware (B)						
Metallic Body Implants (B)						

Section: [C] Details of Bio-Medical Waste Disposal by HCF

Please fill-in appropriate details in the below section						Observations/ Comments of Surveyor
Is the HCF a member of Common Bio-Medical Waste Treatment Facility (CBWTF)	Yes ☐		No ☐			
(If No, specify the mode of Disposal of Bio-Medical waste by HCF):						
Name of the CBWTF handling Bio-Medical Waste:						
How often does the CBWTF operator collect waste from your HCF?	Daily		Weekly			
	Alternate Day		Irregular			
	Other, Specify:					
Please mention Last two dates and time of the collection of Bio-Medical Waste by CBWTF	Date	Time				
Has the HCF obtained Authorization for Disposal of Bio-Medical Waste from UKPCB	Yes ☐	No ☐				
If Yes, provide below details mentioned in CCA *: Consent No.: Date of Expiry: Consented quantity of BMW (Kg/month): Address of HCF mentioned in CCA *						
Mention the facilities available with the HCF for treatment of Bio-Medical Waste	Autoclaving		Deep Burial			
	Microwaving		Chemical Treatment			
	Syringe cutter		Other (Specify):			
What do you do with expired medicines/ drugs?	Sent for disposal to CBWTF					
	Return to Pharmacy					
	Other (Specify):					
Do the HCF has an ETP/STP Facility, If Yes, please specify capacity in KLD	Yes ☐	No ☐				
If No, whether effluent is connected to sewer line:	Yes ☐	No ☐				
If Yes, i. whether provided pre-treatment: ii. whether sewer line connected with STP:	Yes ☐ Yes ☐	No ☐ No ☐				
If Effluent is discharged into terminal STP, Whether STP is operational	Yes ☐	No ☐				
Status of implementation of bar-code label	Yes ☐	No ☐				
Does the HCF use non-chlorinated plastic bags?	Yes ☐	No ☐				
Does HCF maintain daily record of Bio-Medical waste generated?	Yes ☐	No ☐	Partial ☐			
Does the HCF maintains annual report?	Yes ☐	No ☐				
Does the HCF has constituted an Internal Committee for BMW management?	Yes ☐	No ☐				
Does the HCF display monthly record of Bio-Medical Waste on their website?	Yes ☐	No ☐				

Section: [D] Safety Measures & Training

Please fill-in appropriate details in the below section		Observations/ Comments of Surveyor
Has the HCF provided immunization to their staff against various infectious diseases?	Yes ☐ No ☐	
Has the HCF provided Personal Protective equipments for handling Bio-Medical waste?	Yes ☐ No ☐	
If yes, please select PPE Types		
Hand Gloves, Head Cover, Face mask, Gown/Apron, Goggles, Shoe Cover, Cytotoxic PPE's		
Has the HCF provided training to Bio-Medical waste handlers?	Yes ☐ No ☐	

ANNEXURE-II: Survey Information collected from HCFs about BMW Management

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
UT/1	Prasad Pathology	Uttarkashi	Pvt	Pathological Lab/ Diagnostic center	0	4	No	not disclosed	NA	NA	No	No	Yes	No
UT/2	Dental Town	Uttarkashi	Pvt	Clinic/ Dispensary	0	2	No	NA	NA	Return to pharmacy	No	No	Yes	No
UT/3	Bhandari clinic	Uttarkashi	Pvt	Clinic/ Dispensary	0	8	No	not disclosed	NA	Not Disc	No	No	Yes	No
UT/4	District Hospital Uttarkashi	Uttarkashi	Govt	Hospital	158	160	Yes	CBWTF	Irreg-ular	Return to pharmacy	Yes	No	Yes	yes
UT/5	Sanjyoti Dental care	Uttarkashi	Pvt	Clinic/ Dispensary	0	4	No	NA	NA	Total Use	No	No	Yes	No
UT/6	Vinayak path lab	Uttarkashi	Pvt	Pathological Lab/ Diagnostic center	0	5	No	NA	NA	NA	No	No	Yes	No
