

Chapter-6

Infection Control

6 Infection Control

Infection control practices are important in maintaining a safe environment for both patients and staff in the hospitals by reducing the risk of potential spread of hospital associated infections. This chapter discusses audit findings in respect of various aspects of infection control, as shown in **Figure 5**.

Figure 5: Aspects of infection control



6.1. Standard Operating Procedures

To prevent hospital acquired infections in patients, visitors and staff, it is required under NHM Assessor's Guidebooks for DHs and CHCs to frame a schedule of procedure to be followed by the health care facilities known as Standard Operating Procedures (SOPs). Audit observed that while SOPs for infection control were only available in DH-II Allahabad and DWH Agra out of test-checked hospitals during 2013-16, the situation improved significantly during 2016-18 as shown in **Table 30**.

Positive feature

The improvement in availability of Standard Operating Procedures, documentation pertaining to infection control and formation of Hospital Infection Control Committee coincided with the assignment of Hospital Managers in the test-checked hospitals.

Table 30: Availability of SOPs for infection control

Year	Availability of SOPs in hospitals (Out of 19 hospitals test-checked)		Availability of SOPs in CHCs (out of 22 CHCs test-checked)
	Available	Not Available	
2013-14	2	17	Not available in any of the test-checked CHCs
2014-15	2	17	
2015-16	2	17	
2016-17	9	10	
2017-18	11	08	

(Source: Test-checked hospitals/CHCs)

Non-availability of SOPs resulted in lack of structural response to issues of hygiene and infection control especially in case of CHCs, as discussed in the succeeding paragraphs.

The Government stated (May 2019) that guidelines for preparation of SOPs for infection control had been issued and effective action on these had been started during 2018-19.

Checklist for hygiene and infection control

NHM Assessor's Guidebook requires that for cleaning and disinfection of patient care areas, standard practices be followed through maintenance of a checklist for hygiene and infection control in each hospital. Also, Infection Control Policies are needed to be framed, practiced and monitored by the Hospital Infection Control Committee (HICC). The role of the HICC is to implement the infection control programme and policies.

The availability of a checklist for hygiene and infection control and Infection Control Committee in the test-checked hospitals was as shown in **Table 31**.

Table 31: Availability of checklist for infection control and HICC

Year	Availability of checklist for hygiene and infection control in test-checked hospitals (Out of 19 hospitals)	Presence of Hospital Infection Control Committee in the test-checked hospitals (Out of 19 hospitals)
2013-14	0	0
2014-15	0	0
2015-16	1	2
2016-17	5	8
2017-18	6	10

(Source: Test-checked hospitals)

In all the test-checked CHCs neither was the checklist maintained nor the HICC formed during 2013-18. In the absence of these, Audit could not derive an assurance whether the required processes of hygiene and infection control were followed in the concerned test-checked hospitals/CHCs.

The Government replied that necessary instructions would be issued to the hospitals in this respect.

Pest and rodent control

Controlling spread of infection through rodents and pests in the hospitals is an important component of infection control practices as per NHM Assessor's Guidebook. The availability of the records of pest and rodent control in the test-checked hospitals was as shown in **Table 32**.

Table 32: Availability of records of pest and rodent control

Year	Records in hospitals (Out of 19 hospitals test-checked)		Records in CHCs (Out of 22 CHCs test-checked)	
	Pest control	Rodent control	Pest control	Rodent control
2013-14	01	01	01	01
2014-15	01	01	02	01
2015-16	03	03	02	01
2016-17	06	06	03	02
2017-18	11	08	03	02

(Source: Test-checked hospitals/CHCs)

In the absence of records, Audit could not derive an assurance whether pest and rodent control practices were actually followed in the concerned test-checked hospitals/CHCs.

However, the Government in reply did not provide details of the actual implementation of pest and rodent control practices and merely stated that orders would be issued for maintaining the records of pest and rodent control in each hospital.

It was noticed in audit that the improvement in availability of documentation pertaining to infection control and formation of Hospital Infection Control Committee in certain test-checked hospitals during 2016-18, coincided with the assignment of Hospital Managers. Hence, the standardisation of infection control processes would be the key driver for effectively minimizing hospital acquired infections and creating a culture of infection control in the public hospitals.

