

Report on Bio-medical Waste Management in Hospitals and Path Labs located in NDMC Area

(Original application No. 199 of 2014 in the matter of Almitra H. Patel Vs UOI and application no. 281 of 2016 in the matter of Kudrat Sandhu Vs Govt. of NCT of Delhi & Govt. of India)

Consequent to the directions of Hon'ble NGT vide its order dated 10.01.20107 and 11.01.2017 in the original Application No 199 of 2014 in the matter Almitra H. Patel vs Union of India and Application No. 281 of 2016 in the matter of Kudrat Sandhu vs Govt. of NCT of Delhi, the Government of India, Ministry of Environment, Forests and Climate Change (MoEFCC) constituted 4 Sub-committees on 23.01.2017 to visit various locations in NCT of Delhi where the mass generators of wastes are located and submit report to the Ministry. These sub-committees would be entitled to direct assistance of participation of any of the Public Authorities, Corporations, Local Authority, DDA, or any other Government and semi-Government wherever they require participation of any officer of Governments or Authorities. The Sub-committee-1 constituted for New Delhi Municipal Council (NDMC) has been given mandate to inspect the following locations in NDMC area:

- All four and five star hotels.
- All hospitals which are more than 200 beds whether private or Government.
- The cooperative group housing society having more than 300 flats, markets,
- Shopping malls having built-up area of more than 50, 000 sq.mts.,
- College having hostel and accommodating more than 500 students and
- Such other places in NDMC area of NCT of Delhi.
- Path Labs.
- Central Government Residential colonies

The following report covers exclusively Bio-Medical Waste Management (BMWM) in hospitals, Path Labs and treatment, by authorized agent.

1. Lady Harding Medical College (LHMC) and Associated Hospitals

1.1. Date of Visit: 10 .02.2017, 08.03.2017 and 22.03.2017

1.2. General Information

The hospital is a large scale government hospital with 1252 beds and provides access to affordable health care in Delhi. The bed occupancy rate is 100% and 70% for Kalawati Saran Children's Hospital (KSCH) and Sucheta Kriplani Hospital (SKH) respectively.

1.3. Observations

1.3.1 Quantum of waste generated

(i) Biomedical waste: Average Bio-Medical Waste generated at LHMC is about 545 kgs/day. The category wise waste generated is as below:

Waste Category	Quantity generated in Kg per day
BMW	
Yellow	200.66
Red	285.36
Blue	-
White	60.6
Hospital Hazardous waste	Information not available

(ii) Details about quantum of municipal solid waste generated is not available.

(iii) Quantum of hospital hazardous waste.

At LHMC mercury has been completely phased out and estimates of nuclear compounds are not available separately. Long half life nuclear compounds are not used in the hospital. Estimates of waste such as Lead batteries, e waste are also not available separately.

(iv) Waste generated in path labs - Not available separately

1.3.2 Method of processing of waste

Waste is transported at 8:00 am (after the night shift during which maximum waste is generated) to the isolated Bio-Medical Waste store room in covered trolleys with bio-hazard mark. Collection from, isolated storage site and final disposal is outsourced to M/s Biotic waste solutions Pvt Ltd. The waste is collected by covered and partitioned lorries of the outsourced agency at 11:00 am every day (including Sundays).

1.3.3 Observations during inspection

During first day of visit in LHMC (Kalawati H) laundry was found closed and solid waste was observed in front of laundry. ETP installed for laundry was partially functioning. No log book was maintained for ETP for the dosing of chemicals etc. During inspection it was also observed that Rain Water Harvesting System (RWHS) Pit was fully filled with water, which was observed stagnated and in septic condition.

As reported there are total 24 Pits for RWHS and maintenance of all required since long. During second visit of the hospital laundry was visited and observed there was huge water spillage also and there was no boiler. All the infected/ used clothes are washed in cold water. Height of Chimney provided in the kitchen was not adequate and Oil & grease Trap (OGT) was also not provided in kitchen.



Condition of Rain Water Harvesting Pit and Laundry in LHMC

1.3.4. ETP in LHMC & Associated Hospitals.

ETP is installed for laundry effluent at LHMC but not for entire hospital's effluent and was not appearing to be run properly. Samples were taken by DPCC/CPCB and results are given in Table-1. New ETP /Augmentation of existing one, is however, approved by LHMC under the Hospital Redevelopment Plan, which has been held up due to vendor issues and representations have been made in this regard to the concerned organisation.

1.3.5 Sewage connection of treated/untreated effluent

The hospitals do not have an independent system of STP but is connected to the General Sewerage system and as such they are not complying with the requirement of DPCC. However, as per Bio-Medical Waste Management Rules 2016, there is no such requirement of STP but Effluent Treatment Plant (ETP) has to be provided for treatment of emanating effluents. However, as per the decision taken by the DPCC, it is mandatory for the hospitals with bed capacity of more than 50 to install wastewater treatment system so as to treat the entire wastewater generated for reuse of the treated wastewater. This is done looking at the scarce water resources in the country especially in NCT of Delhi.

1.3.6 Path labs and infection prevention and control

- (i) LHMC & Associated Hospitals have separate biochemistry laboratory for Sucheta Kriplani Hospital and Kalawati Saran's Children hospital. Pathological and microbiological samples are sent to respective pathology and microbiology department. Pathology department has various laboratories like histopathology, haematology, cytology, immunology, autopsy and grossing room. Microbiology department has various laboratories such as Bacteriology, Mycology, Serology, Tuberculosis laboratory, Parasitology, HIV laboratory, Media preparation and autoclaving room.

(ii) The labs visited were pathology (Immunology lab and histopathology lab), microbiology (Bacteriology lab) in LHMC (including Sucheta Kriplani) and Emergency lab (biochemistry largely) and microbiology (basic tests). Culture is only done in the main microbiology lab of LHMC. Following observation was made;

- Waste segregation was observed to be satisfactory as per schedule. However, blue bins (as per Bio-Medical Waste Management Rules, 1998) are still in use. Process for procurement of red bins is underway.
- All vacuutainers are collected in red bags and handed over to common biomedical waste treatment facility for autoclaving.
- The disposable culture plates are autoclaved in the department and then sent in yellow bags.
- Infected liquid waste is first decontaminated with 1% sodium hypochlorite solution and then diluted and discharged in the drain
- All the plastic items such as pipette, tips, plates, vials, gloves, etc are discarded in red bags.
- The reusable glass items are first disinfected in 1% hypochlorite solution then washed thoroughly in potassium dichromate solution and then sterilized for reuse.
- Discharge from automated equipments are disinfected with 1% hypochlorite solution.
- It was also reported that the pH of the effluent from automated equipments is tested and neutralisation is done according to need before effluent is discarded into the drain. Also the hospital effluent is tested periodically through CPCB/ DPCC authorised laboratory to check whether it meets effluent standards.
- Three new autoclaves have been procured in the last one month of which one will be used exclusively for Bio-Medical Waste.
- All recyclable waste is handed over to the outsourced agency M/s Biotic Waste Solutions Pvt. Ltd. (Bio-Medical Waste Management) which has the responsibility of shredding/ mutilating and autoclaving.
- Blue and Red bins are required to be procured urgently.

iii) **Infection prevention and control** The factors responsible for hospital acquired infections (HAI) are related to the condition of patients, duration of hospital stay, invasive procedures (catheterization, ventilation, IV central line, surgery) and improper infection control practices. To prevent hospital acquired infections there is an Infection Control Committee and an Infection Control Team in the hospital. The hospital has an Antibiotic policy and draft Guidelines for Infection Control Practices has been developed. The steps taken to prevent HAI are as under;

- Surveillance of Hospital Acquired Infections (HAI) is undertaken in all high risk areas like Gynae (post op), Surgical ICU, Medical ICU, Nursery, Neo-natal ward, Paediatric ICU and HAI rates are in range of 2 to 10% mostly.
- Monitoring of air bacterial counts in OTs is done routinely and environment sampling from high suspicion areas is undertaken.
- Water culture from various areas on rotation basis.


- Monitoring sterilization procedures, sterility testing of IV fluids and blood bags is done routinely.
- Hep B vaccination is available in the hospital and is administered to all staff on voluntary basis and needle stick injury PEP (Post Exposure Prophylaxis) is also available round the clock based on evaluation.
- For Hand hygiene alcohol hand rubs are available at all nursing stations, labs, OTs, OPDs and other areas where necessary.
- Training of health care workers is conducted on infection prevention regularly. Training on bio-medical waste is mandatory within one month of joining for all staff and residents and is condition for release of first salary.

1.4 Specific Observations

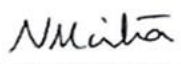
Pre-treatment is being undertaken at LHMC; One autoclave is present in microbiology lab which is being used to disinfect, infectious waste generated in the lab including waste from Blood Bank. The hospital is under process of procuring additional autoclaves. Category red (recyclables) is not being autoclaved before handed over to recyclers, if it is not infected.


Chemical treatment is reportedly undertaken with 1% hypochlorite solution for liquid waste generated such as blood & body fluids before discharge into general sewer line at LHMC. DPCC took the effluent samples from ETP and analysis report is given in Table- 1. It may be seen from the Table-1 that all the parameters are not meeting the prescribed standards. BOD should be 30 mg/l but found 42 mg/l. Bio-assay test was found to be 40% as against the required survival rate of 90-100%

Table 1: Effluent analysis report of Lady Harding Medical College. Effluent sample is exceeding the prescribed standard specially in 2 parameters i.e. BOD and Bio-assay test.

	DELHI POLLUTION CONTROL COMMITTEE Water Laboratory 5 th Floor I.S.B.T. Building, Kashmere Gate, Delhi-6 visit us at : http://dpec.delhigovt.nic.in			
Result No.:- DPCC/W/Misc./17-18/04 / 345 Dated: - 23/05/2017				
1. Name of Ind/Unit 2. Date of sampling 3. Sampling Location 4. Samples collected by 5. Control Measures (if any) 6. Nature of Sample 7. Nature of Industry 8. Analysis results	: M/s Lady Harding Medical College and SSK, SSK Site, Connaught Place, New Delhi- 01 : 12.05.17 : Inlet and Outlet of ETP : DPCC Lab : ETP : Grab : Hospital :			
S.No.	Parameters	ETP Inlet	ETP Outlet	Prescribed Standards
1.	pH	8.1	7.8	5.5-9
2.	Total suspended solid	152	44	50
3.	BOD (3 days at 27 ^o C)	75	42	30
4.	Oil and Grease	10.8	1.6	10
5.	COD	220	140	250
6.	TDS	1300	1210	-
7.	Bio-assay test (percent survival of fish after 96 hours in 100 percent effluent)	0	40	90-100

All parameters are in mg/l except pH value.