UT/7	ECHS Polyclinic	Uttarkashi	Govt	Clinic/ Dispensary	0	10	Yes	not disclosed	NA	Return to pharmacy	No	No	Yes	yes
UT/8	State Veterinary Hospital, Gyansu	Uttarkashi	Govt	Veterinary	0	6	No	Deep Burial	NA	Total Use	No	No	Yes	No
UT/9	State ayurvedic Hospital, Uttarkashi	Uttarkashi	Govt	Hospital	25	33	No			Total Use	No	No	Yes	No
UT/10	Dr. A.K. Dutta Clinic	Uttarkashi	Pvt	Clinic/ Dispensary	0	12	No	NA	NA	Return to pharmacy	No	No	Yes	No
UT/11	Dr. Nityanand Chikitsalaya (swami Vivekananda health mission)	Uttarkashi	Trust	Clinic/ Dispensary	0	35	No	NA	NA	Return to pharmacy	No	No	Yes	No
UT/12	PHC Bhatwadi	Uttarkashi	Govt	Hospital	5	35	Yes	CBWTF	Irreg-ular	Return to pharmacy	Yes	No	Yes	yes
UT/13	State Veterinary Hospital, Bhatwadi	Uttarkashi	Govt	Veterinary	0	10	No	Deep Burial	NA	Total Use	No	No	Yes	yes
UT/14	SAD, Harsil	Uttarkashi	Govt	Clinic/ Dispensary	0	2	Yes	Deep Burial	NA	Total Use	No	No	Yes	No
UT/15	SAD, Maneri	Uttarkashi	Govt	Clinic/ Dispensary	0	10	No	Deep Burial	NA	Total Use	No	No	Yes	No
UT/16	PHC, Dunda	Uttarkashi	Govt	Hospital	4	20	Yes	CBWTF	Irreg-ular	Return to pharmacy	Yes	No	Yes	yes
TG/1	Shivananda Charitable Hospital	Tehri Garhwal	Trust	Hospital	12	100	yes	Deep Burial	NA	Total Use	Yes	No	No	No
TG/2	State ayurvedic Hospital, Tehri	Tehri Garhwal	Govt	Ayurvedic	4	25	No			Return to pharmacy	No	No	No	No
TG/3	Veterinary hospital, tehri	Tehri Garhwal	Govt	Veterinary	0	5	No	Deep Burial	NA	Total Use	No	No	No	No
TG/4	Maxwhite Dental	Tehri Garhwal	Pvt	Clinic/ Dispensary	0	4	No	CBWTF	Irreg-ular	NA	Yes	No	Yes	No

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
TG/5	Dr. Lal Path Lab (collection center)	Tehri Garhwal	Pvt	Pathological Lab/ Diagnostic centre	0	3	yes	CBWTF	Alter-nate day	NA	Yes	No	Yes	yes
TG/6	Garhwal clinic	Tehri Garhwal	Pvt	Clinic/ Dispensary	0	5	No	NA	NA	Not Disc	Yes	No	No	No
TG/7	R.S. Pundir Clinic	Tehri Garhwal	Pvt	Clinic/ Dispensary	0	3	No	CBWTF	Alter-nate day	Total Use	Yes	No	No	No
TG/8	Shri Dev Suman Hospital, Narendranagar	Tehri Garhwal	Govt	Hospital	50	50	yes	CBWTF	Irreg-ular	Return to pharmacy	Yes	No	Yes	yes
TG/9	TB hospital, Narendranagar	Tehri Garhwal	Govt	Hospital	4	40	Yes	CBWTF	Irreg-ular	Return to pharmacy	Yes	No	Yes	yes
TG/10	state veterinary hospital	Tehri Garhwal	Govt	Veterinary	0	4		Deep Burial	NA	Total Use	No	No	No	No
TG/11	State Ayurvedic Hospital	Tehri Garhwal	Govt	Hospital	20	50	no		NA	Total Use	No	No	No	No
TG/12	PHC, Fakot	Tehri Garhwal	Govt	Hospital	3	20	Yes	CBWTF	Irreg-ular	Total Use	Yes	No	Yes	No
TG/13	CHC Chamba	Tehri Garhwal	Govt	Hospital	10	30	No	CBWTF	Irreg-ular	Total Use	No	No	No	No
TG/14	State Veterinary Hospital	Tehri Garhwal	Govt	Veterinary	0	6	No	Deep Burial	NA	Total Use	No	No	No	No
TG/15	Christian Hospital (messiah hospital)	Tehri Garhwal	Pvt	Hospital	25	25	No	CBWTF	Irreg-ular	Total Use	No	No	No	yes
TG/16	Dental health care	Tehri Garhwal	Pvt	Clinic/ Dispensary	0	6	No	not disclosed	NA	NA	No	No	Yes	No
TG/17	H.M. Path (collection center)	Tehri Garhwal	Pvt	Pathological Lab/ Diagnostic centre	0	6	No	not disclosed	NA	Total Use	No	No	No	yes
TG/18	Devnirmita clinic (Ayurvedic)	Tehri Garhwal	Pvt	Clinic/ Dispensary	0	3	No	not disclosed	NA	Not Disc	No	No	No	No
TG/19	Dental clinic	Tehri Garhwal	Pvt	Clinic/ Dispensary	0	5	No	not disclosed	NA	Not Disc	No	No	No	No
