

# NOT HANDLED WITH CARE

**A survey of biomedical  
waste management  
practices in Jharkhand**



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**Disclaimer:**

The survey was conducted in June 2016. The designations of persons and officials mentioned in the book are what they held at the time of the original reports.



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# 1. INTRODUCTION

The healthcare sector is known to be a wellness centre and must unwittingly act as a source of further risk exposure to the healthcare staffs, patients and their families as well as the neighbourhood. Biomedical waste, the waste generated from the healthcare sector, is the biggest concern for all healthcare facilities, owing to the increasing incidents of a large number of hospital acquired infection (HAI) taking place across India.

A study by Indian Clinical Epidemiology Network (CLEN) in 2002–04 shows that, out of the total annual injection usage of three–six billion, two-thirds are unsafe. The situation becomes worse, when National Aids Control Organisation (NACO) data of 1993 shows that the rate of sero-prevalence of Hepatitis-B and HIV in India is 38/1,000 and 7/1,000 respectively.

Has the situation improved over the years? Even after considerable improvements in public health and hospital care, infections continue to develop in hospitalized patients. Many factors promote such infections, including decreased immunity among patients, increasing variety of medical procedures and invasive techniques creating potential new routes of infection, transmission of drug-resistant bacteria among crowded hospital populations, where poor infection control practices may facilitate transmission and, last but not least, poor waste management and sanitation conditions prevailing in hospitals.

How prepared is our healthcare sector to first reduce and then address the issue of healthcare-associated infections? Where do we stand now, 10 years after a pledge and commitment to address healthcare-associated infections in the country was made by the government of India? The country, well before 2006, had already notified the Biomedical Waste (Management and Handling) Rules of 1998, with an emphasis on safe and sound disposal of healthcare waste including used needles and syringes. But if we look at the effectiveness of such Rules on the ground, we realize that we still have a long way to go.

However, the risks and harmful effects of ill-managed medical waste do not limit themselves to a hospital setting. It puts the society at large at a risk as it pollutes the environment and human health by illegal disposal and uncontrolled burning of mixed waste, discharge of toxic chemicals and liquid effluent into water bodies, and by paving the way for illegal reuse of infected waste generating from healthcare facilities.

## **2. STUDY BACKGROUND**

Jharkhand is a state in eastern India carved out of the southern part of Bihar on 15 November 2000. According to the 2011 census, the state has a total population of about 32,988,134 with a population density of 414/ km<sup>2</sup>. The state is very rich in mineral resources, particularly coal.

Ranchi, the state capital, has a population of 1,120,374 within its municipal limits, as per the 2011 census, making it the 46th largest urban centre in India. The city witnessed a sudden surge in population owing to the rising employment opportunities and opening of numerous regional and state level offices, banks, and FMCG companies after it became the capital of the new state.

Given this population explosion, Jharkhand is struggling in maintaining its waste, both municipal solid as well as biomedical. The drainage system has not been able to keep up with the expanding cityscape. In many cases, waste is simply disposed of in nearby Jhoras or dead mines. The status of the healthcare sector is also grim, and the same story is repeated in other big cities and towns of the state.

The Biomedical Waste (Management and Handling) Rules, 1998 were put in place for ensuring environmentally sound management and disposal of biomedical waste. New rules, superseding the 1998 Rules, were incorporated in 2016, and these are known as the Biomedical Waste Management Rules, 2016. In spite of all these efforts, the country is lagging far behind with regard to compliance with the biomedical waste management and handling practices in various parts of country. Given this background, CSE has conducted a gap assessment study in Jharkhand to assess the existing management, handling and disposal practices of biomedical waste by the healthcare facilities.

## 3. METHODOLOGY

A thorough secondary research was conducted by scanning through various papers and reports available online to get an idea of the total number of healthcare facilities present in Jharkhand.

Further, Ranchi, the state capital Ranchi, and Dhanbad, one of the largest cities in the state, were selected for the study. In both the selected district, government and private healthcare facilities spread across the district were identified and surveyed. A total of 20 healthcare facilities were visited, out of which one facility denied to share any information. Both quantitative and qualitative modules were used to gather pertinent information on the following aspects:

- Availability of infrastructure required for waste management
- Staff awareness level, and training and capacity building
- Status of in-house waste treatment and disposal
- Availability, accessibility and operational condition of common biomedical waste treatment facility (CBWTF)

Besides healthcare facilities, a visit was also made to the lone CBWTF of the state, which is located in district Ramgarh, some 55 km from Ranchi. Photo documentation of the CBWTF from the outside was done, as the operator disallowed permission to meet and share any information, or to enter the facility.

The surveyor also met with officials from the State Pollution Control Board, State Department of Health, State chapter of NRHM and the city municipalities of both Ranchi and Dhanbad. Individual interviews with local media persons, local NGOs and local community were also conducted as part of this survey.

The following sections detail out the key findings emerging from the survey.

# 4. QUANTITATIVE ANALYSIS

A quantitative analysis was carried out keeping in mind the various aspects of waste management in compliance with the Biomedical Waste (Management and Handling) Rules, 1998 and 2016. An attempt has been made to provide a comparison between the two districts with respect to the private and government healthcare facilities.

## a. Distribution of healthcare facilities

Out of 19 healthcare facilities visited in the study districts of Ranchi and Dhanbad, nine were private, seven were government, and three were semi-government facilities. See *Figure 1* and *Table 1*.

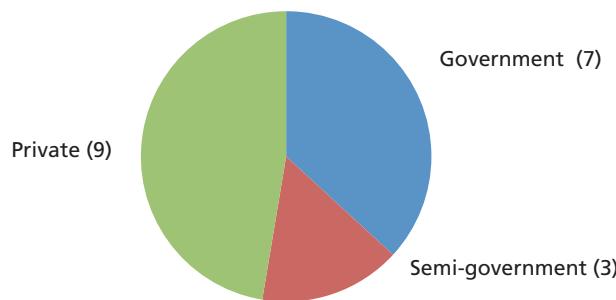
## b. Staff awareness level and need for training and capacity building

Staff awareness level on the Rules and their various aspects is closely linked with the training and capacity building mechanism. Therefore, an assessment was done to check the awareness level of the healthcare workers, including practicing nurses and waste handlers, on a few priority areas of waste management, viz., the Rules, colour-coding practices for waste segregation, mercury spill clean-up measures, preparation of sodium hypochlorite solution for disinfection and so on, which are presented in *Figure 2* to *Figure 4*.

*Figure 2* represents the district-wise status of the staff awareness level on the Rules. Out of 12 healthcare facilities in Ranchi, the staff in three was fully aware and in four was partially aware of the Rules; five healthcare facilities had not heard of the 1998 Rules. It was found that two government healthcare facilities in the non-urban part of Ranchi were among those with zero awareness. Private healthcare facilities are no better as three of them had no awareness of the Rules. The largest government hospital of Ranchi, Rajendra Institute of Medical Science (RIMS) reported partial awareness on the Rules. In Dhanbad too, five facilities were completely unaware of the Rules.