Presence of animals in hospital premises

As per GoUP Order (2011), the hospital authorities should prevent animals from entering the premises of the hospitals to control infection among the patients and hospital staff. Audit, however, noticed several instances of presence of stray dogs and other stray animals in the premises of the test-checked hospitals as depicted below:



Thus, hospital authorities did not take sufficient steps to tackle the menace of stray animals in the hospital premises, putting the patients, their attendants and the hospital staff at risk of animal attacks and also potential infections.

In response, the Government stated that cow catchers had been installed and fencing of the hospitals has been done to prevent entry of animals.

The reply of the Government is not satisfactory since the actual evidence is illustrative of the presence of animals in the premises of hospitals, and underlines the need for more effective interventions towards reducing harm to patients and staff from contracting infections.

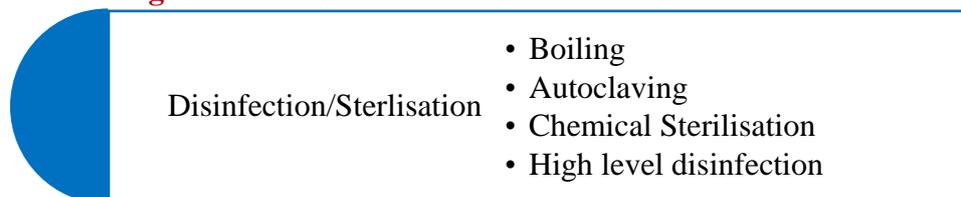
6.2. Disinfection and sterilisation

As per Hospital Infection Control Guidelines of the ICMR¹¹³, disinfection and sterilisation help prevent the build-up of bacteria/viruses, etc. on the medical

¹¹³ ICMR - Indian Council of Medical Research.

tools, linen and consumables and reduce the chances of spread of infection in patients and staff of hospitals. NHM Assessor's Guidebook recommends boiling, autoclaving, high level disinfection (HLD) and chemical sterilisation process for disinfection/sterilisation in the DHs and CHCs.

Figure 6: Various methods of disinfection and sterilisation



Generally, critical instruments/equipment (those penetrating skin or mucous membrane) should undergo sterilisation before and after use, e.g. surgical instruments. Semi-critical instruments/equipment (those which come in contact with the intact mucous membrane without penetration) should undergo high level disinfection before use and intermediate level disinfection after use, e.g. endotracheal tubes. Availability of the methods of disinfection and sterilisation in the test-checked hospitals was as shown in **Table 33**.

Positive feature

DH-II Allahabad, DH Lucknow, DWHs Allahabad, Lucknow and JH Lucknow had all prescribed types of sterilisation procedures.

Table 33: Availability of disinfection and sterilisation procedures

Hospital	Boiling	Chemical Sterilisation	Autoclaving	High level disinfection (HLD)
DH Agra	Yes	No	Yes	No
DWH Agra	Yes	Yes	Yes	No
DH Allahabad	Yes	Yes	Yes	No
DWH Allahabad	Yes	Yes	Yes	Yes
DH-II Allahabad	Yes	Yes	Yes	Yes
DH Budaun	Yes	Yes	Yes	No
DWH Budaun	Yes	Yes	Yes	No
DH Balrampur	Yes	Yes	Yes	No
DWH Balrampur	Yes	Yes	Yes	No
JH Balrampur	Yes	Yes	Yes	No
DH Banda	Yes	No	Yes	No
DWH Banda	Yes	No	Yes	No
DH Gorakhpur	Yes	No	Yes	No
DWH Gorakhpur	Yes	No	Yes	No
DH Lucknow	Yes	Yes	Yes	Yes
DWH Lucknow	Yes	Yes	Yes	Yes
JH Lucknow	Yes	Yes	Yes	Yes
DH Saharanpur	Yes	Yes	Yes	No
DWH Saharanpur	Yes	Yes	Yes	No

(Source: Test-checked hospitals for 2017-18)

6.2.1. Boiling and autoclaving

Boiling for 10-15 minutes kills bacteria but not viruses and spores. It is used for sterilisation of syringes, needles, bowls, trays and metallic instruments *etc.* On the other hand, in autoclaving, at 15 lbs pressure for 45 minutes on 121°C kills even spores and viruses¹¹⁴. It is used for blunt metallic instruments, rubber and glass articles, linen and bandages and non-absorbable suture material.