TG/20	THDC hospital Bhagirathi Puram	Tehri Garhwal	Trust/ PSU/PPP	Hospital	20	150	Yes	Incinerator in house	NA	Total Use	Yes	No	No	yes
TG/21	District Hospital Bauradi	Tehri Garhwal	Trust/ PSU/PPP	Hospital	100	350	Yes	CBWTF	Irreg-ular	Return to pharmacy	Yes	No	yes	yes
TG/22	Dr. Prashant dental clinic	Tehri Garhwal	Pvt	Clinic/ Dispensary	0	10	No	CBWTF	Irreg-ular	NA	No	No	No	No
TG/23	Chauhan medical and pathological center	Tehri Garhwal	Pvt	Pathological Lab/ Diagnostic center	0	4	No	not disclosed	NA	NA	Yes	No	Yes	No
TG/24	APHC New Tehri	Tehri Garhwal	Govt	Hospital	0	40	No	CBWTF	Irreg-ular	Total Use	No	No	no	yes
TG/25	State veterinary hospital	Tehri Garhwal	Govt	Veterinary	0	4	No	Deep Burial	NA	Total Use	Yes	No	No	No
TG/26	Sub center Badshahithaul	Tehri Garhwal	Govt	Hospital	0	10	No	not disclosed	NA	Return to pharmacy	No	No	Yes	No

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
TG/27	CHC, Khadi	Tehri Garhwal	Govt	Hospital	10	3	Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	No
TG/28	APHC Ranakot	Tehri Garhwal	Govt	Hospital	0	2	Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	No
TG/29	APHC Pawkidevi	Tehri Garhwal	Govt	Hospital	2	2	Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	No
TG/30	SAD Kodrana	Tehri Garhwal	Govt	Hospital	0	2	Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	No
NA/1	CHC Suyalbadi	Nainital	Govt	Hospital	10	7	Yes	Deep Burial	NA	Total Use	Yes	No	Yes	yes
NA/2	Brij Lal hospital	Nainital	Pvt	Hospital	100			CBWTF	daily	CBWTF	Yes	No	Yes	yes
NA/3	Bombay hospital	Nainital	Pvt	Hospital	65	50	Yes	CBWTF	daily	Return to pharmacy	Yes	No	Yes	yes
NA/4	Krishna hospital	Nainital	Pvt	Hospital	150	110	Yes	CBWTF	daily	Return to pharmacy	Yes	No	Yes	yes
NA/5	Drishti eye	Nainital	Pvt	Clinic/ Dispensary	0	70	Yes	CBWTF	daily	Return to pharmacy	Yes	No	No	No
NA/6	Smile dental care	Nainital	Pvt	Clinic/ Dispensary	0	10	Yes	CBWTF	Irregular	NA	Yes	No	Yes	No
NA/7	Kalyan hospital	Nainital	Pvt	Hospital	20	10	Yes	CBWTF	daily	Return to pharmacy	Yes	No	Yes	yes
NA/8	Aggarwal clinic & nursing home	Nainital	Pvt	Hospital	25	24	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
NA/9	central hospital (trauma & heart care center)	Nainital	Pvt	Hospital	150	70	Yes	CBWTF	daily	Return to pharmacy	Yes	No	Yes	yes
NA/10	Dr Lal path lab	Nainital	Pvt	Pathological Lab/Diagnostic center	0	50	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
NA/11	Perfect imaging and ultrasound center	Nainital	Pvt	Pathological Lab/ Diagnostic center	0	15	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
NA/12	Chandan diagnostic center (dr lal path)	Nainital	Pvt	Pathological Lab/Diagnostic center	0	100	Yes	CBWTF	Alternate day	NA	Yes	No	Yes	No
NA/13	Maxcare diagnostics center	Nainital	Pvt	Pathological Lab/Diagnostic center	0	16	Yes	CBWTF	Irregular	NA	Yes	No	Yes	No
NA/14	Vivekananda hospital	Nainital	Pvt	Hospital	50	50	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
NA/15	State veterinary hospital	Nainital	Govt	Veterinary	0	5	No	Deep Burial	NA	Total Use	No	No	no	No
NA/16	SBR Path labs	Nainital	Pvt	Pathological Lab/Diagnostic center	0	30	Yes	CBWTF	Irregular	NA	Yes	No	Yes	yes
NA/17	city dental & himalaya clinic	Nainital	Pvt	Clinic/ Dispensary	0	15	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