Staff awareness level on the new rules of 2016 has also been checked during the survey. It was found that none of the facilities visited in Ranchi and Dhanbad had heard of the new 2016 Rules, except the Medical Superintendent of Patliputra Medical College Hospital (PMCH), Dhanbad. It was observed during the visit that though the hospital hardly had any system for waste management in place, the newly appointed medical superintendent is aware of the new Rules and is keen to put the system in place.

**Figure 1: Distribution of health care facilities surveyed in Ranchi and Dhanbad**



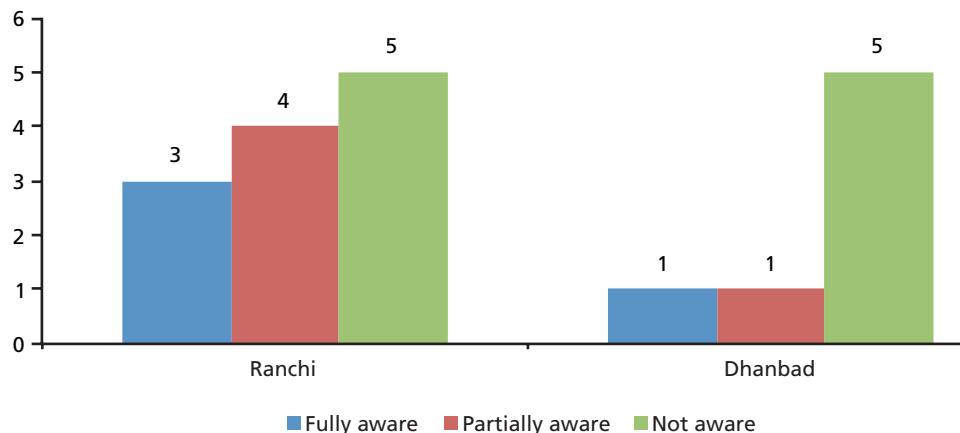
**Table 1: List of healthcare facilities**

S no	Name of the healthcare facility	Bed capacity
<b>RANCHI</b>		
1	Medica Super Speciality Hospital	291
2	District Hospital (Sadar)	87
3	Rajendra Institute of Medical	1,500
<b>SCIENCES (RIMS) HOSPITAL</b>		
4	Ispat Hospital	60
5	Orchid Hospital	
6	KC Roy Memorial Hospital	60
7	Om Nursing Home and Research Centre	16
8	Namkum Community Health Centre	30
9	Chango Community Health Centre	6
10	Mandar Referral Hospital	30
11	Lakshmi Nursing Home	38
12	HEC Hospital	150
<b>DHANBAD</b>		
13	Patliputra Medical College Hospital (PMCH)	500
14	Central Hospital	500
15	Jalan Hospital	100
16	Shakti Nursing Home	40
17	Dhanbad Nursing Home	20
18	Govindpur Community Health Centre	8
19	Patliputra Nursing Home	50

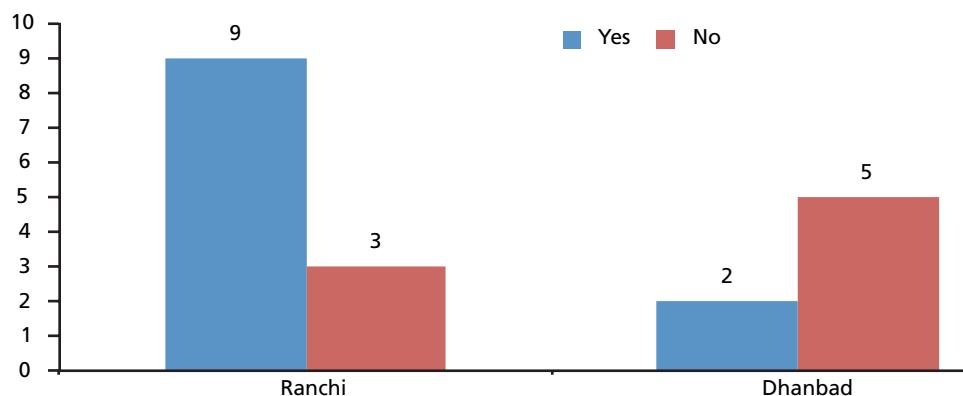
Staff awareness level on colour-coding practices for waste segregation was assessed in healthcare facilities of Ranchi and Dhanbad (see *Figure 3*).

In Ranchi, nine healthcare facilities reported to have knowledge on colour-coding practices needed for waste segregation. Dhanbad, on the other hand, showed a poor knowledge level among staff on the colour-coding practices. However, pictures (of various coloured bags filled with waste) taken during the survey raised doubts on these claims, as a majority of the bags did not showcase colour-coding segregation as per the Rules.

**Figure 2: Staff awareness level on 1998 Rules in the two district**



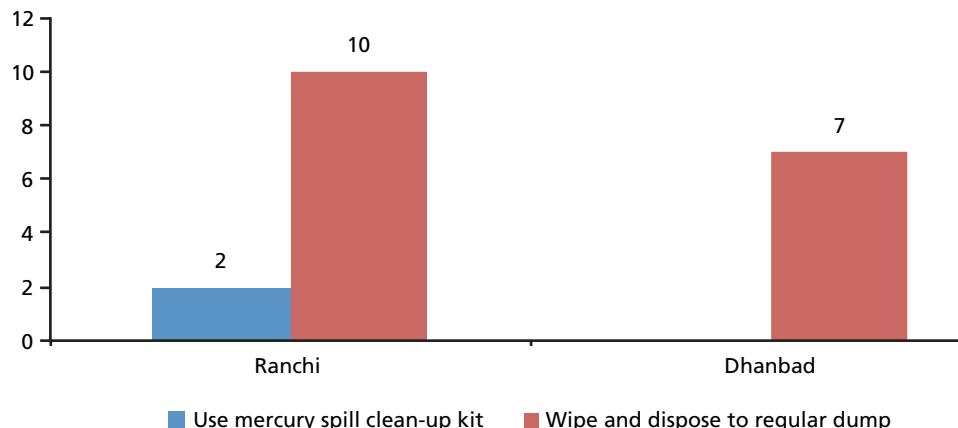
**Figure 3: Staff awareness level of colour-coding in the two districts**



Yellow bin filled with general waste



Green coloured bags (not mentioned in the Rules)

**Figure 4: Mercury spill clean-up measures in the two districts**

This also points out to the non-compliance in terms of environmentally-sound waste management. It is said that in order to avoid spillage from waste filled bags, they must be tied when two-thirds full. The ground scenario was not complying with this, as a majority of the bags were kept open even while being transported within a healthcare facility.