Audit observed that sterilisation through boiling was available in all the test-checked hospitals. Autoclaving was also available in all the test-checked hospitals/CHCs, except in four CHCs – Baharia and Meja of Allahabad and Gaisandi and Pachperwa of Balrampur. The non-availability of autoclaving in these four CHCs increased chances of the spread of various types of infections as only boiling alone of the instruments like bowls, trays and other metallic instruments cannot kill the spores and viruses.

The Government replied that necessary instructions would be issued to the hospitals for the use of proper methods of disinfection and sterilisation and suitable action would be taken for non-compliance.

6.2.1.1. Maintenance of autoclave machine

As per IPHS, there should be an Annual Maintenance Contract (AMC) for all equipment which need special care and preventive maintenance to avoid breakdown and reduce downtime of such equipment.

Audit observed that AMC for autoclave machine was not done in any of the 22 test-checked CHCs and out of the 19 test-checked hospitals, only DH Lucknow during 2013-18, DH-II Allahabad during 2014-18 and JH Lucknow in 2017-18 had the requisite AMC. In the absence of AMC for equipment like autoclave *etc.* in the test-checked hospitals, Audit could not derive an assurance regarding preventive maintenance of sterilisation equipment. Pertinently, Audit observed that in DWH Banda and CHC Baharia and Meja, Allahabad, autoclave machine was non-functional for want of repair.

The Government stated that necessary instructions would be issued for the regular maintenance of sterilisation equipment.

6.2.1.2. Validation of autoclaving process

NHM Assessor's Guidebook requires that biological indicators should be used in all the hospitals to prevent insecticide toxicity due to interactions with the membrane. Such biological indicators are a tool to validate the steam-based sterilisation process in autoclave machine.

Audit observed that this indicator was used only in DWH Allahabad during 2013-18. Non-use of this indicator in any other test-checked hospital resulted in non-validation of the sterilisation process using autoclave machine.

¹¹⁴ As per the provisions laid down in Manual of Laboratory Techniques, National Institute of Communicable diseases, Directorate General of Health Services, GoI

The Government replied that after examining the issue necessary direction would be issued to the concerned hospitals.

6.2.1.3. Records of sterilisation using autoclave

Audit observed the following discrepancies in the maintenance of records of sterilisation using autoclaves as detailed in **Table 34**.

Table 34: Availability of records of sterilisation using autoclave

Name of the record	Availability of records (Out of 19 hospitals)					Impact of non-maintenance of records
	2013-14	2014-15	2015-16	2016-17	2017-18	
Log for records of date of sterilisation	2	3	4	4	8	Periodicity of sterilisation could not be ascertained
Log for records of date of return of equipment after sterilisation	1	2	3	3	6	As above
Records of number of instruments received per pack	1	1	2	2	3	Weakness in monitoring of the requisite equipment
Records of number of instruments sterilised per pack	1	1	2	2	4	As above

(Source: Test-checked hospitals)

Thus, non-maintenance of the requisite records not only indicated weakness in monitoring of sterilised equipment/instruments but also periodicity of the re-sterilisation of the equipment/instruments could not be ascertained in audit.

The Government replied that necessary directions would be issued to the districts in this respect.

6.2.2. Chemical sterilisation

As per NHM Assessor's Guidebook, chemical sterilisation is needed for instruments like ambu-bag, suction canulae and surgical instruments by soaking in 0.5% chlorine solution, wiping with 0.5% chlorine solution or 70% alcohol, as applicable.

Audit observed that the chemical sterilisation method was available in only 14 out of the 19 test-checked hospitals and 13 out of the 22 test-checked CHCs, putting patients at risk of acquiring secondary infections in the rest of the 05 hospitals and 09 CHCs.

The Government replied that necessary instructions would be issued to the respective hospitals and suitable action would be taken in cases of non-compliance.