NA/18	tooth planet	Nainital	Pvt	Clinic/ Dispensary	0	6	No	CBWTF	Irregular	Total Use	No	No	Yes	No
NA/19	Neelkanth hospital	Nainital	Pvt	Hospital	50	150	Yes	CBWTF	daily	Sent for disposal to CBWTF	Yes	No	Yes	yes
NA/20	Sushila tiwari hospital	Nainital	Govt	Hospital	650	1700	yes	Incinerator in house	NA	disposal inhouse incinerator	Yes	No	Yes	yes

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
NA/21	Dr lal path lab, ITI	Nainital	Pvt	Pathological Lab/Diagnostic center	0	8	yes	CBWTF	Irregular	NA	Yes	No	Yes	yes
NA/22	Prakash dental hospital	Nainital	Pvt	Clinic/ Dispensary	0	15	yes	CBWTF	Irregular	NA	Yes	No	Yes	No
NA/23	SRL diagnostic center (garv diagnostic center)	Nainital	Pvt	Pathological Lab/Diagnostic center	0	20	yes	CBWTF	daily	NA	Yes	Yes	Yes	yes
NA/24	jagdamba heart care center	Nainital	Pvt	Clinic/ Dispensary	0	50	yes	CBWTF	Alternate day	NA	Yes	No	Yes	No
NA/25	Sai hospital	Nainital	Pvt	Hospital	100	70	yes	CBWTF	Alternate day	Return to pharmacy	Yes	No	Yes	yes
NA/26	Maxface clinic	Nainital	Pvt	Clinic/ Dispensary	0	3	yes	CBWTF	Irregular	Total Use	Yes	No	Yes	No
NA/27	Dr. Negi dental	Nainital	Pvt	Clinic/ Dispensary	0	10	yes	CBWTF	Irregular	Total Use	Yes	No	Yes	No
NA/28	Tiwari maternity care and nursing home	Nainital	Pvt	Hospital	48	40	yes	CBWTF	Alternate day	Return to pharmacy	Yes	No	Yes	yes
NA/29	Dr. Binod joshi chikitsalaya	Nainital	Pvt	Clinic/ Dispensary	0	4	No	NA	NA	NA	Yes		no	no
AL/1	EyeQ vision	Almora	Pvt	Clinic/ Dispensary	0	1.5	Yes	Deep Burial	NA	Return to pharmacy	Yes	No	Yes	No
AL/2	GTR base hospital	Almora	Govt	Hospital	200	75	Yes	CBWTF	daily	Return to pharmacy	Yes	No	Yes	yes
AL/3	Victor Mohan Joshi female hospital	Almora	Govt	Hospital	38	41	Yes	Deep Burial	NA	Total Use	Yes	No	Yes	yes
AL/4	APHC Panuwanaula	Almora	Govt	Hospital	2	12	No	Deep Burial	NA	Total Use	Yes	No	Yes	No
AL/5	PHC Barechina	Almora	Govt	Hospital	3	20	Yes	Deep Burial	NA	Total Use	Yes	No	Yes	yes
AL/6	Hargovind pant district hospital	Almora	Govt	Hospital	56	300	Yes	Deep Burial	NA	Total Use	Yes	No	Yes	yes
AL/7	Jeevan Jyoti hospital	Almora	Pvt	Clinic/ Dispensary	0	15	Yes	Deep Burial	NA	Total Use	Yes	No	Yes	yes
AL/8	Anjali hospital	Almora	Pvt	Hospital	9	30	No	Deep Burial	NA	Total Use	Yes	No	no	yes
AL/9	Ayurvedic Center, Kalmatia	Almora	Pvt	Hospital	20		No	Deep Burial	NA	NA	No	No	no	No
US/1	Chamunda hospital	US Nagar	Pvt	Hospital	49	60	Yes	CBWTF	Alternate day	Return to pharmacy	Yes	No	Yes	yes
US/2	Shri Krishna Hospital	US Nagar	Pvt	Hospital	100	100	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
US/3	LD Bhatt govt hospital	US Nagar	Govt	Hospital	95	195	Yes	CBWTF	Alternate day	Sent for disposal to CBWTF	Yes	No	yes	yes
US/4	A to Z diagnostic center	US Nagar	Pvt	Pathological Lab/Diagnostic center	0	35	Yes	CBWTF	Irregular	NA	Yes	No	yes	yes
US/5	Dr Goel Kidney care center	US Nagar	Pvt	Clinic/ Dispensary	0	5	Yes	CBWTF	Irregular	NA	Yes	No	yes	yes
US/6	Dr. Goel diagnostics	US Nagar	Pvt	Pathological Lab/Diagnostic center	0	5	Yes	CBWTF	Irregular	NA	Yes	No	yes	yes

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
US/7	Rastogi clinic	US Nagar	Pvt	Clinic/ Dispensary	0	25	NA	NA	NA	Total Use	No	No	No	No
US/8	Dr. Sharma's skin & Beauty clinic	US Nagar	Pvt	Clinic/ Dispensary	0	20	NA	CBWTF	Irregular	NA	No	No	Yes	No
US/9	Aggarwal ortho care & Trauma	US Nagar	Pvt	Hospital	9	40	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