The issue of mercury toxicity was also taken into consideration during the survey and it was found that none of the visited healthcare facilities had phased out mercury-based thermometers, sphygmomanometers, or dental amalgam. This is in violation of the 2010 and 2016 guidelines by Directorate General of Health Services (DGHS).<sup>1</sup>

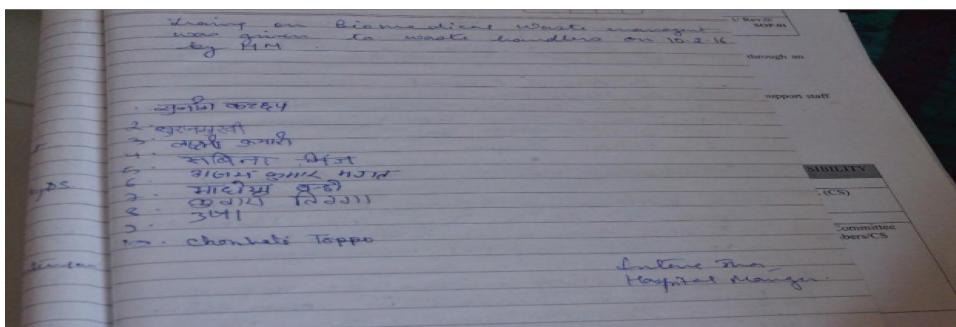
These lacunae point out to the need for regular training and capacity building programmes for healthcare workers. Training and capacity building is an integral part of environmentally-sound management of biomedical waste. Regular trainings are important because the attrition rate among the workers in the healthcare industry is very high.

*Figure 5* represents the district level comparison of training protocols. Out of 12 facilities in Ranchi, four had a training protocol in place. In Dhanbad, out of seven facilities, only two had a training protocol in place.

Ranchi district hospital, despite being a government hospital, stood out for the date on the high number of participants attending its training programmes. Medica Super Speciality hospital Ranchi also maintained data on staff training programmes. All these facilities reported training of nurses, ward boys, waste handlers and paramedic staff. However, none of the visited facilities reported any training programme for doctors.

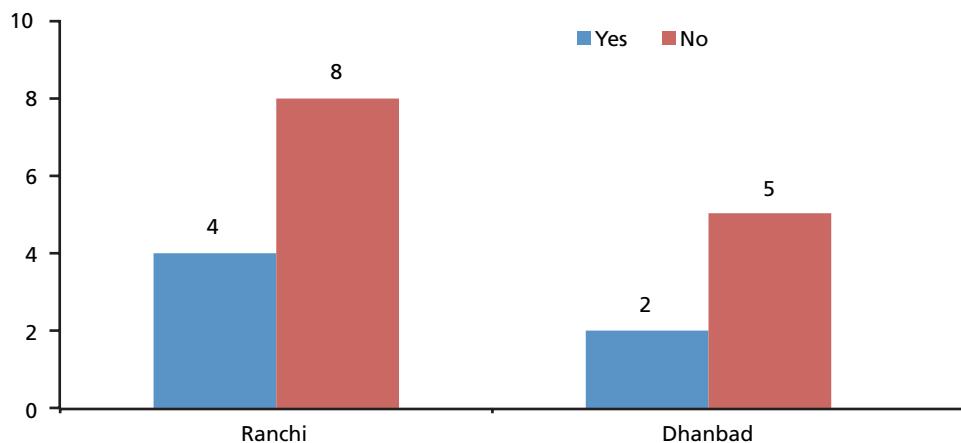
When asked about the training and capacity building programme in other healthcare facilities, we were informed that at the very beginning of

1. <http://module.ima-india.org/ima/25feb201.pdf> <http://toxicslink.org/docs/rulesansregulation/Mercury-phase-out-order.pdf> (Pg 1-2)



Training programme for safai workers as documented by the Ranchi district hospital

**Figure 5: Presence of training protocols in the two districts**



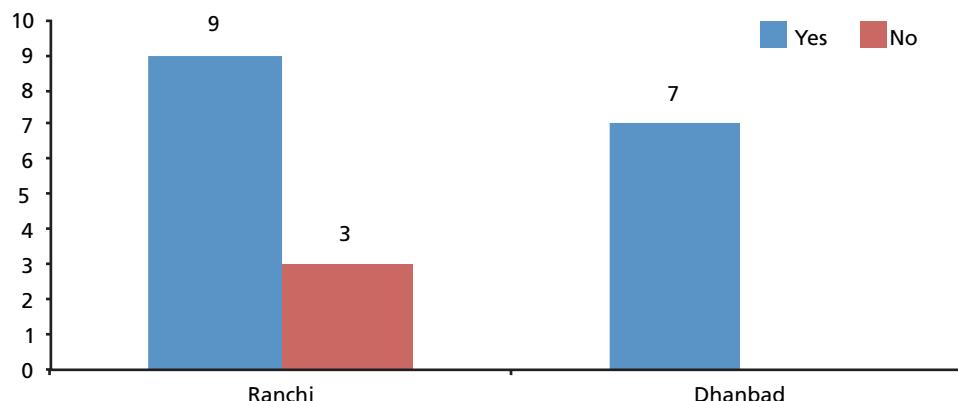
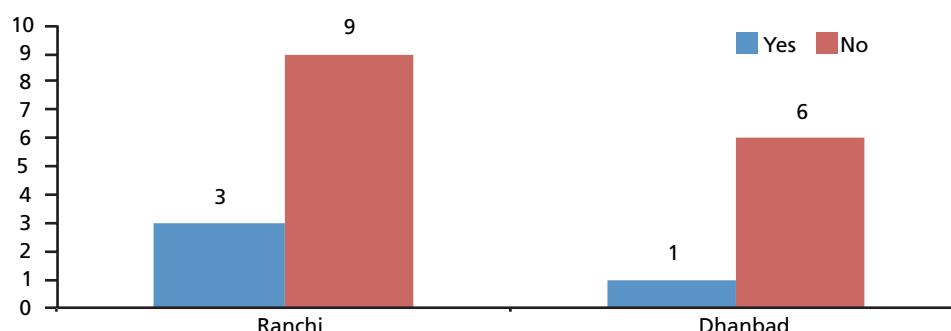
the implementation of a waste management system, the staff were given training, following which no further training programme was conducted. The management was also of the opinion that the need for such a training did not arise.

### c. Infrastructure for waste management

The word infrastructure here refers to the colour-coded bags and bins, trolleys required to transfer the waste from the point of generation to the interim storage facilities, and the availability of interim waste storage facilities.

*Figure 6* represents the district level comparison in terms of availability of bags. All the seven facilities visited in Dhanbad had colour-coded bags for waste collection.

In Ranchi, nine out of the 12 healthcare facilities visited reported to have colour-coded bags. Two of the facilities had only bins for waste collection and no bags. All nine of the private facilities were found to possess colour-coded bags.