 Dr. Nandita Moitra
 (Sr. Scientist)


 Arvind Kumar
 (Sr. Scientific Assistant)

Waste segregation in the hospital; The Common Bio-Medical Waste storage facility in LHMC was found to be in a dilapidated condition and needs improvement.

1.6 Suggestions

1. LHMC should accelerate the process of transition from the old rules to the Bio-Medical Waste Management Rules, 2016
2. LHMC to upgrade its isolated Bio-Medical Waste storage facility by undertaking appropriate civil works to ensure adequate ventilation at the common storage facility.
3. To pursue for the construction of ETP at the earliest and ensure treatment of all effluent before discharging into general sewer at the earliest.

2. Dr. Ram Manohar Lohia (RML) Hospital

2.1 Date of Visit: 10.02.2017, 08.03.2017 and 22.03.2017

2.2 General Information

The specific bed strength of RML is 1420 and occupancy is often more than 100%.

2.3 Observations:

2.3.1 Quantum of waste generated

- (i) Biomedical waste: Average bio-medical waste generated at RML is 910 kgs/day. The category wise waste collected is as below:

Waste Category	Quantity generated in Kg per day
BMW	
Yellow	275
Red	475
Blue	100
White	50
Hospital Hazardous waste	Information not available

- (ii) Details about quantum of municipal solid waste generated is not available.
(iii) Quantum of hospital hazardous waste generated at RML; Mercury has been completely phased out, for medical purposes.
(iv) Details of quantum of waste generated in path labs is not available separately.

2.3.2 Method of processing of waste

The waste generated in the hospital is segregated as per Bio-Medical Waste Management Rules, 2016 at source in four colour categories. It is transported at 8:00 am to the common Bio-Medical Waste store room in covered trolleys with bio-hazard mark. Collection and final disposal is outsourced to M/s Biotic waste solutions Pvt. Ltd. The waste is collected by covered and partitioned lorries of the outsourced agency at 11:00 am every day.

2.3.3 Observation during inspection – Rain Water Harvesting System (RWHS) in RML was not found functional.



Waste discharged from kitchen in RML Hospital and boilers in laundry.

2.3.4 ETP/STP status in RML Hospital.

At present, there is no STP/ETP in RML hospital. The Central Public Works Department (CPWD) has the overall responsibility of STP/ETP construction. Samples were taken by DPCC/CPCB. The STP/ETP is under construction and the official timeline for completion was stated to be 30.06.2017 but it is likely to take more time.

2.3.5 Sewage connection of treated/untreated effluent

The hospital does not have an independent system of STP but is connected to the General Sewerage System.

2.3.6 Path labs and infection prevention and control

- (i) The labs visited were Nursing Home lab, Biochemistry lab (including hormone lab), Pathology (Fine Needle Aspiration Cytology (FNAC) lab and Haematology lab) and microbiology lab (Bacteriology) and blood bank.
- (ii) Waste segregation was observed to be satisfactory as per schedule Bio-Medical Waste Management, Rules, 2016. However, blue bins (as per Bio-Medical Waste Management Rules, 1998) are still in use. Process for procurement of red bins is underway and as such this requirement has not yet been complied with as per Bio-Medical Waste Management Rules, 2016.
- (iii) The labs are using advanced fully automated analysers. Some of these analysers are loop closed based on systems which have provision for diluents and blood to be treated with hypochlorite before effluent is discharged. In other kind of diagnostic machine, used for different pathology

tests, the hypochlorite solution is added to the effluent collection container before being discharged.

- (iv) In microbiology lab, culture plates and all infected material is autoclaved before discarding into yellow bags.
- (v) The blood bank has provision for separate autoclave for disinfecting Transfusion Transmitted Infection (TTI) positive and expired blood. Hospital is also in the process of purchasing Programmable Autoclaves as per requirements of revised rules which will take some time. On a trial basis the possibility of using vertical autoclave for disinfection purpose is being explored.
- (vi) Infection prevention and control: Chances of acquiring infection in the hospital are highest in OTs and ICUs. These infections are blood stream infection, urinary tract infection, pneumonia and surgical site infections.
- (vii) There is multidisciplinary Infection Control Committee and an Infection Control Team in the hospital. The hospital also has an Infection Control Policy (2016).

Steps taken to prevent Hospital Acquired Infection are:


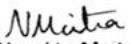
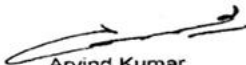
- Surveillance of Hospital Acquired Infections (HAI) is undertaken by point prevalence study. The report of point prevalence study performed in the month of December 2016 found HAI as 4.2%.
- Passive surveillance for outbreak in critical areas like ICU, burn ward by maintaining record of infection in these areas.
- Monitoring of air bacterial counts is done in OTs and cidex used for sterilization is monitored from all OTs, Burn wards ICUs etc every fortnight.
- Water culture from various areas on rotation basis.
- Weekly testing of biological controls of all autoclaves.
- Maintaining sterilization practices in all OTs and carbolization.
- Hep B vaccination is available in the hospital and is administered to all staff on voluntary basis and needle stick Post Exposure Prophylaxis (PEP) is also available round the clock based on evaluation.
- For Hand hygiene alcohol hand rubs are available at all nursing stations, labs, OTs, OPDs and other areas where necessary.
- Training of health care workers is conducted on infection prevention regularly. Training on bio-medical waste is mandatory for all staff and residents.
- Hospital staff engaged in implementing Bio-Medical Waste Management Rules are not given the first monthly salaries after joining till they undergo training in the field of Bio-Medical Waste Management.

2.4 Specific Observations:

Pre-treatment is being undertaken at the facility. All infectious lab solid waste is being pre-treated by autoclaving. Two (capacity approx 200 lit) autoclaves are present and autoclaving undertaken in microbiology lab and Blood Bank for infectious waste. The hospital is in the process of procuring additional autoclaves.

At present, no STP/ETP has been installed and as such untreated effluent is going in Sewer lines. DPCC took the effluent samples and analysis report is given in Table-2. Effluent is not meeting the prescribed standards for BOD and Bio-assay test as may be seen from Table-2. BOD should be 30 mg/l but was found to be 82,165, 110 mg/l at discharge gate no. 1, gate no.5 and by-pass G point respectively. Similarly, COD levels were found 228, 508 and 340 mg/l at gate no.1, gate no.5 and By pass G point respectively as against the standard of 250 mg/l. Bio-assay test was found to be in compliance with the norm laid down.

Table-2: Effluent Analysis Report of RML Hospital

		DELHI POLLUTION CONTROL COMMITTEE Water Laboratory 5 th Floor I.S.B.T. Building, Kashmere Gate, Delhi-6 visit us at : http://dpcc.delhigovt.nic.in			
ANALYSIS REPORT					
Result No.:- DPCC/W/Misc./17-18/08/362			Dated: - 29/05/2017		
1. Name of Ind/Unit	:	M/s R.M.L Hospital, Baba Kharak Singh Marg, C.P. New Delhi- 110001			
2. Date of sampling	:	18.05.17			
3. Sampling Location	:	Bypass of unit			
4. Samples collected by	:	DPCC Lab			
5. Control Measures (if any)	:	STP			
6. Nature of Sample	:	Grab			
7. Nature of Industry	:	Hospital			
8. Analysis results	:				
S.No.	Parameters	Bypass Gate-1	Bypass Gate-5	Bypass G-Point	Prescribed Standards
1.	pH	7.7	7.5	7.6	6.5-9
2.	Total suspended solid	212	220	244	100
3.	BOD (3 days at 27°C)	82	165	110	30
4.	Oil and Grease	15.6	16.0	16.4	10
5.	Bio-assay test (percent survival of fish after 96 hours in 100 percent effluent)	10	0	0	90-100
6.	COD	228	508	340	250
7.	TDS	1010	1090	1350	-
All parameters are in mg/l except pH value.					
 Dr. Nandita Moitra (Sr. Scientist)		 Arvind Kumar (Sr. Scientific Assistant)			

2.5 Waste segregation is quite satisfactory. Common Bio-Medical Waste Management storage facility exists with separate rooms for yellow and red category with ramp access.

2.6 Suggestions

- (i) Accelerate the process of transition and move towards Bio-Medical Waste Management, 2016 Rules.
- (ii) All laboratory waste at microbiology, pathology, biochemistry and blood bank (yellow category) to be completely pre-treated.
- (iii) To ensure timely completion of ETP Plant.

3. Primus Hospital, Chanakyapuri

Sub-committee 1 members visited Primus Hospital, Chanakya Puri on 24.03.2017 to inspect the path labs with regard to Bio-Medical Waste Management. It is a 130 bedded hospital with 65% occupancy. The daily OPD is 300 per day approximately. It is an NABH/QCI accredited hospital. The hospital has an NABH accredited lab since 2010. The accreditation is valid for three years. In Dec 2016 the NABH inspection was completed and closure report has been sent. Under NABH the hospital also undergoes surveillance after one and half years of accreditation. The hospital has biochemistry, pathology and microbiology laboratories and a blood bank. The main observations are given below:

Observations:

3.1 Biomedical waste

Waste was being segregated in the laboratories into four categories, however, some improvement is required as per Bio-Medical Waste Management Rules, 2016. **Average bio-medical waste generated at Primus Hospital is 118 kg/day.** The category wise waste collected is as below.

Waste Category	Quantity generated in Kg per day
BMW	
Yellow	35
Red	54
Blue	18
White	1.6

The data on Waste generated in pathological laboratory is not available separately.

3.2 Method of processing of waste

The Bio-medical waste generated in the hospital is collected in the common storage collection area in segregated colour coded rooms. However, ventilation in these rooms needs improvement.

3.3 ETP/STP status

Sewage Treatment Plant (STP) installed in the hospital was found functional and in proper working condition.

3.4 Sewage connection

All hospital effluent is subsequently discharged into the General Sewer System after treatment.

Effluent sample was collected and analyzed by DPCC from the outlet of STP and the analysis report is placed at Table-3. All the parameters were found well within the prescribed standards.


3.5 Hospital Acquired Infections (HAI)

It has a Hospital Infection Control Committee. For hand hygiene alcohol based hand rubs are available in nursing stations, patient bedside, common areas and OPDs. Week wise hand hygiene compliance in the month of Jan 2017 was reported in the range of 57-75%. All staff is vaccinated against Hep B and Tetanus (including safai karmcharis/ cleaning staff). Kitchen staff is vaccinated for typhoid.