US/10	Jeevan rekha MRI & Skin center	US Nagar	Pvt	Pathological Lab/Diagnostic center	0	60	No	CBWTF	Irregular	NA	Yes	No	Yes	No
US/11	Kasturi Devi hospital	US Nagar	Pvt	Hospital	14	25	Yes	CBWTF	Alternate day	Return to pharmacy	Yes	No	Yes	yes
US/12	Uk Hijamah Sciences Unani clinic	US Nagar	Pvt	Clinic/ Dispensary	0	20	Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	yes
US/13	Indian Glycol Medical center (OHC)	US Nagar	Pvt	Clinic/ Dispensary	0	5	Yes	CBWTF	Irregular	both CBWTF & Pharmacy	Yes	No	Yes	yes
US/14	PHC Narayan Nagar	US Nagar	Govt	Clinic/ Dispensary	0	20	No	Deep Burial	NA	Return to pharmacy	No	No	no	No
US/15	State Veterinary hospital Kashipur	US Nagar	Govt	Veterinary	0	10	No	Deep Burial	NA	Total Use	No	No	No	No
US/16	Bacho ka aspatal	US Nagar	Pvt	Clinic/ Dispensary	0	30	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	no	No
US/17	Dr Lal path lab (FPSC, Spectrum mall)	US Nagar	Pvt	Pathological Lab/Diagnostic center	0	10	Yes	CBWTF	Alternate day	NA	Yes	No	Yes	yes
US/18	Badrish dental care	US Nagar	Pvt	Clinic/ Dispensary	0	8	Yes	CBWTF	Irregular	NA	Yes	No	Yes	No
US/19	Dr. Ravi singhal nursing home	US Nagar	Pvt	nursing home	6	50	Yes	CBWTF	Alternate day	Sent for disposal to CBWTF	Yes	No	Yes	yes
US/20	shiv diagnostics & maternity center	US Nagar	Pvt	Pathological Lab/Diagnostic center	0	15	Yes	CBWTF	Alternate day	NA	Yes	No	Yes	yes
US/21	Gupta nursing home	US Nagar	Pvt	nursing home	10	30	Yes	NA	NA	NA	No	No	no	No
US/22	Ambeka eye hospital	US Nagar	Pvt	Clinic/ Dispensary	0	20	Yes	CBWTF	Alternate day	Total Use	Yes	No	no	yes
US/23	Global specialty hospital	US Nagar	Pvt	Hospital	50	15	Yes	CBWTF	Alternate day	Return to pharmacy	Yes	No	Yes	yes
US/24	Uttkarsh heart care center	US Nagar	Pvt	Hospital	10	25	Yes	CBWTF	Alternate day	Return to pharmacy	Yes	No	no	No
US/25	Sirohi bone hospital	US Nagar	Pvt	Hospital	8	10	No	CBWTF	Irregular	Return to pharmacy	No	No	no	No
US/26	Dr anil clinic	US Nagar	Pvt	Clinic/ Dispensary	0	30	No	CBWTF	Irregular	Total Use	Yes	No	no	No
US/27	Narendra heart center	US Nagar	Pvt	Clinic/ Dispensary	0	10	No	CBWTF	Irregular	NA	Yes	No	Yes	No
US/28	Surya diagnostics	US Nagar	Pvt	Pathological Lab/Diagnostic center	0	35		CBWTF	Alternate day	NA	Yes	No	no	No

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
US/29	Dr veena joshi hospital	US Nagar	Pvt	Hospital	12	20	Yes	CBWTF	Alternate day	Return to pharmacy	Yes	No	Yes	yes
US/30	YK X-Ray & Pathology	US Nagar	Pvt	Pathological Lab/ Diagnostic center	0	30	Yes	CBWTF	Alternate day	NA	Yes	No	Yes	No
DD/1	Max superspeciality hospital	Dehradun	Pvt	Hospital	200	127	Yes	CBWTF	daily	Return to pharmacy	Yes	Yes	Yes	yes
DD/2	AIIMS Rishikesh	Dehradun	Govt	Hospital	960	858	Yes	CBWTF	daily	both CBWTF & Pharmacy	Yes	No	Yes	yes
DD/3	CHC Doiwala	Dehradun	Govt	Hospital	30	96	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	No
DD/4	State Veterinary hospital Doiwala	Dehradun	Govt	Veterinary	0	10	No	Deep Burial	NA	Total Use	No	No	no	No
DD/5	himalayan ayurvedic medical college & hospital	Dehradun	Pvt	Hospital	120	83	No	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	No
DD/6	PHC Bhaniyawala	Dehradun	Govt	Hospital	0	20	yes	CBWTF	Irregular	Total Use	Yes	No	Yes	No