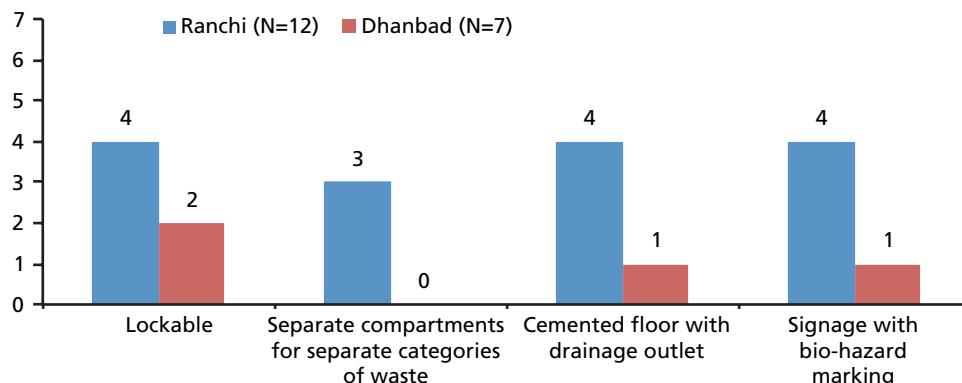
**Figure 6: Availability of bags by place of survey****Figure 7: Availability of transportation trolleys by place of survey**

Transportation trolleys are needed within healthcare facilities in order to avoid manual handling of infectious waste. *Figure 7* depicts the district-wise comparison in terms of availability of trolleys. Out of 12 facilities in Ranchi, three had waste transportation trolleys whereas in Dhanbad only one facility was found to have transportation trolleys. The picture was grimmer in private healthcare facilities as only one out of nine facilities reported to use transportation trolleys for waste movement.

Any healthcare facility needs to have a designated interim waste storage point within its premises, as the waste generated at various wards needs to be shifted on a regular basis. The interim storage area must be locked and inaccessible to visitors and animals, otherwise it could spread infection. The area must have separate compartments for different categories of waste and must have cemented floor along with drainage outlets. Finally, the storage area must be covered by a roof and wall and marked with a biohazard sign, as per the Rules.

*Figure 8* depicts the condition of interim waste storage facilities of the visited healthcare facilities. “Yes” responses have been considered to prepare the graph and it was found that Ranchi’s facilities had better infrastructure in place compared to Dhanbad’s.

**Figure 8: Designated waste storage area within healthcare facilities**



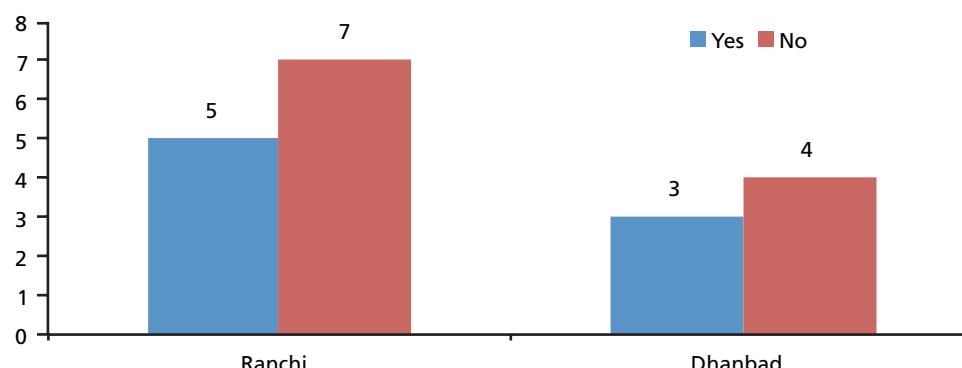
#### d. System for waste management

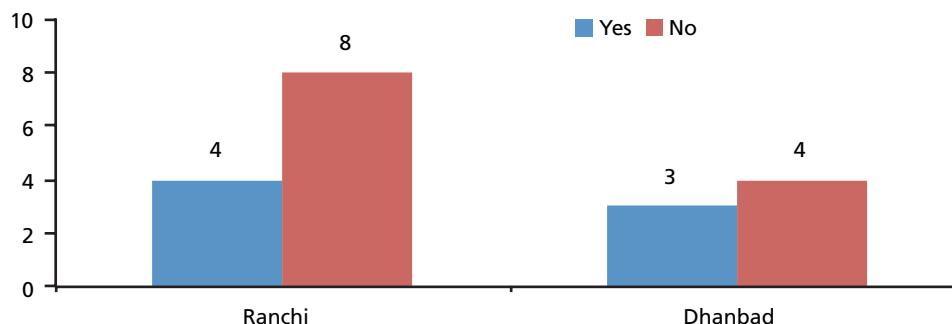
Once the necessary infrastructure for waste management is in place, ensuring that a system for effective waste management is in place is call of the hour. An effective system includes proper segregation as per colour-coding, labelling of waste filled bags, and maintenance of records on waste generation and handling by the healthcare facilities etc.

**Segregation:** Segregation of waste is the main pillar of effective implementation of biomedical waste management. *Figure 9* represents the variation in segregation practices in Ranchi and Dhanbad. Five out of 12 facilities in Ranchi are following waste segregation practices. In Dhanbad, the corresponding numbers are three out of seven.

It is interesting to note that even though the awareness level in terms of colour-coding for waste segregation is better in Ranchi compared to Dhanbad, the actual segregation practice is as poor in Ranchi as in Dhanbad. It can largely be attributed to the absence of any self-monitoring protocol by the healthcare facilities. This allows workers to escape from responsibly doing their job.

**Figure 9: Level of segregation**



**Figure 10: Maintenance of records**

**Labelling of bags:** Labelling of bags filled with waste is a necessary prerequisite for transportation within and outside healthcare facilities. The labelling must include information on the waste generator ward or sender's name, date of waste generation, category of waste and the quantum of waste the bag contains.

During the visit, it was found that none of the facilities follow proper labelling practices. This is not only a gross violation of the Rules, but it also paves the way for the waste generators to escape from responsibility for offences.

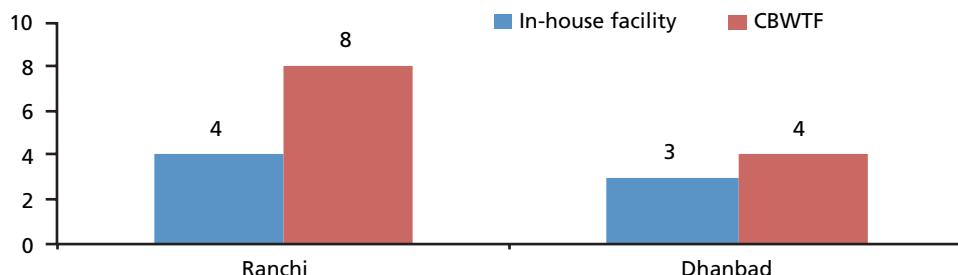
**Maintenance of records:** Every authorized person or healthcare facility is supposed to maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal, and any form of handling of biomedical waste in accordance with the Rules.