6.2.3. High level disinfection

As per Hospital Infection Control Guidelines of the ICMR, High Level Disinfection (HLD) is the process of complete elimination of all micro-

organisms in or on a device, with the exception of small numbers of bacterial spores.

While HLD process was available in 05 out of the 19 test-checked hospitals, in none of the 22 test-checked CHCs this disinfection method was used. Since HLD is used for disinfecting semi-critical devices that come into contact with intact mucous membranes but do not ordinarily penetrate sterile tissue such as laryngoscope blades and respiratory therapy equipment, HLD process is required to be available in every hospital/CHC.

The Government replied that necessary instructions would be issued to the respective hospitals and suitable action would be taken in cases of non-compliance.

6.3. Cleaning services

6.3.1. Standard operating procedure for housekeeping

As per IPHS, to provide a clean environment to patients, visitors and staff it is required to frame a Standard Operating Procedure (SOP) for housekeeping, by which hospital authorities would ensure the cleanliness of the hospital premises. Audit observed that SOPs for housekeeping were not available in most of the test-checked hospitals as detailed in **Table 35**.

Table 35: Availability of SOPs for housekeeping

Year	Availability of SOPs (Out of 19 hospitals)	Availability of SOPs in test-checked CHCs (Out of 22 CHCs)
2013-14	01	Not available in any test-checked CHCs during 2013-18.
2014-15	02	
2015-16	02	
2016-17	05	
2017-18	08	

(Source: Test-checked hospitals/CHCs)

The improvement in availability of SOPs in hospitals during 2016-18 coincided with the availability of Hospital Managers.

The Government stated that SOPs had been prepared and implemented since 2018-19.

6.3.2. Hygiene practices

NHM Assessor's Guidebook prescribes that the hospital must have a system to take air and surface samples for microbiological survey to check for infections.

Audit scrutiny of the records of test-checked hospitals for 2013-18 revealed that only DH Banda had prepared the report of microbiological survey in critical care areas (OT, Paediatric ward) for 2017-18. Apart from this, no reports of any surface/air/hand swab tests were prepared in any of the test-checked hospitals during 2013-18. Thus, Audit could not derive an assurance regarding effectiveness of cleaning of surfaces and hands hygiene of hospital staff in the test-checked hospitals.

The Government replied that after examining the issue necessary directions would be issued in this respect.

6.3.3. Outsourcing of cleaning services

NHM Assessor's Guidebook requires that the hospitals should ensure decontamination of functional areas. Audit observed that out of the 19 test-checked hospitals, cleaning services were outsourced to private vendors/firms in 16 hospitals during 2017-18. Audit noticed the following discrepancies in cleaning services in the test-checked hospitals:

- Proper cleaning of operation theatres within the health facility was not done in DWH Balrampur and Budaun.
- Adequate cleaning of toilets was not done in DWH Balrampur, DH and DWH Budaun and DWH Gorakhpur.
- In eight hospitals, the contracts executed with the outsourced firms did not specify the disinfectants/detergents that were to be used for cleaning of floors, table tops, beds, *etc.*
- In 10 hospitals, records of consumables used for cleaning were not available.
- To prevent infections among patients, it is necessary to clean the total area of the hospital. Audit observed that in DH Lucknow during the period 2014-18, the covered area contracted for cleaning ranged between 56 *per cent* and 66 *per cent* of the total area of the hospital required to be cleaned, as some areas were being cleaned by regular staff of hospital. Audit, however, observed that cleaning was not done regularly in the new OPD block, nursing schools, *etc.*

The Government replied that orders would be issued to each hospital in this regard to provide an infection free environment to patients and suitable action would be taken in cases of non-compliance.