DD/7	State veterinary dispensary, Bhaniyawala	Dehradun	Govt	Veterinary	0	5	No	Deep Burial	NA	Total Use	No	No	no	No
DD/8	CHC Thano	Dehradun	Govt	Hospital	0	40	yes	CBWTF	Irregular	Total Use	Yes	No	Yes	No
DD/9	CHC Raipur	Dehradun	Govt	Hospital	10	101	yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
DD/10	Asha nursing home	Dehradun	Pvt	Hospital	30	5	yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	No
DD/11	Healing touch	Dehradun	Pvt	Hospital	20	15	No	CBWTF	Alternate day	Return to pharmacy	Yes	No	Yes	No
DD/12	PHC Balawala	Dehradun	Govt	Hospital	0	30	Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	yes
DD/13	State veterinary hospital balawala	Dehradun	Govt	Veterinary	0	2	No	Deep Burial	NA	Total Use	No	No	no	No
DD/14	Doon public hospital	Dehradun	Govt	Hospital	9	NA	Yes	CBWTF	Irregular	Sent for disposal to CBWTF	Yes	yes	Yes	yes
DD/15	Govind hospital	Dehradun	Pvt	Hospital	30	30	Yes	CBWTF	Irregular	Return to pharmacy	Yes	yes	Yes	yes
DD/16	State animal dispensary, Nehrugram	Dehradun	Govt	Veterinary	0	7	No	Deep Burial	NA	Total Use	No	No	no	No
DD/17	PHC Nehrugram	Dehradun	Govt	Hospital	0	not disc	No	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
DD/18	Ordinance factory hospital	Dehradun	Govt	Clinic/ Dispensary	0	20	Yes	CBWTF	Irregular	Return to pharmacy	Yes	yes	Yes	yes
DD/19	Raahat animal hospital	Dehradun	trust	Veterinary	0	30	No	NA	NA	Total Use	No	No	no	No
DD/20	Aesthetic dental care	Dehradun	Pvt	Clinic/ Dispensary	0	2	Yes	CBWTF	Irregular	Return to pharmacy	Yes	yes	Yes	yes

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
DD/21	Uttaranchal Ayush hospital	Dehradun	Pvt	Hospital	50	NA	No	NA	NA	NA	No	No	no	No
DD/22	Ghanshala dental care	Dehradun	Pvt	Clinic/ Dispensary	0	5	No	CBWTF	Irregular	NA	Yes	No	No	No
DD/23	IMA blood bank	Dehradun	Pvt	blood bank	0	15	Yes	CBWTF	Irregular	NA	Yes	yes	Yes	yes
DD/24	Additional PHC Mehuwala	Dehradun	Govt	Hospital	4	10	Yes	CBWTF	Irregular	Return to pharmacy	Yes	yes	yes	yes
DD/25	Luthra nursing home	Dehradun	Pvt	nursing home	10	30	Yes	CBWTF	Irregular	Return to pharmacy	Yes	yes	yes	yes
DD/26	Bloom medicity	Dehradun	Pvt	Hospital	14	15	Yes	CBWTF	Irregular	Return to pharmacy	under process	yes	yes	yes
DD/27	Sunanda medical center	Dehradun	Pvt	Hospital	20	10	Yes	CBWTF	Irregular	Return to pharmacy	Yes	yes	yes	yes
DD/28	Belwal meternity center	Dehradun	Pvt	nursing home	4	15	Yes	CBWTF	Irregular	Sent for disposal to CBWTF	Yes	yes	Yes	yes
DD/29	Drishti eye center	Dehradun	Pvt	Clinic/ Dispensary	0	100	Yes	CBWTF	Alternate day	Return to pharmacy	Yes	yes	Yes	yes
DD/30	Ahuja pathology & Imaging care	Dehradun	Pvt	Pathological Lab/Diagnostic center	0	35	Yes	CBWTF	Irregular	NA	Yes	No	Yes	yes
DD/31	Ahuja pathology lab	Dehradun	Pvt	Pathological Lab/Diagnostic center	0	300	Yes	CBWTF	Irregular	NA	Yes	No	Yes	yes
DD/32	Vohra hospital	Dehradun	Pvt	Hospital	10	40	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	no	yes
DD/33	Swati diagnostics	Dehradun	Pvt	Pathological Lab/Diagnostic center	0	15	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	No
DD/34	St. Paul hospital	Dehradun	Pvt	Hospital	10	20	No	CBWTF	Irregular	Total Use	Yes	No	no	yes
DD/35	Velmed hospital	Dehradun	Pvt	Hospital	150	110	Yes	CBWTF	daily	Return to pharmacy	Yes	No	Yes	yes
DD/36	Health care hospital	Dehradun	Pvt	Hospital	35	10	Yes	CBWTF	Irregular	Total Use	under process	No	Yes	No