*Figure 10* shows that only four out of 12 facilities in Ranchi and three out of seven facilities in Dhanbad were maintaining records of daily waste generation. It was found that, only one government healthcare facility, Ranchi district hospital, maintained record of the daily waste generation. All the other healthcare facilities showed data shared by the CBWTF. None of them maintained their own register of waste generation.

**Treatment facility:** Once segregated, the waste from various healthcare facilities needs to be treated in-house or through the CBWTF.

*Figure 11* shows the treatment options chosen by various types of healthcare facilities in Ranchi and Dhanbad. Out of 12 facilities in Ranchi, four had in-house treatment facilities, whereas the rest had opted utilizing the services of the CBWTF. In case of Dhanbad, out of the seven visited facilities, three had in-house waste treatment and disposal. Six government healthcare facilities, including RIMS and community health centres, had their own in-house treatment provision whereas in case of private healthcare facilities, all the nine visited sent their waste to the CBWTF.

**Figure 11: Treatment options in two different districts**



It is to be noted here that none of the government facilities with in-house treatment provision had a good waste management system in place.

**Collection frequency of the CBWTF vehicle:** Jharkhand has one CBWTF, which is located in the Ramgarh district and where 12 out of the 19 healthcare facilities visited (in Ranchi and Dhanbad) sent their waste for treatment and disposal (see *Figure 11*). All the 12 healthcare facilities had mixed feelings when asked about the consistency with which the vehicles of the CBWTF collect waste.

None of the facilities tied up with the CBWTF reported daily collection. Three private facilities reported a collection frequency of 48 hours. Another three private facilities and one government facility reported a 72-hour collection frequency. Two private and one semi-government facility reported a collection frequency of twice a week. Waste in two of the facilities was only collected once a week. See *Figure 12*.

Out of the four healthcare facilities in Dhanbad which are tied up with the CBWTF, two reported waste collection at an interval of 72 hours, whereas two experienced waste collection twice a week, and once a single time every week. Eight facilities in Ranchi out of 12 visited sent their waste to the CBWTF. One reported collection of waste once in a week, whereas two facilities reported collection of waste twice a week. See *Figure 13*.

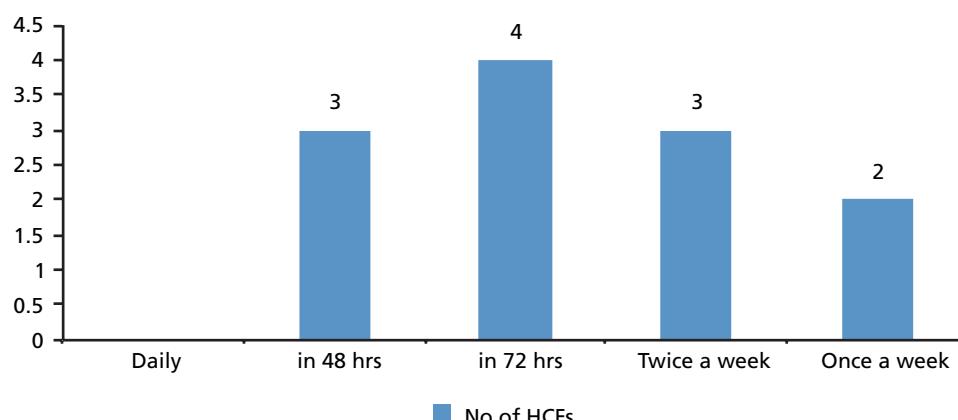
### e. Waste water management

In absence of sewage treatment plants in Ranchi and Dhanbad, it is necessary to have onsite treatment for sanitary (bathrooms, kitchen and other regular wash) and non-sanitary waste water (microbiology and pathology labs and waste water contaminated by any disinfectant or other chemicals) generated from any healthcare facility. Three of the facilities in Ranchi have installed sewage treatment plants, wherein they treat their waste water before discharging it into the public sewer. These were RIMS hospital, Ispat hospital and Medical Super Speciality Hospital. In Dhanbad, none of the visited facilities had installed any such plants.

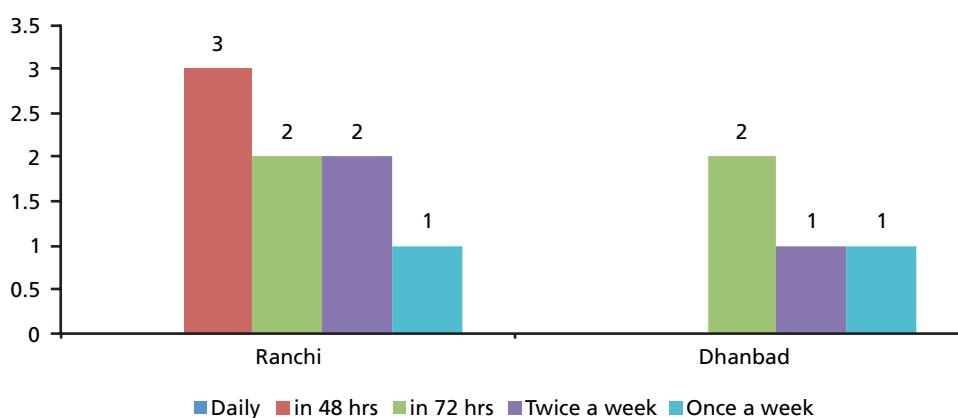
Talking about separate channelling of sanitary and non-sanitary waste water, none of the facilities had such provisions. The three facilities in

Ranchi with onsite sewage treatment plants were sending all their non-sanitary waste water into the plants. All other facilities did not even have an arrangement for chemical pre-treatment of toxic effluents generated in the laboratory and pathology sections. Nor had they plans to install such a facility in the near future.