The hospital has identified high risk procedure and high risk patients in which extra precautions are taken to prevent HAI such as regular daily mopping with bactericide is done and use of autoclaved bed sheets is also practised.

In 2016, three cases of HAI were reported. A detailed analysis was undertaken to find the root cause and remedial measures were taken.

Table-3: Effluent analysis report of Primus Hospital.

	DELHI POLLUTION CONTROL COMMITTEE Water Laboratory 5 th Floor I.S.B.T. Building, Kashmere Gate, Delhi-6 visit us at : http://dpcc.delhigovt.nic.in
Result No.:- DPCCW/Misc./17-18/03/344	
Dated: - 23/05/2017	
1. Name of Ind/Unit	: M/s Primus Hospital , Chanakyapuri, Chandra Gupta Marg, New Delhi-21
2. Date of sampling	: 12.05.17
3. Sampling Location	: Inlet and Outlet of STP
4. Samples collected by	: DPCC Lab
5. Control Measures (if any)	: STP
6. Nature of Sample	: Grab
7. Nature of Industry	: Hospital
8. Analysis results	:

S.No.	Parameters	STP Inlet	STP Outlet	Prescribed Standards
1.	pH	7.6	7.5	5.5-9
2.	Total suspended solid	108	24	50
3.	BOD (3 days at 27 ^o C)	65	20	30
4.	Oil and Grease	7.6	0.8	10
5.	COD	192	60	250
6.	TDS	1080	825	-
7.	Bio-assay test (percent survival of fish after 96 hours in 100 percent effluent)	0	100	90-100

All parameters are in mg/l except pH value.

451/00001
25-5-17

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3.6 Suggestions:

The segregated bio-medical waste from various wards hospital is stored at common storage site which needs improvement in terms of ventilation.

4. Palika Maternity Hospital

Palika Maternity Hospital, Lodhi Colony was visited on 13.04.2017 to inspect the pathological labs with regard to Bio-Medical Waste Management. It is a 60 bedded hospital with 70-80% occupancy. The hospital has one path labs in which routine Blood Tests, PAP Smears, FNAC, HIV testing and routine Bio-chemistry tests are undertaken. The main observations are given below:

4.1 Observations:

a. Biomedical waste

Waste segregation in the path lab was being done. Average bio-medical waste generated at Palika Maternity Hospital is 40 kgs/day. Pre-treatment of recyclables and infectious material needs improvement. The category wise waste collected is as given below:

Waste Category	Quantity generated in Kg per day
BMW	
Yellow	20
Red	10
Blue	10
White	

Separate information regarding waste generated exclusively by Path Lab is not available. There is a MoU with M/s Biotic waste solutions for transport, treatment and final disposal of Bio-Medical Waste Management. All bio-medical waste is handed over to this agency. It was observed that the storage room provided for different category of Bio-Medical Waste Management is not ventilated as per the requirement of Bio-Medical Waste Management Rules, 2016.


b. Method of processing of waste

The waste is collected in a common collection & storage area which requires improvement for ventilation as well as repairing of the door for red bag to prevent pilferage. However, during the second visit by the committee the door was found to be repaired but ventilation was yet to be done.

c. ETP/STP status

Effluent Treatment Plant (ETP) of 35 KL/D was installed in the hospital but same was found not in operational condition at the time of inspection on 26th July. It was reported that 5-10 KL/D effluent generated from the hospital is treated every day and is utilised for flushing in toilets and for horticultural purposes. The maintenance of this plant has been outsourced. Effluent sample was taken by DPCC and the analytical report is given in Table-4. It may be seen from this Table that BOD level was found to be 38 mg/l as against the prescribed standard of 30 mg/l and Bio-assay test was found to be 40% whereas the standard is 90-100%, indicating that the effluent is quite toxic in nature. Since treated effluent is said to be used for flushing of toilets, it must be made infection free by using disinfectants.

Table -4 Effluent Analysis of Palika Maternity Hospital.



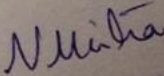
DELHI POLLUTION CONTROL COMMITTEE
 Water Laboratory
 5th Floor I.S.B.T. Building Kashmiri Gate Delhi-6
 visit us at : <http://dpcc.delhigovt.nic.in>

Result No.:- DPCCW/Misc./17-18/130/755 Dated: - 01/08/2017

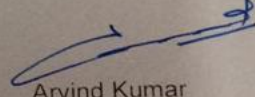
1. Name of Ind/Unit : M/s Palika Maternity Hospital, Lodhi Colony, New Delhi- 110003
2. Date of sampling : 26.07.17
3. Sampling Location : Inlet and Outlet of ETP
4. Samples collected by : DPCC Lab
5. Control Measures (if any) : ETP
6. Nature of Sample : Grab
7. Nature of Industry : Hospital
8. Analysis results :

S.No.	Parameters	ETP Inlet	ETP Outlet	Prescribed Standards
1.	pH	7.4	8.0	6.5-9
2.	Total suspended solid	112	46	100
3.	BOD (3 days at 27°C)	95	38	30
4.	Oil and Grease	7.6	0.8	10
5.	Bio-assay test (percent survival of fish after 96 hours in 100 percent effluent)	0	40	90-100
6.	COD	284	120	250
7.	TDS	272	256	-
8.	MLSS	110		-

All parameters are in mg/l except pH value.



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Further it was informed that about 1 Kg. of sludge is generated from ETP and is used as manure which is not advisable as this sludge is categorised as hazardous waste and should be disposed of to TSDF in consultation with DPCC. It is understood that DPCC has so far not approved even a single TSDF in Delhi. As a result ETP sludge generated from various ETPs along with hazardous waste generated from industrial units located in Delhi is just stored or scattered. DPCC must initiate necessary action to provide TSDF within the territory of Delhi or should make arrangements with the neighbouring states such as UP, Haryana, Rajasthan etc. for disposal of hazardous waste generated and stored in Delhi.



Pictures indicate ETP and DG sets in Palika Maternity Hospital

d. Sewage connection

All hospital liquid waste is subsequently discharged into the General Sewer System of the local body.

e. Hospital acquired infection and prevention

A Hospital Infection Control Committee and a Hospital Infection Control Team were constituted a year back. It was informed that the hospital is preparing for NABH/QCI accreditation.

SOPs exist for infection prevention for OT, autoclaving, instruments, linen, labour room, OPD area, nursery and post natal ward. Some of the steps taken to prevent hospital acquired infections are pre-zoning (preparatory room) in OT, OT culture every six months, autoclaving of all hospital instruments every morning, cleaning of radiant warmers daily, Bio-Medical Waste Management and spill management as per hospital policy, hand hygiene and proper hand wash technique before any procedure, housekeeping procedures and training on Bio-Medical Waste Management. All technical staff handling Bio-Medical Waste receives Hep B vaccination and it was reported that the recruiting agency vaccinates safai karamcharis also. During inspection it was reported by the concerned Doctor dealing with HAI issues that quiet often surgical gloves are not available in the stock and as such patients are asked to procure it from out side. It was also reported that there is no practice of providing hand sanitizers in the wards. However, in the Operation Theatres, hand sanitizers are available for use by Doctors and Nurses.

The Report of the hospital includes 15 indicators which are calculated monthly. For the month of March 2017 the rate for Surgical Site Infection (SSI) was 1.1%, Respiratory Tract Infection was 0%, Urinary Tract Infection (UTI) was 0%.

f. Suggestions

- i. Effluent from auto analysers is pre-treated with 1% hypochlorite, but improvement in pre-treatment of recyclables is required. Training to staff w.r.t. Bio-Medical Waste Management Rules, 2016 is required.
- ii. Each of the compartments of store room of Bio-Medical Waste needs improvement in terms of ventilation.
- iii. Infection Prevention and Control: SOPs and Practices for small scale Healthcare facilities were started a year back. On the ground some of the practices are operational while others like water sampling (roster based), OT air culture, surface swab culture (roster based), disinfectant analysis, culture based surveillance to be institutionalised over the time.

5. Charak Palika Hospital

Sub-committee 1 members visited Charak Palika Hospital on 21.03.2017 to inspect the path labs with regards to biomedical waste management. It is a 150 bedded hospital with 75% occupancy. The average OPD is 2100 patients per day. The hospital has one path lab. Tests undertaken in the laboratory are

pertaining to Bio-chemistry, Complete Blood Counts (CBC), cytology and FNAC. The main observations are given below:

Observations:

i. Biomedical waste

Waste segregation in the pathology lab was found to be satisfactory. Average bio-medical waste generated at Charak Palika Hospital is 44.5 kgs/day. The category wise waste generated is as below.

Waste Category generated	Quantity generated in Kg per day
BMW	
Yellow	8.5
Red	12.5
Blue	23.5
White	-

Waste generated in path laboratory is not available separately. There is a MoU with M/s Biotic Waste Solutions for transport and final disposal of BIO-MEDICAL WASTE MANAGEMENT. All bio-medical waste is handed over to this agency.

Hazardous waste: Cytotoxic drugs are returned to the manufacturers and hyposolution generated from X Ray is stored safely and subsequently disposed through registered recyclers

ii. Causes of Hospital infections and remedies for the same

OTs and wards are the main sites of Hospital Acquired Infection. To prevent hospital acquired infections there is one Hospital Infection Control Committee for all NDMC hospitals and a representative from Charak Palika Hospital is part of this committee. The representative from Charak Palika Hospital was in a meeting at the time of visit and could not be contacted. It was reported that hand hygiene practices are followed and all OPDs and nursing stations are provided with alcohol based hand rub. Spore test and strip test are done regularly to check sterilization. All technical staff of NDMC handling Bio-Medical Waste have been administered Hep B vaccination. However, there is no provision of vaccination for safai karamcharis. It was reported that the recruiting agency is supposed to vaccinate these workers but the same is not being practical being contractual labourers but NDMC must ensure that safai karamcharis are also vaccinated. HAI data was not available. There is no committee formed in this regard as well.

iii. Method of processing of waste

The waste generated in the lab is segregated as per Bio-Medical Waste Management Rules, 2016 and collected in an area outside the lab area from where it is transported to the common waste storage area for handing it over to the authorised agent.

iv. ETP/STP status

Effluent Treatment Plant (ETP) is installed in the hospital but was in non-operational condition at the time of inspection and as such untreated effluent was being discharged in sewer line. Even the operator of ETP was not available during the inspection.