6.4. Laundry services

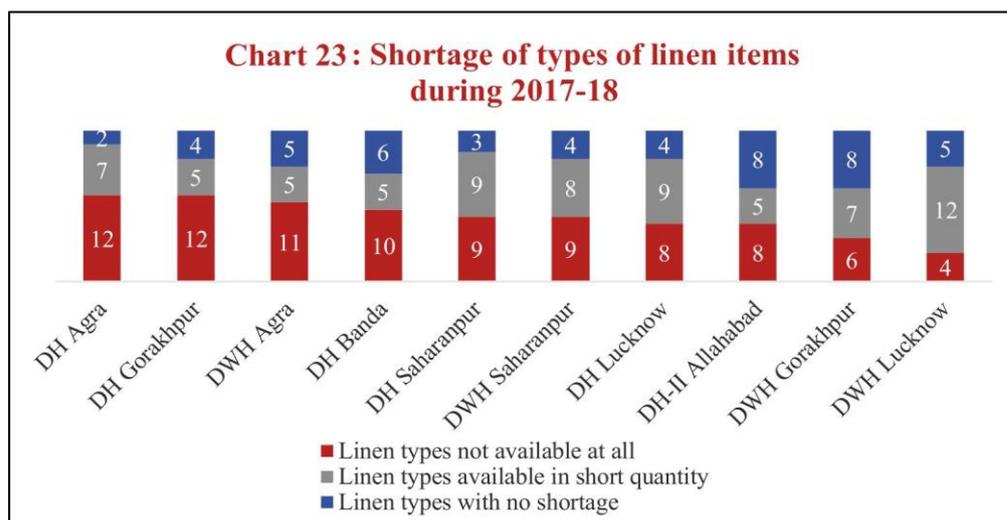
6.4.1. Availability of linen

IPHS prescribe the number of different types of linen¹¹⁵ that are required for patient care services for hospitals with 101 beds and more.

In 10 test-checked hospitals¹¹⁶, Audit observed shortage of different types of linen such as bedspreads, hospital worker OT coats, pediatric mattress, table cloths, *etc.* The shortage ranged between 13 and 19 against the requirement of 21 different types of linen during 2017-18 as shown in **Chart 23**.

¹¹⁵ Abdominal sheets for OT, Bed sheets, Bedspreads, Blankets (Red and Blue), Doctor's overcoats, Draw sheets, Hospital worker OT coats, Leggings, Macintosh sheets, Mats (nylon), Mattresses (Foam) for adults, Mortuary sheets, over-shoe pairs, paediatric mattresses, Patient's coats (Female), Patient's pyjamas, Shirts (Male), Patna towels, Perennial sheets for OT, Pillows, Pillow cover and Table cloth

¹¹⁶ Out of the test-checked 19 hospitals, only 13 hospitals had bed strength of 101 or more beds. DWH Allahabad did not provide information, while DHs Allahabad and Budaun gave incomplete information.



(Source: Test-checked hospitals)

Further, DHs Allahabad and Budaun, which provided incomplete information, had at least 12 types of linen which were available in short quantity, while in DH Budaun at least two types of linen were not available at all.

Table 36 shows the types of linen not available at all in the test-checked hospitals during 2017-18:

Table 36: Linen items not available at all during 2017-18

Hospital	Linen items
DH Agra	Bedspreads, Hospital worker OT coats, Patients house coats (for female), Patients pyjamas (for male) and shirts, Over-shoe pairs, Mattresses (foam), Paediatric mattresses, Abdominal sheets for OT, Perennial sheets for OT, Leggings, Mortuary sheets and Mats (Nylon).
DH Banda	Bedspreads, Leggings, Mats (Nylon), Mortuary sheets, Over-shoe pairs, Paediatric Mattresses, Patients house coats (for female), Patients pyjamas (for male) and shirts, Perennial sheets for OT and Table cloth.
DH Gorakhpur	Bedspreads, Hospital worker OT coats, Mackintosh sheets, Mats (Nylon), Mortuary sheets, Over-shoe pairs, Paediatric mattresses, Patients house coats (for female), Patna towels, Perennial sheets for OT, Pillows and Table cloth.
DH Lucknow	Bedspreads, Leggings, Hospital worker OT coats, Paediatric mattresses, Perennial sheets for OT, Mats (Nylon), Mortuary sheets and Table cloth.
DH Saharanpur	Bedspreads, Leggings, Hospital worker OT coats, Paediatric mattresses, Perennial sheets for OT, Mats (Nylon), Mortuary sheets, Table cloth and Over-shoe pairs.
DH-II Allahabad	Bedspreads, Doctor's overcoats, Leggings, Mackintosh sheets, Mats (Nylon), Mortuary sheets, Over-shoe pairs and Perennial sheets for OT.
DWH Agra	Bedspreads, Doctor's overcoats, Hospital worker OT coats, Leggings, Mats (Nylon), Mortuary sheets, Over-shoe pairs, Paediatric mattresses, Patients pyjamas (for male) and shirts, Perennial sheets for OT and Table cloth.
DWH Gorakhpur	Bedspreads, Hospital worker OT coats, Over-shoe pairs, Patients pyjamas (for male) and shirts, Patna towels and Table cloth
DWH Lucknow	Bedspreads, Hospital worker OT coats, Mortuary sheets and Table cloth.
DWH Saharanpur	Bedspreads, Leggings, Mats (Nylon), Mortuary sheets, Over-shoe pairs, Paediatric mattresses, Patients pyjamas (for male) and shirts, Pillows and Table cloth.