DD/37	Surya hospital	Dehradun	Pvt	Hospital	25	10	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	no	yes
DD/38	Kanishk hospital	Dehradun	Pvt	Hospital	49	43	Yes	CBWTF	daily	Total Use	Yes	yes	Yes	yes
DD/39	Krishna Medical Center	Dehradun	Pvt	Hospital	8	10	Yes	CBWTF	Alternate day	Return to pharmacy	Yes	yes	Yes	yes
DD/40	CHC Sahaspur	Dehradun	Pvt	Hospital	10	98	Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	yes
DD/41	Joshi Multispecialty hospital	Dehradun	Pvt	nursing home	15	20	Yes	CBWTF	Irregular	Sent for disposal to CBWTF	Yes	yes	Yes	yes
DD/42	PHC Selaqui	Dehradun	Govt	Hospital	4	25	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
DD/43	State combined hospital Premnagar	Dehradun	Govt	Hospital	30	30	Yes	CBWTF	Alternate day	Sent for disposal to CBWTF	Yes	yes	Yes	yes
DD/44	Nanda Hospital	Dehradun	Pvt	Hospital	18	25	Yes	CBWTF	Irregular	Return to pharmacy	Yes	yes	Yes	yes

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
DD/45	CHC Chakrata	Dehradun	Govt	Hospital	10	25	No	Deep Burial	NA	Total Use	Yes	No	Yes	yes
DD/46	CHC Shaiya	Dehradun	Govt	Hospital	30	150	Yes	Deep Burial	NA	Return to pharmacy	Yes	No	Yes	yes
DD/47	PHC Kalsi	Dehradun	Govt	Hospital	4	10	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	No
DD/48	Kalindi hospital	Dehradun	Pvt	Hospital	46	50	No	CBWTF	Irregular	Sent for disposal to CBWTF	No	No	Yes	No
DD/49	Devbhoomi hospital and nursing home	Dehradun	Pvt	Hospital	20	15	No	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	No
DD/50	Dr Chauhan hospital	Dehradun	Pvt	Hospital	10	10	Yes	CBWTF	Irregular	Return to pharmacy	Yes	yes	no	No
DD/51	Swami Vivekanand charitable hospital	Dehradun	trust	Hospital	30	200	Yes	CBWTF	Irregular	Sent for disposal to CBWTF	Yes	yes	Yes	No
DD/52	Synergy institute of medical sciences	Dehradun	Pvt	Hospital	140		Yes	CBWTF	daily	Sent for disposal to CBWTF	Yes	Yes	Yes	yes
DD/53	Himalayan hospital	Dehradun	trust	Hospital	750		yes	CBWTF	daily					
DD/54	Kailash hospital	Dehradun	Pvt	Hospital	150	300	yes	CBWTF	daily	Return to pharmacy	Yes	Yes	Yes	yes
DD/55	CMI hospital	Dehradun	Govt	Hospital	100		yes	CBWTF	daily	Return to pharmacy	Yes	Yes	Yes	yes
DD/56	Coronation hospital	Dehradun	Govt	Hospital	100		yes	CBWTF	Irregular	Return to pharmacy	Yes	Yes	Yes	yes
HA/1	SDH Roorkee	Haridwar	Govt	Hospital	106	420	yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
HA/2	Mother and child hospital	Haridwar	Pvt	Hospital	7	25	No	CBWTF	Irregular	Return to pharmacy	Yes	yes	Yes	yes
HA/3	metro city hospital	Haridwar	Pvt	Hospital	7	5	No	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	No
HA/4	Arpit hospital	Haridwar	Pvt	Hospital	16	20	No	CBWTF	Irregular	Sent for disposal to CBWTF	Yes	No	no	No
HA/5	Kalavati hospital	Haridwar	Pvt	Hospital	10	5	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
HA/6	Shakuntala nursing home	Haridwar	Pvt	nursing home	21	40	No	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	No
HA/7	Neelkanth pathology lab	Haridwar	Pvt	Pathological Lab/ Diagnostic center	0	10	No	CBWTF	Irregular	NA	Yes	No	Yes	No
HA/8	IIT Roorkee hospital	Haridwar	Govt	Hospital	26	5	No	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	No
HA/9	Harmilap hospital	Haridwar	Govt	Hospital	70	50	Yes	CBWTF	daily	Return to pharmacy	Yes	No	Yes	No