Condition of defunct ETP in Charak Palika Hospital

V Sewage connection

All hospital waste is subsequently discharged into the General Sewer system.

vi. Suggestions:

Limited pre-treatment is being undertaken. All infectious lab waste including blood, ascitic fluid tap, urine etc is being pre-treated with 10% hypochlorite in the labs (1% in the wards). Blood bags are being pre-treated with 1% hypochlorite solution. Pre-treatment is not being undertaken by autoclaving.

The segregated bio-medical waste from the lab is put together with general waste, outside the lab in an area which is common passage for patients. This practice needs to be stopped to ensure that Bio-Medical Waste is stored in a separate well ventilated room for collection finally by authorised agent.

6. Northern Railway Central Hospital

Sub-committee 1 members visited Northern Railway Central Hospital (NRCH) on 18.05.2017 to inspect the Pathology labs with regards to biomedical waste management. It is a 419 bedded hospital with 70-80% occupancy. The average OPD attendance is 1000-1500 per day. Inspection of Casualty, ICU, Pediatric Ward, Pathology Department, kitchen and laundry was carried out to evaluate biomedical waste management facilities.

NRCH has a Bio-Medical Waste Management Cell which oversees day to day activities and comprises of one Senior Administrative Grade In-charge, one Nodal Officer In-charge and two Chief Health Inspectors.

Biomedical Waste Management Committee has been constituted to frame policy guidelines regarding implementation of Bio-Medical Waste Management Rules 2016. The committee meets every six months and in the deliberations held in the meetings so far ground work for evolving a protocol has been laid. The main observations are given below:

Observations:

6.1 Quantum of waste generated

- **Biomedical waste:**

Average biomedical waste generated is 44.5 kg per day. The category wise waste collected is as below

BIO-MEDICAL WASTE MANAGEMENT Waste Category	Quantity generated in Kg per day
Yellow	8.5
Red	12.5
Blue	23.5
White	-

- **Municipal solid waste**

Data regarding quantum of municipal waste generated is not available.

- **Hospital hazardous waste**

Data regarding quantum of hospital hazardous waste generated is not available. Mercury containing equipments have been completely phased out in NRCH. Long half life nuclear compounds are not used in the hospital. Data regarding waste such as Lead batteries, e-waste, CFLs is not available separately.

- **Waste generated in path lab**

Data regarding quantum of waste generated in Path lab is not available separately.

6.2 Method of processing of waste

Waste generated in NRCH is segregated at source in four color categories as per Bio-Medical Waste Management Rules 2016 guidelines. The collection of waste from source is carried out by in-house staff in the morning in covered color-coded trolleys to the biomedical waste storage site. At present, services of M/s Biotic Waste Solutions Pvt. Ltd. have been engaged for transportation, treatment and disposal of biomedical waste generated at NRCH. However, as per allocated jurisdiction, M/s SMS Water Grace BMW Pvt. Ltd is the agency designated by DPCC for this area. Hence the next contract will be pursued with M/s SMS Water Grace Bio-Medical Waste Management Pvt. Ltd. Collection of biomedical waste from NRCH takes place every day around noon by covered trucks of M/s Biotic Waste Solutions Pvt. Ltd.

6.3 ETP/STP status in NRCH

Proposal for installation of ETP/STP in NRCH has been sanctioned by Railway Board. The process of floating the tender for installing ETP/STP is underway by the Engineering Department of Delhi Division of Northern Railway. Expected time of completion of the project is December 2017.

6.4 Sewage and effluent discharge

All hospital sewage and effluent are discharged into the municipal sewer system. In the absence of ETP/STP, at present the effluent generated is being discharged without treatment. However, with the proposed installation of STP/ETP this situation will soon get changed.

6.5 Pathology Laboratories

NRCH Pathology Department has different sections namely, OPD sample collection Lab, Haematology, Biochemistry, Microbiology, Immunology, Serology, Histopathology, Cytology, Clinical Pathology, Emergency Lab Services and Blood Bank.

Segregation of biomedical waste in the laboratories was being done quite satisfactorily and as per Bio-Medical Waste Management Rules, 2016. Posters and charts indicating color coded segregation were available in English as well as in Hindi to ensure that all categories of healthcare workers can follow them.

The Microbiology laboratory has an autoclave where culture plates, media and other equipment are autoclaved before disposal.

The hematology and biochemistry labs have fully automated analysers wherein primary sample tubes or test tubes/cups are used for sample testing. The glass tubes are pre-treated, cleaned, disinfected and re-used. Disposable tubes/sample cups/reaction cuvettes or reaction vessels after pre-treatment are disposed as per bio-medical waste guidelines. Waste fluid from these analysers are pre-treated and disposed as per bio medical waste guidelines.

Automated immunoassay analyser has disposable reaction cuvettes and after processing of sample, these are discarded in a Bio-medical waste disposal bag which

is a sealed bag and fitted within the equipment. This bag is disposed as per bio medical waste guidelines.

All disposable consumables and effluent generated in Laboratories are being treated with 1% Hypochlorite solution before disposal.


6.6 Prevention of Hospital infections

Bio-Medical Waste Management Cell and committee exist which meet every six months and ground work for evolving a protocol has been laid .Periodic training of all staff is being undertaken. The strategy has been to train all doctors and supervisory staff in first phase including contractual staff with the master trainers undertaking further trainings of the subordinate staff. Hospital infection control committee was constituted for the first time on 12th November 2013 and its meetings are held once in every quarter. Regular monitoring of hospital environment in areas like Operation theatres, ICUs, Nursery etc., is conducted by periodical swab cultures and exposure plate cultures. Hepatitis B vaccination programme has been proposed for various categories of staff depending on the reported status of vaccination, which is under process pending approval of the competent authority. It has been suggested by the inspection team that all hospital staff irrespective of their work status should be immunized for Hepatitis B infection. As part of surveillance program for HAI studies have been conducted for detection of hospital acquired infection, its type and identifying the cause for that. In March 2017 4.54% UTIs and 9% SSIs were reported while in April only 5% SSIs were reported.

6.7 Effluent Analysis Report

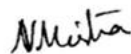
Sample of the effluent was collected and analyzed by DPCC. Since no ETP is installed in the Railway Hospital, all parameters were exceeding the prescribed standards as may be seen from Table-4. Hospital was discharging the effluent, in sewer line without any treatment except for Hypochlorite treatment of Laboratory waste. BOD level was found 160 mg/l as against the limit of 30 mg/l and bio-assay test indicated 0% as against the standing of 90-100% reflecting that effluent is very toxic.


Table- 4 Effluent Analysis Report of NRCH

	DELHI POLLUTION CONTROL COMMITTEE Water Laboratory 5 th Floor L.S.B.T. Building, Kashmere Gate, Delhi-6 visit us at : http://dpcc.delhigovt.nic.in
ANALYSIS REPORT	
Result No. :- DPCC/W/Misc./17-18/09/363	
Dated :- 29/05/2017	
1. Name of Ind/Unit	: M/s Northern Railway, Central Hospital, Basant Lane, C.P, New Delhi-110001
2. Date of sampling	: 18.05.17
3. Sampling Location	: Bypass of unit
4. Samples collected by	: DPCC Lab
5. Control Measures (if any)	: NIL
6. Nature of Sample	: Grab
7. Nature of Industry	: Hospital
8. Analysis results	:

S No.	Parameters	Bypass of Third Entry Near Mortuary	Bypass from Backside of Unit	Prescribed Standards
1.	pH	7.3	6.7	5.5-9
2.	Total suspended solid	252	236	50
3.	BOD (3 days at 27°C)	170	160	30
4.	Oil and Grease	15.6	14.8	10
6.	COD	572	468	-
7.	TDS	1370	1040	-
8.	Bio-assay test (percent survival of fish after 96 hours in 100 percent effluent)	0	0	90-100

All parameters are in mg/l except pH value.


Dr. Nandita Moitra
 (Sr. Scientist)


Arvind Kumar
 (Sr. Scientific Assistant)

6.8 Method of processing of waste

Bio- Medical waste is being collected by M/s Biotic Waste Solutions Pvt. Ltd. as per authorisation granted by DPCC

6.9 Sewage connection

All hospital waste is subsequently discharged into the General Sewer System of the local body.



Waste segregation in NRCH

7. **Hospital-acquired infections**”, are infections acquired during hospital care which is not present or incubating at admission. *Infections occurring more than 48 hours after admission are usually considered HAI.* These infections are opportunistic and microorganisms of low virulence can also cause disease in hospital patients whose immune mechanisms are impaired or weak.

According to WHO, 7% of hospitalized patients in developed countries and 10% in developing countries, at any given time, will acquire at least one health care-associated infection. WHO states that at any given time, the prevalence of health care-associated infection varies **between 5.7% and 19.1% in low and middle-income countries.**

The most frequent and important HAIs are:

- 1) Catheter associated urinary tract infection (CAUTI)
- 2) Surgical site infection (SSI)
- 3) Ventilator associated pneumonia (VAP)
- 4) Intravascular device or catheter related bloodstream infections (CRBSI).

The Intensive Care Units (ICUs) account for fewer than 10% of total beds in most hospitals. However, more than 20% of all HAI infections are acquired in ICUs.

7.1 Causes:

Many factors contribute to the frequency of HAI:

- Hospitalized patients are often immune compromised, they undergo invasive examinations and treatments, and patient care practices and the hospital environment may facilitate the transmission of microorganisms among patients.
- The selective pressure of intense antibiotic use promotes antibiotic resistance and further causes antibiotic resistant infections.
- Occurrence of HAI depends upon condition of patient, duration of hospital stay, invasive procedures (catheterization, ventilation, IV central line, surgery) and improper infection control practices.