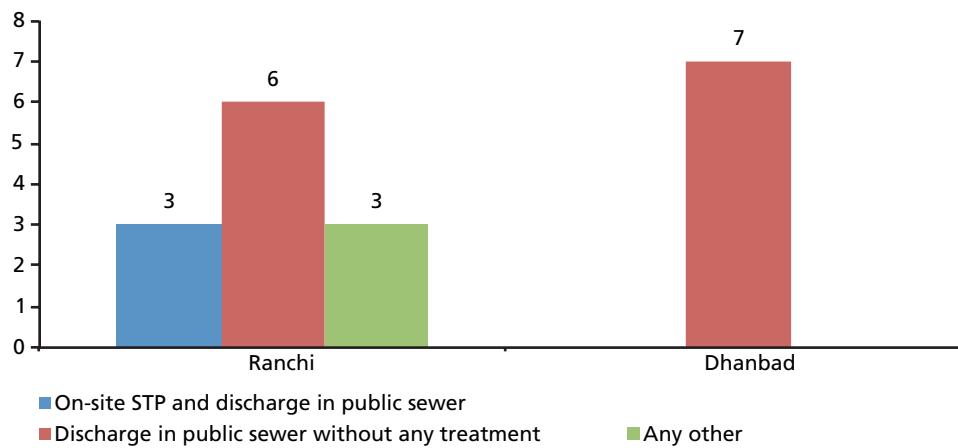
**Figure 12: Collection frequency of CBWTF vehicles**



**Figure 13: Variation in collection frequency by place of survey**



**Figure 14: Treatment and disposal of sanitary waste water in the two districts**



## **Maharashtra Pollution Control Board to survey hospitals for sewage treatment**

Last year, the Maharashtra Pollution Control Board (MPCB) decided to carry out a survey and prepare an inventory of all hospitals across Maharashtra to check if they have an effluent or sewage treatment plant (STP) on their premises. The inventory, officials said, would enable them to issue directives to defaulting hospitals to set up a STPs or effluent treatment plants in their premises.

It is important for hospitals to act as even their National Accreditation Board for Hospitals accreditation hinges on compliance with these Rules.

According to an officer of the MPCB, almost all big hospitals have an STP, but old hospitals in the corporation limit are connected to the civic sewer. These hospitals will be issued directions. In the absence of a treating facility, hospitals discharge their sewage directly into the municipal sewer. Simply put, the concern lies in the threat of infections spreading in the community and the population at large. Such disposal practices can breed drug resistance.

In a hospital, the volume of antibiotics used is high compared to, say, a residential building. The antibiotic consumed by patients is not completely inactive in their discharge that is flushed into the municipal sewer.

Besides, this discharge travels to the main sewer which could be around 5 to 10 km away, leading to the possibility of soil or even drinking water contamination if the sewer pipe leaks. The presence of this faecal flora in the soil can lead to drug-resistant bugs in the community.

Dr Vivek Desai, founder of Hosmac, a hospital consultancy, pegged the compliance to the STP rule to about 50 per cent. "Hospitals with more than 100 beds and those that came up in the last 10 years have an STP," he said, and pointed out for smaller units that work out of buildings, it would be a tall order.

The MPCB made STPs mandatory in 2012, but compliance was limited to new and big facilities. "The rule was there, but is being enforced with much vigour now," said the senior official of a private hospital. NABH officials said they seek the biomedical waste authorization certificate issued by state Pollution Control Boards while giving accreditation.

## **f. Occupational safety**

Healthcare sector is a major source of occupational health hazards, as defined by the International Labour Organization (ILO), as workers are susceptible to accidents involving dangerous biomedical waste. According to the Rules, ensuring occupational safety at healthcare facilities is the owner's responsibility.

Accident reporting is one such mechanism, and it has to be recorded by every healthcare facility.

Unlike the previous section, analysis of this section was done based on the type of healthcare facilities and not by district, as it was found from the data that the practice of ensuring occupational safety depended a lot on the former.

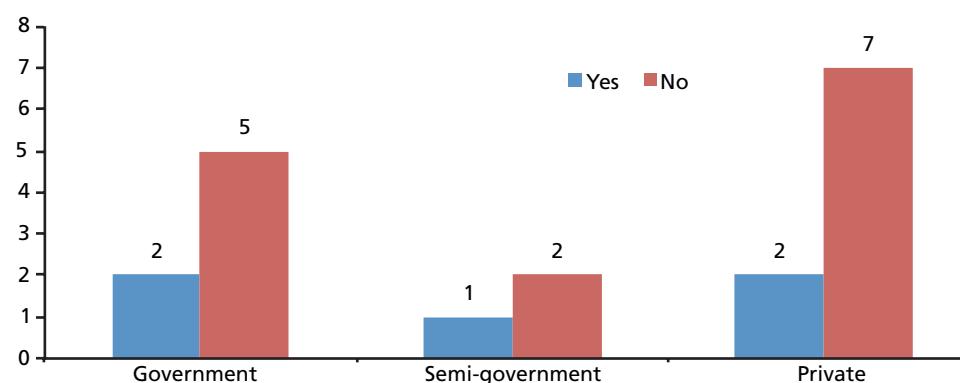
*Figure 15* shows that only two out of the seven government facilities and two out of the nine private healthcare facilities had an accident reporting system in place; in the case of semi-government setups one out of three facilities had such a system.

Needle stick injury (NSI) has been accepted by the American Nursing Council (ANC) as an occupational hazard that occurs from unsafe injection practices and data shows that documentation of each NSI is essential to address this issue, and to prevent the spread of Hepatitis B, HIV and similar infections. Therefore, data has been collected to check whether healthcare facilities follow the practice of maintaining a record on NSI.

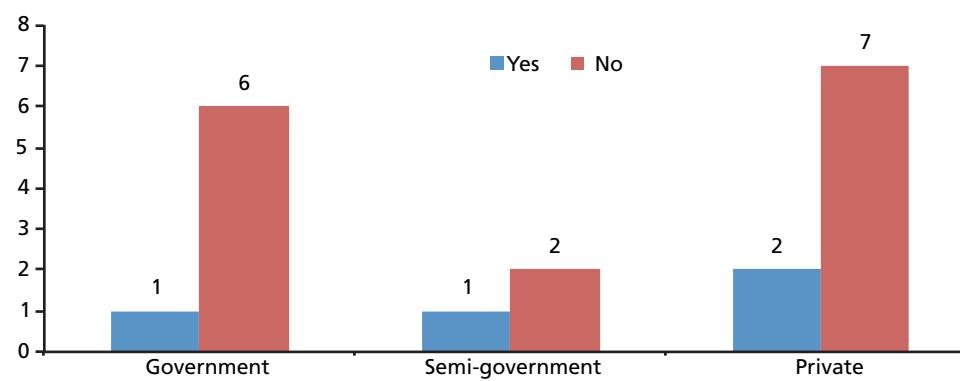
*Figure 16* shows that one out of seven government and two out of nine private healthcare setups were maintaining records of NSI. When an NSI occurs, they did source blood test and, if positive for Hepatitis B or HIV, they immediately started dosage of the post-exposure prophylaxis (PEP).

**Vaccination policy of healthcare facilities:** In order to adhere with the issue of NSI procedure, healthcare facilities are supposed to maintain a mandatory vaccination policy against Tetanus and Hepatitis B for their staff. Data has been collected on how many facilities are following this rule.