(Source: Test-checked hospitals)

On the other hand, it was also observed that in 09 hospitals¹¹⁷ bed sheets were available in excess by 12.50 per cent to 321.55 per cent and in 10 hospitals¹¹⁸ blankets were in excess by 52 per cent to 1100 per cent, indicating that these hospitals were procuring bed sheets and blankets in excess while ignoring the requirements of other types of linen.

The Government replied that after examining the matter, necessary directions would be issued in this respect.

6.4.2. Deficiencies in laundry services

As per the State Government Order (2011), a hospital should provide clean and hygienic linen to patients for preventing infection among patients and hospital staff. Audit scrutiny of laundry services in the 19 test-checked hospitals and 22 CHCs revealed the deficiencies as detailed in **Table 37**:

Table 37: Deficiencies in laundry services in hospitals and CHCs

Particulars	2013-14		2014-15		2015-16		2016-17		2017-18	
	DHs	CHCs								
Bed sheets not changed on daily basis (with colour code)	12	15	12	15	11	15	9	14	5	12
Daily collection of soiled linen not done ¹¹⁹	11	16	11	16	11	16	10	16	6	16
Daily delivery of cleaned linen not done ¹²⁰	12	16	12	16	12	16	11	16	5	16
Registers of maintenance of linen not available ¹²¹	14	16	14	16	14	16	14	17	11	17
Records of quantity of linen received from laundry not available ¹²²	11	13	11	13	11	13	10	13	5	13

(Source: Test-checked hospitals/CHCs)

As evident from Table 37, in 05 to 12 hospitals and in 12 to 15 CHCs, bed sheets were not changed on daily basis and in 06 to 11 DHs and in 16 CHCs, daily collection of soiled linen was not done during 2013-18. Thus, the patients were not provided hygienic and clean bed linen in these hospitals, exposing them to the risk of further infection.

¹¹⁷ DHs - Allahabad (02), Banda, Gorakhpur, Lucknow, Saharanpur and DWHs - Agra, Lucknow, Saharanpur

¹¹⁸ DHs - Agra, Allahabad (DH-II), Banda, Budaun, Gorakhpur, Lucknow, Saharanpur and DWHs - Agra, Lucknow, Saharanpur

¹¹⁹ DH Agra for 2013-17 and CHCs - Baroli Ahir and Kheragarh Agra and CHC Pipraich, Gorakhpur did not provide information for 2013-18.

¹²⁰ DH Agra for 2013-17 and CHCs - Baroli Ahir and Kheragarh Agra and CHC Pipraich, Gorakhpur did not provide information for 2013-18.

¹²¹ DH and DWH, Agra for 2013-17 and CHCs - Baroli Ahir and Kheragarh Agra and CHC Pipraich, Gorakhpur did not provide information for 2013-18.

¹²² DH Agra, CHCs - Baroli Ahir and Kheragarh Agra and CHC Pipraich, Gorakhpur did not provide information for 2013-18.

The Government replied that after examining the matter necessary direction would be issued.

6.4.3. Washing of linen

As per the IPHS, laundry facility should be available in the hospitals to provide well washed and infection free linen to patients. Audit observed that washing of linen was outsourced in 14 test-checked hospitals and seven CHCs.