7.2 Indian perspective:

Out of all the HAI, SSI and CRBSI are most common in India. The overall incidence rate of SSI varies from 2 to 21% as per recent reports the reasons for which was be as stated below:-

- Risk factors considered as predictors of SSI development
- Old age
- Obesity
- Hypertension
- Smoking
- Prolonged operative procedures
- Immunocompromized status and underlying illness
- Complex procedures
- Increased pre-operative stay
- Wound type (contaminated or dirty wounds)
- Inadequate preparation of skin

Over the last decade, CRBSI incidence in India has been varying from 0.2 to 27%, with a rate of 0.5 - 47 per 1000 catheter days. As with the global scenario, neonatal ICUs in India also have a higher CRBSI rate (27.02 per 1000 catheter days) when compared with other ICUs. The variability of CRBSI incidence is attributed to various risk factors like:

- Patient setting (e.g. ICU, hospital, or home),
- Length of hospitalization time,
- Insertion techniques,
- Long-term indwelling central venous catheter,
- Site of catheterization,
- Number of catheter lumens,
- Type of catheter used,
- Local and systemic antibiotic use,

- Type and frequency of dressing,
- Type of antiseptic solution use,
- Frequency of manipulation,
- Experience of the person in charge of catheter care,
- Duration of catheterization,

7.3 Prevention of HAI:

- Prevention is the cornerstone of hospital acquired infections. The control of risk factors can reduce the incidence of HAI by at least 40%. Because HAI are due to multiple factors and there is no simple strategy to prevent infection.
- Prevention and control programs based on the proven technology to prevent HAI have to be widely used.
- Risk prevention for patients and staff is a concern of everyone in the facility, and must be supported at the level of senior administration.

7.4 Some Prevention strategies

- A yearly work plan to assess and promote good health care, appropriate isolation, sterilization, and other practices, staff training, and epidemiological surveillance should be developed.
- Surveillance of HAI
- Meticulous and rapid Investigation of outbreaks
- Risk stratification, hand decontamination etc
- Environment - Cleaning practices, waste management, good house keeping and better work practices.

7.5 Status of HAI in the hospitals visited

- 7.5.1 At LHMC (Sucheta Kriplani Hospital included) surveillance for HAI is undertaken in all high risk areas like Gynae (post op), Surgical ICU, Medical ICU, Nursery, Neo-natal ward, Paediatric ICU and HAI rates are in range of 2 to 10%.
- 7.5.2 At Dr RML Hospital point prevalence study performed in the month of December 2016 found HAI at 4.2%.
- 7.5.3 At Primus Hospital in 2016, three cases of HAI were reported.
- 7.5.4 At Palika Maternity Hospital the Report of the hospital includes 15 indicators which are calculated monthly. For the month of March 2017 the rate for SSI was 1.1%, RTI was 0%, UTI was 0%. Annual figures are not available.
- 7.5.5 Data on HAI for Charak Palika Hospital was not available

7.6 Initiatives taken by MOH&FA DTE.GHS regarding BIO-MEDICAL WASTE MANAGEMENT Management

The revised Biomedical Waste Management Rules 2016 were reviewed by an expert Group, technically and for feasibility of implementation, under DteGHS and comments/ report have been conveyed to MoEF&CC and CPCB. Draft guidelines have been developed on biomedical waste management to facilitate implementation of the revised rules and training material is also being developed.

Measures are being undertaken to minimise Hospital Acquired Infection (HAI) under the National AMR policy and Plan. The national Patient safety Implementation Plan which is under development will also address the issues of HAI.

7.7 Actions initiated by MoHFW/ DTE.GHS

An expert group in Directorate General of Health Services, MoHFW reviewed the Bio-medical Waste Management Rules 2016 (Report of the expert group enclosed). Major issues that need to be amended in the new rules by MoEFCC are as follows;




- (i) Non availability of non chlorinated blood bags in India and also globally at present.
- (ii) Setting up of ETP in one year's time to be made desirable as it is not feasible for tertiary care hospitals and major stand alone laboratory in such short timeframe.
- (iii) Revision of sodium hypochlorite strength to 1% instead of 10% mentioned in the Bio-Medical Waste Management Rules 2016
- (iv) Draft guidelines have been developed on biomedical waste management to facilitate implementation of the revised rules and training material is also being developed.
- (v) Measures are being undertaken to minimise Hospital Acquired Infection (HAI) under the National AMR policy and Plan. The National Patient Safety Implementation Plan which is under development will also address the issues of HAI.

8. Lal Path Lab

National Research laboratory (NRL) of Lal Path in Rohini Delhi

Visit to this laboratory was made on June 29, 2017. There are 25 collection centres and 23 Lal Path labs as per the information provided by Lal Path Laboratories (para 8.1.2 & 8.1.3) None of the laboratories of Lal Path have got effluent treatment plant except at NRL located in Rohini. 60 KLD capacity STP/ETP has been provided at NRL. The effluent sample was collected by DPCC and was found to be slightly above (34 mg/l) the prescribed standard of 30 mg/l. Similarly, bioassay test was also not found meeting the standard as may be seen from the following Table-5


Table-5 Analysis report of Dr. Lal Path (NRL) at Rohini

DELHI POLLUTION CONTROL COMMITTEE				
 Water Laboratory 5 th Floor I.S.B.T. Building, Kashmere Gate, Delhi-6 visit us at : http://dpcc.delhigovt.nic.in				
ANALYSIS REPORT				
Result No.:- DPCCW/Misc.117-18/91/622			Dated: - 11/07/2017	
1. Name of Ind/Unit	:	M/s Dr. Lal Path Labs Pvt. Ltd., Block E, Sector-18, Rohini, New Delhi- 110085		
2. Date of sampling	:	30.06.17		
3. Sampling Location	:	Inlet and Outlet of ETP		
4. Samples collected by	:	DPCC Lab		
5. Control Measures (if any)	:	ETP		
6. Nature of Sample	:	Grab		
7. Nature of Industry	:	Pathology Lab		
8. Analysis results	:			
S No	Parameters	ETP Inlet	ETP Outlet	Prescribed Standards
1.	pH	4.7	7.4	6-8.5
2.	Total Suspended Solids	92	38	100
3.	BOD (3 days at 27°C)	125	34	30
4.	Oil and Grease	16.0	2.0	10
5.	Chromium (Hexavalent)	0.14	0.01	0.1
6.	Lead	0.55	0.02	0.1
7.	Phosphates (as P)	6.6	0.7	5
8.	Sulphide (as S)	1.1	0.7	2
9.	Bio-assay test (percent survival of fish after 96 hours in 100 percent effluent)	0	60	90-100
All parameters are in mg/l except pH value.				
 Dr. Nandita Moitra (Sr. Scientist)		 Arvind Kumar (Sr. Scientific Assistant)		

8.1 Visit to Lal Path Lab at Preet Vihar

Lal Path Lab at Preet Vihar is a sample collection and analysis centre without any Effluent Treatment Plant. The Effluent generated is treated with hypochlorite solution before discharging into a tank connected to sewerage system. Effluent analysis report indicates that BOD, Oil and grease as also Bio-assay test are not meeting the standards as may be seen from Table-6. Infact, the Bio-assay test indicates Zero survival rate indicating that Effluent is very toxic and is being discharged in sewer lines without any treatment which could be lethal to the micro organisms present in the sewage.

Table-6 Effluent analysis report of Dr. Lal Path Lab, Preet Vihar, Delhi.



DELHI POLLUTION CONTROL COMMITTEE
 Water Laboratory
 5th Floor I S B I Building, Kashmere Gate, Delhi-6
 Contact: <http://dpcw.delhi.gov.in>

ANALYSIS REPORT

Result No - DPCCW/Misc./17-18/ 89/598 Dated - 03/07/2017

1. Name of Ind/Unit M/s Dr. Lal Path Lab Diagnostic Centre, C-49, Main Vikas Marg, Preet Vihar, New Delhi- 110092

2. Date of sampling 20.06.17

3. Sampling Location Bypass of Unit

4. Samples collected by DPCC Lab

5. Control Measures (if any) NIL

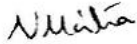
6. Nature of Sample Grab

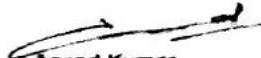
7. Nature of Industry Pathology Lab

8. Analysis results

S No.	Parameters	Bypass of Unit	Prescribed Standards
1.	pH	6.9	6-8.5
2.	Total Suspended Solids	136	100
3.	BOD (3 days at 27°C)	145	30
4.	Oil and Grease	13.2	10
5.	Chromium (Hexavalent)	0.06	0.1
6.	Lead	0.58	0.1
7.	Cyanide	ND	0.1
8.	Phenolics (as C ₆ H ₅ OH)	ND	1
9.	Phosphates (as P)	3.0	5
10.	Sulphide (as S)	1.5	2
11.	Bio-assay test (percent survival of fish after 96 hours in 100 percent effluent)	0	90-100

All parameters are in mg/l except pH value.


Dr. Nandita Moitra
 (Sr. Scientist)


Arvind Kumar
 (Sr. Scientific Assistant)

8.1.1 Observations made during site visit to Lal Path Lab, Preet Vihar Delhi.

Effluent was seen to have been treated in a crude way by hypochlorite solution before discharging in sewer line.



8.1.2 The details of Lal Path Labs in Delhi/NCR are given below

**Dr LAL PATHLABS
MONTHLY BIOMEDICAL WASTE REPORT LABS- DELHI / NCR**

S. No.	CODE	LAB NAME	RED BAG (KG)	YELLOW BAG (KG)	BLUE /WHITE (SHARPS)	TOTAL (KG)
1	S02	GURGAON	295	11	5.3	311.3
2	S03	PREET VIHAR	133.5	41.9	4.5	179.9
3	S04	SDA	60	10	9	79
4	S14	GHAZIABAD	137	12.1	13	162.1
5	S16	FARIDABAD	52	30	95	177
6	S60	NOIDA (SECTOR 18)	46.5	35.5	36.5	118.5
7	L28	GREATER NOIDA	20.5	7	2	29.5
8	L42	VASUNDHARA	106.6	1.6	42.4	150.6
9	S59	TILAK NAGAR	147.5	1.8	6	155.3
10	S44	NOIDA (SECTOR 50)	5	5.6	1.4	12
11	S71	INDIRAPURAM	8.66	15	0	23.66
12	S61	HANUMAN ROAD	60	11		71
13	S07	PUNJABI BAGH	8.7	3.3	1.3	13.3
14	S39	ASHOK VIHAR	21.1	2.5	1.2	24.8
15	S41	NEW FRIENDS COLONY	10.3	1.45	1.5	13.25
16	L05	DWARKA	26.66	3.57	0.4	30.63
17	L09	MAYUR VIHAR	4.1	3.1	0.4	7.6

18	S58	EAST OF KAILASH	5.4	3.6	1	10
19	S55	GURGAON-2	3	2.9	1.9	7.8
20	L60	YUSUF SARAI	10.6	1.5	1.1	13.2
21	L87	INDIRAPURAM - II (SAYA)	8.1	3.1	0.4	11.6
22	L75	DURGAPURI	11.5	9	1	21.5
23	L83	DWARKA - 2	18.2	5.2	23.4	46.8