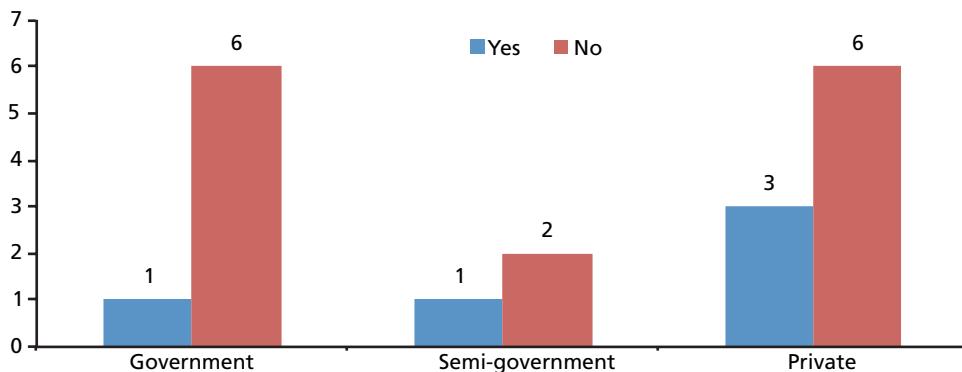
**Figure 15: Accident reporting system by type of healthcare facility**



**Figure 16: Maintenance of records on NSI in various type of healthcare facilities**



**Fig 17 - Vaccination policy at various type of healthcare facilities**



**Figure 18: Health check-up of workers in various type of healthcare facilities**

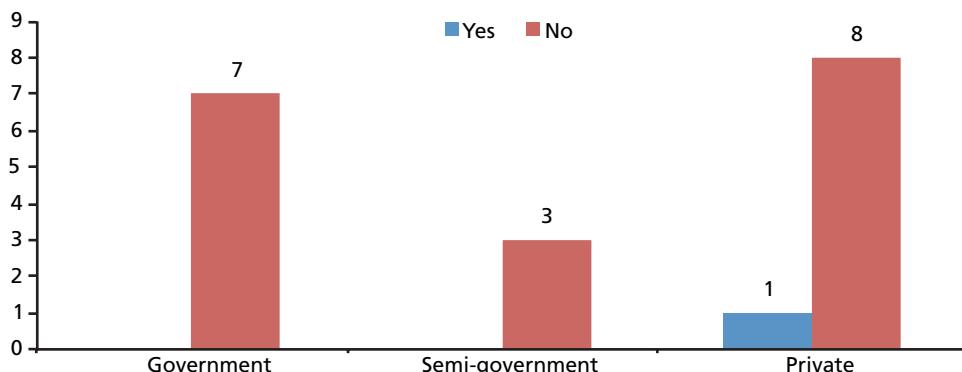


Figure 17 shows that one government facility out of seven had such system in place. In case of private healthcare facilities, three out of nine had such vaccination system in place for new staff. In case of semi-government healthcare facilities, one out of three facilities reported having such a system in place.

**Health check-up of workers by healthcare facilities:** Healthcare facilities have also to conduct regular health check-ups for their staff. Only one facility in the two districts—Shakti Nursing Home in Dhanbad—followed this guideline. See Figure 18. But when asked about the detailed parameters of their health check-up, the respondents were not able to give a proper answer.

### **g. E-waste disposal practice**

The survey also took into account the nature of e-waste disposal practices being followed by the healthcare facilities. It was found that none of the 19 facilities visited were aware of the categorization of e-waste and, as such, did not dispose them off separately. CFL and other mercury-containing lamps were also dumped with the general waste.

# 5. QUALITATIVE ANALYSIS

To complement the quantitative analysis, the survey also tried to arrive at some meaningful qualitative insights through interviews with relevant stakeholders like officials from the State Pollution Control Board (SPCB), State Department of Health, State chapter of NRHM and the city municipalities of both Ranchi and Dhanbad, local media persons, members of local NGOs and the local community at large.

**Absence of accurate data on healthcare facilities:** The first and foremost problem encountered during the visits was the absence of accurate data on the number of healthcare facilities existing in the state. Neither the SPCB nor the state health department kept a record of the number of healthcare facilities in the state.

**Common biomedical waste treatment facility (CBWTF):** A visit to the facility located at Ramgarh was attempted, but the owners denied permission to enter. However, the survey team could observe heaps of waste collected from various healthcare facilities in the premises. The chimney of the incinerator was also not emitting any smoke, thereby raising apprehension on its functionality. There were scattered biomedical waste dumps on the road leading to the facility, leading serious doubts about its compliance with the guidelines governing the operation of CBWTFs.

An interview with local resident and a media person further substantiated the assumption of irregularities in the operation of the CBWTF.

“The plant never runs the incinerators and dumps the placenta in the open, the drainage system is also not functional—all the liquid from the plant is discharged into nearby drain which joins river Damodar,” said Mr Sanjay Kumar Deogharia, a journalist who has been covering the issue.

According to the SPCB, three more CBWTFs are in the pipelines, for which land has been identified and a detailed project report is being prepared. However, all these facilities are awaiting environmental clearance which can be done only once the new State Environment Impact Assessment Authority (SEIAA) is constituted.

**Backdoor selling of infected plastic:** This is one of the significant areas of non-compliance with the Rules, as a majority of the hospitals reported selling infected plastic (without any on-site disinfection of these items) to the kabadiwalas (unauthorized plastic waste collectors) at an average price of Rs 15 per kg. Not only private healthcare facilities, but government ones too are indulging in this malpractice.

	
<b>Waste dumped at the CBWTF site, Ramgarh</b>	<b>Chimney of the incinerator at the CBWTF, Ramgarh</b>
	
<b>Entrance of the CBWTF</b>	<b>Inadequate boundary cover of CBWTF</b>

**Non-compliance with guidelines for immunization waste disposal:** As part of the survey, three community health centres were surveyed. According to CPCB guidelines on biomedical waste management generated during universal immunization programme, the plastic waste is to be carried back to the issuing centre, and then the plastic components are to be disinfected in the autoclave or through chemical disinfection procedure and then sent to an authorized recycler. The metal counterpart, i.e. the separated needles with hubs, has to be buried in sharp pits constructed within the premises of the biomedical facility.

It was found that the healthcare workers did not carry any of the 5,760 auto-disable syringes used per day back to the facilities. Instead, they were just dumped hither thither or sold to kabadiwalas, in gross violation of the Rules and guidelines.

In order to summarize the entire information gathered from the healthcare facilities, a matrix is presented in Table 2. The Table also explains the comparative compliance level of every healthcare facility (between 1998 and 2016 Rules).