As per the agreement with the outsourced service providers, washing equipment such as washing machines, hydro extractor and drying tumbler were required to be established in the hospital laundry for providing infection-free washing of linen. In this regard, only 08 hospitals provided information relating to washing equipment maintained by service provider, which revealed the following:

- In six hospitals (DH and DWH Agra, DH Banda, DWH Lucknow, DH and DWH Saharanpur), shortage of washing machines ranged between one-third to two-thirds of the requirement.
- In four hospitals (DH and DWH Agra, DH Banda, DWH Lucknow), shortage of hydro extractors ranged between 33 and 50 *per cent* and in three hospitals (DH-II Allahabad, DH and DWH Saharanpur), they were not available.
- In six hospitals (DH and DWH Agra, DH Banda, DWH Lucknow, DH and DWH Saharanpur), shortage of drying tumblers ranged between one-third and two-thirds of the requirement.

Thus, proper facilities for infection-free washing of linen were not made available by the service providers in the test-checked hospitals.

Further, the agreement provided that the linen should be separated in different coloured bags and transported in covered trolleys from wards to the laundry and preliminary disinfection should be done. After washing, the laundry should be ironed and kept in almirah/racks in the laundry room, from where it would be sent back to wards packed in paper envelops. Audit observed the following discrepancies in the 14 test-checked hospitals in the washing of linen through outsourcing:

- In two hospitals¹²³, pre- treatment of the soiled linen (contaminated with blood and body fluids) before separating them in colored bags was not done.
- In 11 hospitals, coloured bags were not available to separate the dirty and soiled linen in the wards.
- Covered trolleys were not available to carry the linen from wards to the laundry in 11 hospitals.
- Ironed linen was not packed in paper envelops in 10 hospitals.

¹²³ Two test-checked hospitals did not provide the information in this regard.

- Almirahs and racks were not available in the laundry to keep the washed linen in seven hospitals.

Thus, lack of pre-treatment of soiled linen and non-availability of coloured bags and covered trolleys to separate and carry the dirty linen from wards to the laundry, increased chances for spread of infection in the hospitals.

The Government replied that after examining the matter, necessary directions would be issued to the concerned hospitals.

6.4.4. Individual discrepancies noticed in washing of linen

During joint physical inspection of wards in DH Budaun, Audit observed that the washed bed sheets were dirty despite the fact that washing of linen was outsourced, as depicted in the photograph.



Dirty bed sheet used in General ward of DH Budaun (17.10.2018)

Further, Audit observed that linen items of CHC Mall, Lucknow¹²⁴ were washed in unhygienic conditions, as depicted below:



Unhygienic washing and drying of linen items of CHC Mall, Lucknow (17.11.2018)

Washing and drying of dirty linen items in unhygienic conditions increased chances of spread of infection among the patients. Additionally, cleaning linen items in the flowing rivers and water bodies has the potential to spread infection to the community using the same water for drinking, cooking and bathing.

The Government replied that after examining the matter, necessary directions would be issued in this respect.

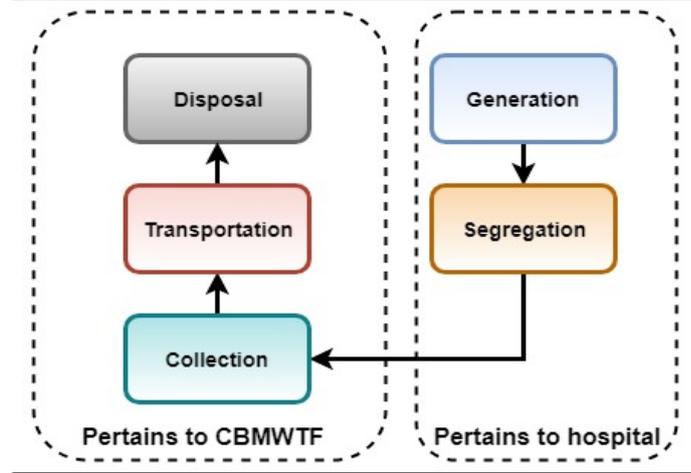
6.5. Bio-medical waste management

Bio-medical waste (BM waste) is generated during procedures related to diagnosis, treatment and immunisation in the hospitals and its management is an integral part of infection control within the hospital premises. The GoI framed Bio-Medical Waste (Management and Handling) Rules, 1998 under Environment (Protection) Act, 1986, which were superseded by Bio-Medical Waste Management Rules, 2016 (BMW Rules). The BMW Rules *inter alia* stipulate the procedures for collection, handling, transportation, disposal and

¹²⁴ Washing of linen was not outsourced in CHCs in Lucknow.

monitoring of the BM waste with clear roles for waste generators and CBMWTF¹²⁵.