8.1.3 Besides the above LaL Path Laboratories/ there are 25 company owned collection centers.

COMPANY OWNED COLLECTION CENTRES – DELHI / NCR

	Invoice Code	Name of PSC	Red bag (kg)	Yellow bag (kg)	Blue /white (sharps)	Total (kg)
1	C04626	VASANT KUNJ-PSC	1.42	2.47	1.85	5.74
2	C04624	SHALIMAR BAGH-PSC	1.55	3.225	2.012	6.787
3	C004261893	PSC ROHINI	0.155	0.325	1.89	2.37
4	C04622	SAPPHIRE-PSC	1.51	4.955	1.99	8.455
5	C04623	PSC-SHAKTI NGR	0.900	1.9	1.69	4.49
6	C04620	PSC-PATPARGANJ	0.565	5.865	1.98	8.41
7	C000240694	PSC-PATEL NAGAR	1.65	8.02	1.79	11.46
8	C04618	PSC-MUKHERJEE NGR.	2.012	2.27	2.1	6.382
9	C04603	PSC-DWARKA	0.955	12.5	2.01	15.465
10	C004268334	SMART PSC ROHINI (SECTOR 8)	1.12	18.85	1.93	21.9
11	C004265833	SMART PSC RAJOURI GARDEN	1.598	16.555	1.955	20.108
12	C004266921	SMART PSC PASCHIM VIHAR II	1.75	13.095	1.87	16.715
13	C004265447	SMART PSC KINGSWAY CAMP	1.97	7.294	1.03	10.294
14	C000240703	NOIDA-PSC	1.68	5.768	1.75	9.198
15	C04615	LAJPAT NAGAR-PSC	1.543	6.904	1.56	10.007
16	C04614	KRISHNA NAGAR-PSC	2.76	7.239	1.67	11.669
17	C004259925	KARNAL-PSC	0.955	2.764	1.43	5.149
18	C004265337	SMART KALKAJI-PSC	2.54	5.91	1.76	10.21
19	C004265445	SMART JANGPURA- PSC	1.69	5.86	1.56	9.11
20	C004610	JANAK PURI-PSC	3.96	4.123	1.76	9.843
21	C004266650	SMART JANAK PURI 2- PSC	0.900	6.7	1.69	9.29
22	C004256343	HISSAR-PSC	1.43	2.43	1.49	5.35
23	C04606	GREEN PARK-PSC	1.51	4.755	1.93	8.195
24	C04604	GALLERIA-PSC	4.54	9.91	2.007	16.457
25	C004265727	SMART FARIDABAD- PSC	1.43	3.43	1.44	6.3

BMW wastes are handed one to the authorized agent according to Lal Path lab management.

8.2 Other path labs in NDMC/Delhi

There are a number of path labs (other than Lal Path Labs) located in NDMC area/Delhi. Few important labs are as under as per the information available:

1. SRL Diagnostics (CLINIC DEE31)
 - (i) Plot no.A 18, Haus Khas, New Delhi, Delhi 110016
 - (ii) Shop No. 12 Udyan Road Opposite Central School Near RML Hospital, New Delhi, Delhi 110001
 - (iii) 149/1, Opp Max Hospital, Hauz Rani, Saket, New Delhi, Delhi 110017
 - (iv) .B-172, GALI D1, 60 FEET ROAD, AMBEDKAR COLONY CHATTARPUR, New Delhi, Delhi 110074
2. HOD Path Labs in Delhi
 - (i) 19/8 Kalkaji Extension, EPDP Road, Near State Bank of India, New Delhi, Delhi 110019
 - (ii) 50-1 Yusuf Sarai Market, Near Green Park Metro Station, New Delhi, Delhi 110016
 - (iii) D - 12D, D Block, Opposite Canara Bank Hauz Khas, New Delhi, Delhi 110016
3. Hind Labs, CGHS, Pandara Road, New Delhi with main lab at R.K. Puram, Sec-12, New Delhi.

According to DPCC, the details of other clinics, path labs, laboratories and blood banks located in NDMC area are given below:

List of HCU's in NDMC Area.

S.No.	HCU Name	HCU Address	Type	HCU Type	Current Status
1	Kaya Limited	FLAT NO-42, KHAN MARKET, NEW DELHI-110003	Fresh	Clinics, Pathological Laboratories and Blood Banks	Pending
2	ITC HOTEL MAURVA SHERATON & TOWERS	Diplomatic Enclave	Fresh	Clinics, Pathological Laboratories and Blood Banks	Authorized
3	DIWAN CHAND SATYAPAL AGGARWAL X-RAY CLINIC	10-B, K.G Marg	Renewal	Clinics, Pathological Laboratories and Blood Banks	Authorized
4	INDIAN RED CROSS SOCIETY BLOOD BANK	1, RED CROSS ROAD	Renewal	Clinics, Pathological Laboratories and Blood Banks	Authorized
5	Lal PathLabs(p) Ltd.	Eskay House, 54, Hanuman Road,	Renewal	Clinics, Pathological Laboratories and Blood Banks	Authorized
6	General Williams Masonic Polyclinic	Janpath	Renewal	Clinics, Pathological Laboratories and Blood Banks	Authorized
7	APOLLO WHITE DENTAL(A UNIT OF ALLIANCE DENTAL CARE LIMITED)	Gf-15-17, TOLSTOY HOUSE, TOLSTOY MARG, CONNAUGHT PLACE	Fresh	Clinics, Pathological Laboratories and Blood Banks	Authorized
8	Amn Health Ways Diagnostic (P) Ltd.	22, Khan Market, New Delhi	Renewal	Clinics, Pathological Laboratories and Blood Banks	Authorized

According to DPCC, there are a total of 8 path labs, clinics as indicated above, in NDMC area which are registered with DPCC. It is understood that none of the path labs/clinics have an independent ETP for treating their effluent emanating specially from Path Labs. These labs use hypochlorite treatment for disinfection. Samples of effluent taken from Lal Path labs indicate that their Preet Vihar Path Lab and NRL Rohini Lab's effluent are toxic in nature as reflected by Bio-Assay Tests and BOD analysis carried out by DPCC. Therefore, almost all the Path labs except Path lab of Primus Hospital, Chanakyapuri are not complying with the stipulated standards specially in terms of BOD and Bio-assay test. It is also observed that untreated effluent from path labs is being discharged into the sewerage system without having NOC from DPCC. Similarly, it is expected that other Path Labs (other than Lal Path Labs) located in NDMC Area are also not having any treatment facilities for the effluent being generated by them. As such, all Path Labs located in NDMC Area must install Effluent Treatment Plants (ETP) urgently as also take consent to establish and consent to operate from DPCC.

9. National Quality Assurance Standards for Public Health Facilities, 2016

National Quality Assurance Standards were launched by the Ministry of Health & Family Welfare, Government of India with the objective of improving Quality of services at Public Health Facilities, and also in Public Health Programmes. The Standards set optimal benchmarks in terms of Service Provision, Patients' Rights, Inputs, Clinical Care, Support Services, Infection Control, Quality Management and Outcome.

National Health Systems Resource Centre (NHSRC) has been entrusted to provide technical support to the Ministry and States/UTs for implementation of the standards.

In pursuit of achieving international recognition and meeting global benchmarks in Quality of care, these Standards (NQAS) were submitted to International Society for Quality in Healthcare for accreditation (ISQUA) under their International Accreditation Program.

After rigorous process of independent assessment by their international assessors, the ISQUA has awarded accreditation to National Quality Assurance Standards (NQAS) for Public Health Facilities. With this accreditation these standards (NQAS) have been included into elite list of standards, meeting the global benchmark. Public Health Facilities meeting these standards are now comparable with any other accredited healthcare facilities across the world.

This achievement will certainly provide boost to the Government's endeavour in improving quality of services at the Public Health facilities and also gives much deserved credibility. Accreditation award letter is displayed below:-



[National Quality Assurance Standards for Public Health Facilities 2016 Accreditation Award Letter](#)

10 Biotic Waste Solutions Pvt Ltd, 46-47, SSI Indl Area, Delhi-110033

Observations

The Unit is a Common Bio Medical Waste Treatment Facility (CBWTF) authorized by Delhi Pollution Control Committee for Collection, Transportation, Treatment, Storage and Disposal of Bio Medical Waste under Bio Medical Waste Management Rules 2016. Inspection of the unit was conducted on 13.02.2017 by the members of the Sub Committee-I consisting of officials of CPCB, DPCC, NDMC, DJB & MoUD. The authorization obtained from DPCC was valid upto 12.09.2015 and unit had applied for renewal of authorization on 19.08.2015. However, consent to operate of the unit is valid upto 20.08.2017. The waste collected by the unit from five districts of Delhi namely North, North-West, New Delhi, South and South-East. The unit is existing on a plot area of 2024 sqm. The Process followed by the unit and observations of the sub-committee are as under:

- The CBWTF has a total installed capacity of 34 tons/day to treat and dispose the bio medical waste. The unit has one Rotary Incinerator of 750 kg/hr and 2 standby incinerators of 250 kg/hr each to treat the Incinerable Waste collected by the unit. The Waste is unloaded in separate isolated waste storage areas for Incinerable Waste and Autoclavable Waste. The Waste is automatically fed into the Incinerators through conveyors and hydraulic feeding system. The Rotary incinerator is provided with Dry Air pollution Control System consisting of Bag Filter House. The finally cleaned gas was released into the atmosphere with the help of the stack having height of 30 meters. During the visit, the Rotary incinerator was found in operation and the temperatures observed in Primary chamber and Secondary chamber were 840-850 degrees and 1050-1080 degrees respectively.
- The CBWTF has installed two autoclaves with a capacity of 450 kg/batch and 250 kg/batch (Standby). The autoclavable waste is fed into the autoclave

through trolleys and the waste is being disinfected at specified temperature and pressure. During the inspection the autoclave was found in working condition.

- After disinfection, the waste is segregated properly and then shredded/mutilated through shredder of capacity of 350 kg/hr. After shredding/mutilation the waste scrap is being sent to authorized recyclers. The glass scrap is sent to M/s Goyal Glassware Pvt Ltd, 11, UPSIDC, Firozabad, UP and the Plastic scrap is sent to M/s Ploycraft Engineers, 27, Murthal Industrial Estate, Sonipat, Haryana.