HA/10	chainrai zila mahila chikitsalaya	Haridwar	Govt	Hospital	30	20	Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	yes
HA/11	mela hospital (covid)	Haridwar	Govt	Hospital	100	not disc	Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	yes
HA/12	metro hospital	Haridwar	Pvt	Hospital	150	100	yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
HA/13	BHEL hospital	Haridwar	PSU	Hospital	180		Yes	CBWTF	Irregular	Total Use	Yes	No	Yes	yes
HA/14	state veterinary hospital	Haridwar	Govt	Veterinary	0	8	No	NA	NA	Total Use	Yes	No	no	No
HA/15	Global health care clinic	Haridwar	Pvt	Hospital	0	5	No	CBWTF	Alternate day	NA	Yes	No	Yes	No
HA/16	Sushrut trauma center	Haridwar	Pvt	Hospital	10	NA	Yes	CBWTF	Alternate day	NA	Yes	No	Yes	No
HA/17	Matracharya medical center	Haridwar	Pvt	Hospital	30	30	No	CBWTF	Alternate day	NA	Yes	yes	Yes	No
HA/18	CITY hospital	Haridwar	Pvt	Hospital	45	150	Yes	CBWTF	Alternate day	NA	Yes	yes	yes	yes
HA/19	OHC Hero Moto Corp	Haridwar	Pvt	Clinic/ Dispensary	0	50	Yes	CBWTF	Irregular	Total Use	Yes	yes	yes	yes
HA/20	Ganga valley hospital	Haridwar	Pvt	Clinic/ Dispensary	25	10	No	CBWTF	Alternate day	Return to pharmacy	Yes	yes	yes	No
HA/21	Shiv shakti hospital	Haridwar	Pvt	Hospital	6	35	No	CBWTF	Irregular	Total Use	No	No	Yes	No
HA/22	Swami ramprakash charitable hospital	Haridwar	Pvt	Hospital	26	100	Yes	CBWTF	Irregular	Return to pharmacy	No	No	Yes	No
HA/23	CHC Bhadarabad	Haridwar	Govt	Hospital	10	200	No	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
HA/24	State veterinary hospital Bhadarabad	Haridwar	Govt	Veterinary	0	10	No	Deep Burial	NA	Total Use	Yes	No	no	No
HA/25	New max hospital	Haridwar	Pvt	Hospital	10	2	No	CBWTF	Irregular	Return to pharmacy	under process	yes	Yes	No
HA/26	New Devbhoomi hospital	Haridwar	Pvt	Hospital	26	60	Yes	CBWTF	Irregular	both CBWTF & Pharmacy	Yes	No	Yes	No
HA/27	Laxmi memorial and Shatabdi hospital	Haridwar	Pvt	Hospital	10	30	Yes	CBWTF	Irregular	Sent for disposal to CBWTF	Yes	yes	Yes	yes
HA/28	Vinayak hospital	Haridwar	Pvt	Hospital	25	20	No	CBWTF	Irregular	Return to pharmacy	under process	yes	Yes	No
HA/29	Leelawati hospital	Haridwar	Pvt	Hospital	15	30	Yes	CBWTF	Irregular	Return to pharmacy	Yes	No	Yes	yes
HA/30	Raja ram hospital	Haridwar	Pvt	Hospital	10	41	Yes	CBWTF	Irregular	Return to pharmacy	Yes	yes	Yes	yes
HA/31	CHC Laksar	Haridwar	Govt	Hospital	30	300	No	CBWTF	Irregular	Total Use	under process	No	Yes	No
HA/32	Bharat hospital	Haridwar	Pvt	Hospital	15	15	No	CBWTF	Irregular	Sent for disposal to CBWTF	No	No	no	No
HA/33	Gangotri hospital	Haridwar	Pvt	Hospital	5	5	No	CBWTF	Irregular	Sent for disposal to CBWTF	No	No	no	No
HA/34	Kabir wellness center	Haridwar	Pvt	Hospital	10	5	Yes	CBWTF	Irregular	Total Use	Yes	yes	Yes	No

Code	Name of HCF	District	Type (ownership)	Type (service)	Beds	OPD/day	Segregation of BMW (color coded bins)	Mode of BMW disposal	frequency of waste collection	Disposal of Medicines	Authorization from UKPCB	Bar-code implementation non-chlorinated plastic bags	BMW Training
HA/35	Nidaan hospital	Haridwar	Pvt	Hospital	40	30	No	CBWTF	Irregular	Return to pharmacy	No	No	Yes	No
HA/36	Aggarwal medical center	Haridwar	Pvt	Hospital	26	60	No	CBWTF	Irregular	Return to pharmacy	Yes	yes	Yes	yes
HA/37	Sanjeevani hospital	Haridwar	Pvt	Hospital	20	25	Yes	CBWTF	Alternate day	Return to pharmacy	Yes	No	Yes	yes