**Table 2: Matrix showing level of compliance of the healthcare facilities**

	List of indicators																
	Biomedical Waste (Management and Handling) Rules, 1998													Biomedical waste management rules, 2016			
Name of the healthcare facility	Segregation as per colour-coding	Bags with biohazard marking	Bags labelled with data on waste	Waste transportation in closed containers	Separate route for transportation of waste	Interim waste storage area locked	Interim waste storage area roofed	Bio-hazard signage at interim storage area	Cemented floor & drainage outlet at interim waste storage area	Collection of waste by CBWTF vehicles within 48 hrs	Maintenance of own records	Phased out mercury	Presence of mercury spill clean up kit	Regular training of HCW on BMW	Immunisation of workers	Accident Reporting	Reporting of Needle Stick Injury (NSI)
Medica Super Speciality Hospital	✓	✓	x	✓	x	✓	✓	✓	✓	x	x	x	✓	✓	✓	✓	
Orchid Hospital	✓	✓	x	✓	x	✓	✓	✓	✓	x	x	✓	x	✓	✓	x	
Ranchi District hospital	✓	✓	✓	x	x	---	✓	---	---	x	✓	x	✓	✓	✓	x	
RIMS Hospital	x	x	x	x	x	✓	✓	✓	✓	NA	x	x	x	x	x	x	
KC Roy Memorial Hospital	✓	✓	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	
Om Nursing Home and Research Centre	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Lakshmi Nursing Home	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
HEC hospital	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Ispat Hospital, MECON Limited	✓	✓	x	✓	x	✓	✓	✓	✓	x	x	x	x	x	x	x	
Central hospital	✓	✓	x	✓	x	✓	✓	x	✓	NA	✓	x	x	✓	✓	x	
Jalan hospital	✓	✓	x	x	x	✓	x	x	x	✓	x	x	x	x	x	x	
Shakti Nursing Home	✓	✓	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	
Dhanbad Nursing Home	x	✓	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	
Patliputra Medical College Hospital (PMCH)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Patliputra Nursing Home	x	x	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	
CHC Namkum	✓	x	x	x	x	x	x	x	x	NA	x	x	x	x	x	x	
CHC Chanho	x	x	x	x	x	x	x	x	x	NA	x	x	x	x	x	x	
Mandar Referral Hospital	✓	x	x	x	x	x	x	x	x	NA	x	x	x	x	x	x	
CHC Govindpur	✓	✓	x	x	x	✓	x	✓	x	NA	x	x	x	x	x	x	

**Mixing infected and non-infected waste:** There is no proper segregation of infected and non-infected waste, and the two are dumped together in community dumping site. The ragpickers sorting the dumping site are often exposed to this mixed waste stream, increasing the chances of the spread of dangerous infections like Hepatitis B and C, and HIV.

**Lack of accountability in the SPCB:** The surveyed healthcare facilities complained about the occasional non-responsiveness of the SPCB in addressing problems related to the CBWTF. The SPCB lags behind in proper documentation on the total number of healthcare facilities that are currently operating in the state. Some SPCB officials also seemed unaware about certain aspects of the new Biomedical Waste Management Rules of 2016.

**Municipal solid waste:** Both Ranchi and Dhanbad do not have any treatment and disposal mechanism for the municipal solid waste. Neither do they follow any protocol for segregation source. Only collection is done, and then the waste is simply dumped in the locality or a larger dumping ground.

Plastic waste is collected by people who live in ghettos, who then send it to big merchants in Jharia.

There are plans to have a better waste management system in place in the future, but right now the situation is abysmal.

**Exploitation of natural resources:** All the surveyed healthcare facilities were dependent on groundwater for their requirements, resulting in an overdraft in the region. According to one source, a majority of them are struggling to get groundwater even at the depth of 700–800 ft, in comparison to a few years ago when the average depth was around 300 ft. Only four of the 19 facilities were planning to have a rainwater collection system in place.



Mixed waste dumped and burned on the roadside in Ranchi



A ragpicker with blood bags sorted from the municipal waste dump site in Dhanbad



Poster on mercury spill clean-up



BMW collection bins are used for water storage

In May 2016, the Jharkhand High Court directed the state government to equip all government buildings, residences, public sector establishments, and apartments having a surface area of more than 3,000 sq ft with rain water harvesting structures immediately; however none of visited facilities has any such structures.<sup>2</sup>

<sup>2</sup> <http://www.dailypioneer.com/state-editions/govt-buildings-must-harvest-rainwater-jharkhand-hc.html>, dated 19th May, 2016

# 6. STUDY LIMITATIONS

An important challenge faced during the survey was occasional non-cooperation of SPCB officials in issuing letters which would have helped in approaching a larger number of healthcare facilities. Although the request was made at short notice, in the absence of any such official authorization letter, it took the surveyor longer to convince each and every individual healthcare facility to get provide data.

	
Incineration ash dumping pit at RIMS, Ranchi	Open burning of waste at HEC Hospital, Ranchi
	
Waste dumping alongside the road	Waste stored in non-specified colour coded bags in RIMS, Ranchi

# 7. THE WAY FORWARD

## **Role of the SPCB**

- Inventorization of the total number of healthcare facilities and the amount of waste generated is a big grey area that needs to be addressed, as without proper inventorization, it is difficult to create the most relevant design for the new CBWTFs, or to decide how many are needed.
- Training and awareness programmes for healthcare personnel need to be organized, as do similar programmes for other stakeholders.
- Legal action against defaulting healthcare facilities and the ill-operated CBWTFs needed.

## **Role of the health department**

- Has to clarify the exact number of healthcare facilities in Jharkhand which are registered under the Clinical Establishment Act, 2010, so that the actual amount of waste generation across the state can be estimated.
- None of the visited government healthcare facilities reported any awareness on mercury toxicity, nor were they financially capable enough of phasing-out mercury-based thermometers, sphygmomanometers and dental amalgam. The department need to look into the preparedness to comply with guidelines on mercury phase-out.
- Has to ensure funding allocation through central funding from NRHM. Under NRHM, budget is allocated for biomedical waste management under the heads of (a) consumable purchase, (b) training of healthcare workers on biomedical waste management and handling, and (c) payment to CBWTF operators for treating their biomedical waste. This money is granted to the state health department once they submit project implementation plans to the NRHM.

## **Role of healthcare facilities**

- Coming up with a self-regulatory mechanism for monitoring and implementation of waste management.
- Regular and ongoing training and capacity building of healthcare workers on biomedical waste management and handling.



**C**entre for Science and Environment is a public-interest research and advocacy organisation, which promotes environmentally sound and equitable development strategies. The Centre's work over the past 33 years has led it to believe and argue, both nationally and internationally, that participation, equity and community-based natural-resource management systems alone will lead the nations of the world towards durable peace and development.

As a public interest organisation, the Centre supports and organises information flow so that the better organised sections of the world get to hear the problems and perspectives of the less organised. Environmental issues are seen in an anthropocentric perspective that seeks to bring about changes in the behaviour of human societies through appropriate governance systems, human-nature interactions, and the use of science and technology.

Though the public awareness programmes of the Centre have been its key strength and focus of work, it has endeavoured to move into associated areas like policy research and advocacy. Learning from the people and innovations of the committed has helped the Centre spread the message regarding environment without its normal association with doom and gloom. Rather, the effort of the Centre is to constantly search for people-based solutions and create a climate of hope.

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