10.1 The unit has installed the Effluent Treatment Plant (ETP) with a treatment capacity of 15 KLD and was found in working condition during the visit. The sludge generated from ETP reported to be 3-3.5 kg per day and at present was stored inside the premises in leak proof containers.

10.2 For collection and transportation of bio medical waste the unit has 28 number of vehicles. Vehicle container washing facility has been provided within the facility. All the vehicles are provide with GPS system. At present the bio-medical waste is collected from approximately 2200 health care units (Approx. 22000 beds) from five districts of Delhi and is treating approximately 13.5 Tons of Bio Medical Waste per day.

10.3 Sharp pit is provided in the premises. The syringes and needles after disinfection sent to metal melting furnace to M/s Duggar Fibre Pvt. Ltd located at C-10, SMA, Industrial Area, at GT Karnal Raod, Delhi 110033.

10.4 The unit is maintaining the logbooks w.r.t operation of different treatment equipments. The PPE's (Personal Protective Equipment) has been provided to staff engaged in handling of bio-medical waste at the facility.

10.5 Approximately 450-500 kg/day of ash from incineration is generated and sent to the nearby landfill.


10.6 The unit has installed a D.G Set of 82.5 KVA and has been provide with acoustic enclosure.

10.7 Routine check-up of the workers involved in the unit was being done for Hepatitis B and Tetanus on annual basis.

10.8 It was observed during the second inspection made on 24.05.2017 that Municipal Solid Waste was found to be burnt near to/ in front of this unit. Besides it was also seen that industrial waste was dumped in the open spaces near roads in front of this unit. On enquiry it was revealed by M/s Biotic Waste Solutions that the industrial waste dumped here and there was belonging to other industries located nearby. DPCC representative present during the inspection was advised to take appropriate action in this regard.

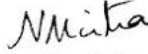
10.9 Samples taken from ETP of M/s Bio-tech solutions private limited indicate that BOD and Bio-assey test comply with the prescribed standards as may be seen from the following Table-7

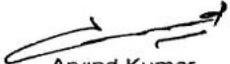
Table- 7 Effluent analysis report of Biotic Waste Solutions The analytical report as given indicates that basic parameters like BOD, COD and Bio-assay are well with in the prescribed standards

	DELHI POLLUTION CONTROL COMMITTEE Water Laboratory 5 th Floor I.S.B.T. Building, Kashmere Gate, Delhi-6 visit us at : http://dpec.delhigovt.nic.in
ANALYSIS REPORT	
Result No. :- DPCC/W/Misc./17-18/10/364	Dated: - 29/05/2017
1. Name of Ind/Unit	: M/s Biotic Waste Solution Pvt. Ltd., 46, SSI Ind. Area, G.T.K Road, Delhi- 110033
2. Date of sampling	: 19.05.17
3. Sampling Location	: Inlet and Outlet of ETP
4. Samples collected by	: DPCC Lab
5. Control Measures (if any)	: ETP
6. Nature of Sample	: Grab
7. Nature of Industry	: Bio Medical Waste (Management & Holding)
8. Analysis results	:

S No.	Parameters	ETP Inlet	ETP Outlet	Prescribed Standards
1.	pH	7.8	7.5	5.5-9
	Total suspended solid	132	28	50
3.	BOD (3 days at 27 ^o C)	160	24	30
4.	Oil and Grease	12.8	0.4	10
6.	COD	456	68	-
7.	TDS	2740	628	-
8.	Bio-assay test (percent survival of fish after 96 hours in 100 percent effluent)	0	90	90-100

All parameters are in mg/l except pH value.


 Dr. Nandita Moitra
 (Sr. Scientist)


 Arvind Kumar
 (Sr. Scientific Assistant)

11. Action taken by DPCC against the units found to have scattered waste outside their premises

As informed by DPCC, inspection of open land in SSI Industrial area was carried out by team of DPCC officials on 26.05.2017. Different industries are located around this piece of land. As enquired, earlier land was used for dumping of municipal waste. Industrial Association of the area has now started working for leveling of the garbage and directed their guard to take care that no further dumping of waste will be carried out. There are about 150 illegal jhuggies in a portion of the land (opposite to plot no 49 to 53 SSI). Solid waste and waste water of these Jhuggies are being discharge in this open land through the drain passing across the road & in front of these jhuggies. As observed, no industrial waste water of the nearby industries was being discharged in this open land and the drain is not connected with any sewer or storm water drain of the area. However, it is felt that DPCC should take further action and keep constant watch in this area to prevent any MSW or industrial waste burning or dumping including surface or ground water contamination.

12. Discussions

Based on the visits made to the various path labs including those of RML and Lady Harding Medical College and Hospitals including NDMC Hospitals, it was observed that RML Hospital and Lal Path Lab in Preet Vihar were not having ET Plants and as such were discharging their untreated effluent in to public sewerage system. Lal Path Lab located in Rohini, New Delhi was also visited by the committee members and it was observed that this facility is having status of National Referral Laboratory (NRL) and as such equipped with almost latest sophisticated equipment and instruments used for various path tests and other medical analysis required to facilitate diagnosis of various ailments/diseases. Sample collected from ET plant of 60 KLD capacity existing in NRL was analysed by DPCC. BOD level of 34 mg/l encountered as against limit of 30 mg/l and bio-assay test was found to have survival rate of 60% as against the requirement of 90-100%. Therefore, there is need to improve efficiency of the ETP of NRL.

We were informed by NRL that at present only 30 KLD effluent including sewage is generated from this facility and as such only 50% capacity of the ETP is being utilized. As it would be advisable to bring effluent generated from other Lal Path Labs to this facility for better utilization of the excess capacity of existing ETP of NRL, Rohini.

As far as the effluent generated from Lady Harding Medical College (LHMC) and associated hospitals, the effluent generated is treated in the ETP plant provided the samples, were also taken and analysed by DPCC. This ETP also received effluent generated from laundry but the analysis of the effluent reveals that the BOD and Bio-assay test have not complied with the prescribed standards. It was also reported that entire effluent generated from LHMC and its associated hospitals are not connected to ETP and as such are discharged to sewer lines without treatment.

Visit made to NDMC hospital, namely Charak Palika Hospital indicated that even though ETP was existing but was not found in operation and the effluent generated was being by-passed to the drain/sewer system directly without any treatment.

Similarly, Palika Maternity Hospital of NDMC was having ETP but the same was also not being operated properly and the analysis of effluent indicated that it is not meeting the prescribed standards in terms of BOD and Bio-assay test.

The committee members visited the NRCH and found that there was no ETP provided so far but recent initiatives included inviting of tenders for installation of STP/ETP.

HAI Cases in all the hospitals were found well without the WHO guidelines and were below 10% as required for developing countries.

Biotic Waste Solutions Pvt. Ltd. is storing their hazardous waste within their premises which are required to be sent to TSDF. As there is no TSDF in Delhi, DPCC should facilitate the same or make arrangements for sending safety hazardous waste to TSDF in the adjoining states in consultation with their SPCB.

13. Recommendations

Urgent Action Required

13.1 RML Hospital

It is gathered from DPCC that RML has not been accorded Consent to Operate and as such they are violating the provisions of the Water Act, 1974. The hospital is discharging effluent in sewerage system of NDMC without proper treatment except giving hypochlorite treatment which is not adequate. However, RML hospital has awarded the contract to CPWD for installation of STP/ETP which should be completed on time. Even though RML has proposed to setup STP but it is felt that the hospital which is connected to city sewerage system for discharge of its sewage should not have individual STP within the hospital complex as it would be a source of infection to the patients. Rather than STP, ETP should be provided for treatment of effluent emanating from path labs and other liquid waste discharged from various wings of the hospital.

Procurement of red bins and additional autoclaves must be expedited.

13.2 Lady Harding Medical College and Hospitals

Lady Harding Medical College and Hospitals (Sucheta Kriplani & Kalawati Saran Hospital) have not been provided with consent to operate by DPCC. LHMC and associated hospitals are required to upgrade their existing ETP Plant or setup a new one so as to treat the effluent emanating from its hospitals and medical college to the desired standards before discharging. LHMC is also discharging untreated effluent in sewers and is required to seek consent to operate from DPCC. However, it is felt that Sewage Treatment Plant is not required to be set up by LHMC and its associated hospitals as it may lead to infection to the patients. Sewage generated (not mixed with any other effluent generated from the hospitals) may be connected to NDMC sewerage system after seeking consent from DPCC.

Common storage facility in LHMC was found in dilapidated condition and needs improvement.

The height of chimney provided in the kitchen is inadequate and as such should be increased in consultation with DPCC.

Also, Oil and Grease Trap (OGT) is required to be provided for the effluent emanating from the kitchen.

13.3 Palika Maternity Hospital

Even though ETP Plant was installed in Palika Maternity Hospital (PMH) of NDMC, it was found non-operational during the visit. BOD and Bio-assay test are not meeting the prescribed standards. More so, it was informed that this treated water is used for flushing of Toilets and for Horticulture purposes which is not desirable as it is not meeting the required norms. As such ETP should be made functional urgently but not later than 3 months so as to meet the prescribed standards. Also all the three chambers made for storing bio-medical wastes in the storage area are required to be well ventilated as per the requirement of Bio-Medical Waste Management Rules, 2016. Use of sludge from STP/ETP for horticultural proposes must be stopped as it is hazardous. Also use of treated effluent for flushing of toilets should be stopped as it may cause infection to the patients.

13.4 Charak Palika Hospital

ETP of NDMC's another Hospital namely Charak Palika Hospital (CPH) was also not found operational and the untreated effluent was being discharged directly into the sewerage system. This ETP must also be made functional urgently within 3 months. There is no committee yet formed for checking and controlling of HAI. The same should be formed urgently and periodic meeting be held. Safai-karmcharis (including contractual staff) should also be vaccinated. BMW should not be stored in common passage used by patients and should be transferred to common storage area as required by Bio-Medical Waste Management Rules, 2016.

13.5 Primus Hospital

In Primus Hospital, the storage rooms provided for storing of red, yellow, blue and black bags are not properly ventilated and as such require improvement as per Bio-Medical Waste Management Rules, 2016.

13.6 NRC Hospital

NRCH must expedite installation of ETP. Also, Hepatitis B vaccination should be given to the concerned staff.

13.7 Hospital management committee

Each hospital to have a hospital management committee to look into issues related to ETP/ STP, solid waste management, water supply, environment and other engineering issues with representation from medical side and engineering side (CPWD).

13.8 ETPs for Lab Path Labs

Lab Path Labs should either provide individual ETPs or provide collection system for effluent generated in these labs and bring the same to NRL, where excess capacity of treatment exists to the extent of 30KL/Day. Efficiency of this STP/ETP provided in NRL must be improved to meet BOD and Bio-assay standards as at present it is not meeting the prescribed standards.

13.9 ETPs for Other Path Labs

Other Path Labs generating effluent should also install ETPs before discharging in the sewage system. Alternatively, DPCC may initiate setting up of a Common Effluent Treatment Plant (CETP) for treatment of effluent generated by these Path Labs. M/s Biotic Solution Pvt. Ltd. may also be asked to explore the possibility of collection & treatment of effluent by augmenting their existing facilities of ETP.

13.10 Recyclable Bio-Medical Waste

In case of recyclable wastes such as tubing, bottles, intravenous, catheters, urine bags, syringes (without needles) vaccutainers and gloves, the disposal has to be in the red bag as per Bio-Medical Waste Management Rules, 2016. However, if such recyclable wastes are infected, as may be decided by the Infection Control Committee of the hospital, it must be treated as infected waste and must be autoclaved and should be put in yellow bags before handing it over to the authorized vendor.

13.11 Need for TSDF

As there is no TSDF in Delhi for disposal of hazardous waste, it is high time to either facilitate construction of TSDF in Delhi itself or make immediate arrangements with neighboring states for transportation, treatment and disposal of hazardous waste being stored presently in Delhi by various industrial units and Bio-Medical Waste Management facilities in their premises.

13.12 MSW and Industrial Waste in SSI industrial area

DPCC should take urgent action and keep constant watch on SSI industrial area, GTK Road Delhi-33 for prevention of dumping of MSW or industrial waste and its burning including surface or ground water contamination. DPCC should have periodical monitoring of this industrial area to avoid environmental pollution problem from the industrial units located in this industrial area in front of M/s Biotic Solutions Pvt. Ltd.

General recommendations

13.13 The observations based on the findings of the inspections carried out in the hospitals indicate that the incidents of hospital acquired infections in hospitalized cases were ranging from 2 to 10% in LHMC, 4.2% in RML, 1.1% in PMH, and only 3 cases in Primus Hospital during 2016, and are comparable to W.H.O estimates of 7% in hospitalized patients for

developed countries and 10% in developing countries. However, every effort should be taken to bring it down by adopting better housekeeping and work practices including anti infection and sterilization measures. Further, in order to minimize HAI, sharing of beds by two/three patients in case of heavy intake of Patients should be avoided. In order to minimize/reduce the incidents of hospital acquired infections, it is advisable to have hand sanitizers installed in front of private and general wards so that Doctors, Patients and Visitors entering the Wards/Rooms may clean/disinfect their hands before and after each contact. Good medical practices like regular vaccination, Hepatitis B and typhoid (kitchen staff) should also be ensured.

There is no HAI data available from Charak Palika Hospital and also no committee has been formed. The same must be formed urgently.

- 13.14** The Infection Control Committee should regularly monitor the infection control practices being implemented in all the hospitals and take necessary corrective action for prevention and control of HAI as mention in para 7.3 and para 7.4 for all the hospitals.
- 13.15** The hospitals may consider taking up NABH (QCI) accreditation on a top priority basis in order to streamline and improve infection control programmes constantly so as to have third party monitoring and evaluation system in place. Alternatively, the guidelines issued by M/o Health & FW should be adopted for keeping HAI to the bare minimum and National Quality Assurance Standards(NQAS) for Public Health Facilities, 2016 may be adopted.
- 13.16** According to Multilateral Environmental Agreement for mercury known as Minamata Convention on-mercury, the hospitals are required to phase out mercury containing instruments (Barometers, Hydrometers Manometers, Fever Thermometers, Sphygmomanometers etc.) by the year 2020. Mercury bearing dental amalgam may also be discouraged and be replaced with non-mercury dental amalgam wherever medically possible.
- 13.17** CFL, TFL (**Tubular** Florescent Lamp) and mercury lamps should be phased out with LED as early as possible but not later than 2020, as per the requirement of Minamata Convention.
- 13.18** As per the requirement of Bio-Medical Waste Management Rules of 2016, non-chlorinated blood bags are required to be used (Rule No.4 (d)) which are not available in the market. The requirement of use of non-chlorinated blood bags was put in the Rules basically to avoid generation of dioxin and furan gases during incineration but now a days incinerators are so designed and temperature is maintained above 1000 degree centigrade that there is no possibility of generation of dioxin and furan gases. As such

Bio-Medical Waste Management Rules, 2016 may be amended accordingly to allow use of chlorinated blood bags.

13.19 As per the provision of Bio-Medical Waste Management Rules 2016, hospitals and path labs are required to adopt bar code system on the bags of the Bio-Medical Waste generated by them. Time given of 1 year for switching over to bar code system has got lapsed on 29.03.2017 but none of the hospitals, path labs and M/s Biotic Waste Solutions Pvt. Ltd. have so far adopted bar coding in their waste management system and as such are in violation of this requirement as per Bio-Medical Waste Management Rules, 2016 (Rule 8.4). As such it should be urgently done.

13.20 Sludge generated from ETP is stored in M/s Biotic Waste Solutions Unit which requires to be sent to TSDF being hazardous. DPCC should facilitate construction of TSDF in Delhi or make arrangements in the neighboring States for transportation, storage, treatment and disposal of hazardous waste in TSDF.

13.21 There should be frequent seminars/workshops for administrators as well as healthcare professionals to resolve issues as given in the Bio-Medical Waste Management Rules, 2016/ Guidelines or practical difficulties in compliance of the Rules/Guidelines.

13.22 A database of best practices, vendors, pricing, guidelines etc., will make administrative implementation easier. Interactive e-platform can also help in early resolution of problems and knowledge sharing.

13.23 ` Periodical training to the concerned hospital personnel dealing with bio-medical waste so as to familiarize the staff with the Rules and Regulations for handling of Bio-Medical Waste as per Bio-Medical Waste Rules, 2016 must be carried out.

14. **Acknowledgement**

Profound thanks are due to Dr. Chhavi Pant Joshi and Dr. Gowri N. Sengupta, both from DGHS, Ministry of Health & Family Welfare for their valuable contribution and specially to Dr. Chhavi for preparing the first draft report on Bio-Medical Waste. Dr. Namita Negi, NRCH extended her valuable advice in finalizing the Report. Dr. Ramakant of MOUD also deserve thanks for his constructive suggestions. Thanks are also due to Dr. Vinay Gangal, CPCB and Er. K. Kumar, DPCC for their extremely valuable contributions and suggestions including facilitation of collection and analysis of samples from ETPs of hospitals and path labs. DPCC officials engaged for collection and analysis of effluent samples taken from STP/ETP do also require thanks. Shri Ravi Tiwari of DPCC has rendered his assistance to the committee during the site visits and did coordination work which is acknowledged. Thanks are also expressed to Ms. Arti Sharma and Mr. Anshul, Secretarial staff attached to the Committee for typing the report.

15. Constraints


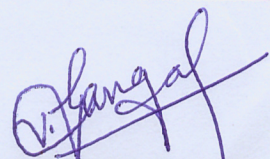
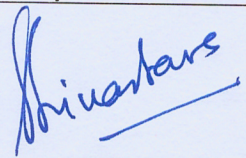
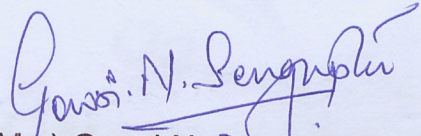
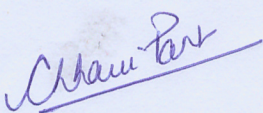

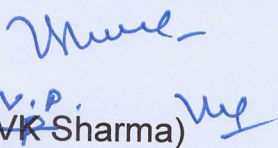
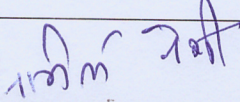
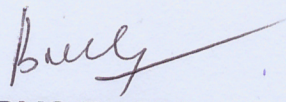

Even though MoEFCC has given a room (with no windows and rather it appears to be a store room of 10x10 sq. ft.) for the committee but the same is too small to accommodate committee members for holding the meetings. Hardly 4-5 members can sit in this room with great difficulty and as such it becomes very difficult to conduct the meeting in a proper manner. Some members had to keep standing which becomes quite embarrassing. MOEFCC was requested to allot a bigger room for the committee which is still pending as this room is also used by the Chairman of the committee and Secretarial Staff including keeping of the records. No almirah has been provided for keeping records. Also, no landline phone is available in the room making it difficult to contact the committee members and other stake holders for site visits or sitting of the committee.

No, Stenographer has been provided.

The desktop computer provided is of a very old model and has become obsolete in terms of speed and performance. It needs to be replaced urgently with a new desktop (core i-7 processor) with printer, having scanner.

Car provided by NDMC to the Chairman of the Sub-Committee-1 was withdrawn in contravention of MoEFCC/NGT order. Under the circumstances, there was no alternative but to engage a taxi for discharging the duties assigned by Hon'ble NGT for which no reimbursement has so far been made by CPCB/MOEFCC to the Chairman of the Committee.

None of the members of the NGT constituted committee have so far been paid in spite of Hon'ble NGT's direction vide its order dated on 20th April, 2017 in the matter Samir Mehta v/s. UoI (O.A. No. 24/2011). However, MOEFCC issued an office order on 19/07/2017 related to payment of sitting fee to the non-official members of the sub-committee but no payment of sitting fee/honorarium has been proposed for official members of the committee which is in contravention of Hon'ble NGT order dt. 20th April, 2017. It is submitted that Hon'ble NGT may like to consider awarding reasonable honorarium to the official members of the Committee who have given their precious time and made valuable contributions during the discussions as also in the preparation of the report.

 (Dr. Ramakant/ Ms. Chaitra Devoor) MoUD Representative	 (Dr. Vinay Gangal) CPCB Representative
 (Dr. (Ms.) S. Srivastava) NDMC Representative	 (Dr. (Ms.) Gowri N. Sengupta) M/o H&FW Representative
 (Dr. (Ms.) Chhavi Pant Joshi) M/o H& FW Representative	 (Er. K. Kumar) DPCC Representative
 (Mr. VK Sharma) DJB Representative	 (Dr. Namita Negi) NRCH, Rep. of Ministry of Railways
 (Dr. BMS Reddy) DPCC Representative	
 (Dr. G.K. Pandey) Chairman, Sub-committee-1	