Figure 7: Stages of bio-medical waste management

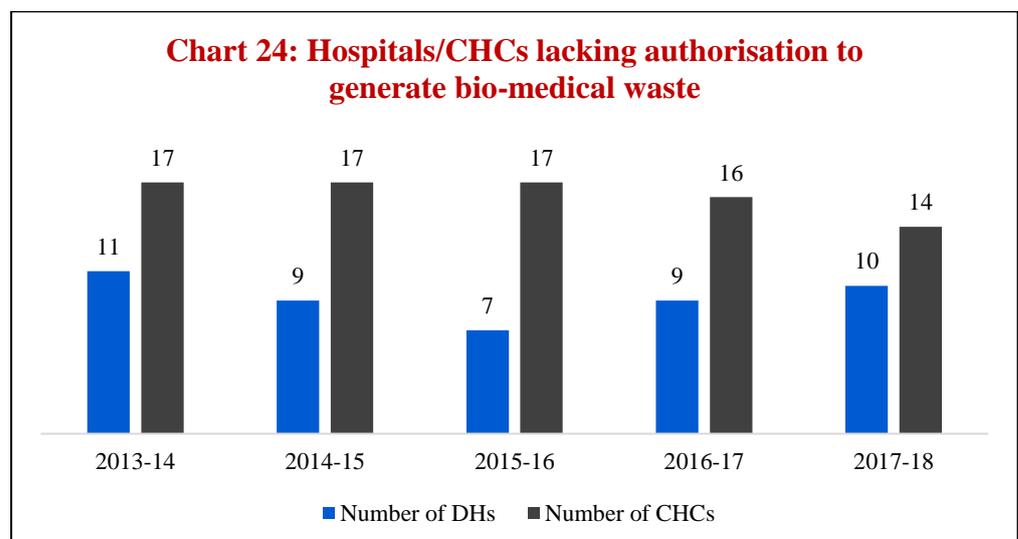


6.5.1. Generation of bio-medical waste

6.5.1.1. Authorisation for generating bio-medical waste

The BMW Rules required the hospitals generating BM waste to obtain authorisation from the State Pollution Control Board (SPCB). The category-wise quantity of BM wastes generated and their disposal were to be forwarded to SPCB in a prescribed format annually.

Scrutiny of the records of the test-checked hospitals¹²⁶ revealed that requisite authorisation from SPCB was not available in the majority of the hospitals as shown in **Chart 24**



(Source: Test-checked hospitals/CHCs)

¹²⁵ CBMWTF – Common Bio-Medical Waste Treatment Facilitator

¹²⁶ Out of the test-checked 19 hospitals, five hospitals for 2013-15 and two hospitals for 2015-18 did not provide information. Out of the test-checked 22 CHCs, 05 CHCs (Baharia, Handia, Meja of Allahabad and Campiarganj and Pipraich of Gorakhpur) did not provide information for 2013-18.

Further, it was observed that some of the test-checked hospitals had authorisation for only a part of the year, as given in **Table 38**.

Table 38: Partial authorisation for generating bio-medical waste

Year	No. of test-checked hospitals which had partial authorisation	Range of days for which authorisation was available during the year
2013-14	3	39 to 250
2014-15	5	73 to 293
2015-16	7	44 to 275
2016-17	5	71 to 275
2017-18	7	08 to 253

(Source: Test-checked hospitals/CHCs)

Audit further observed that the annual information related to the generation and disposal of waste as required in the BMW Rules was also not sent to SPCB, as detailed in **Table 39**.

Table 39: Non-submission of annual report to SPCB

Year	Number of hospitals not submitting annual report to SPCB ¹²⁷	Number of CHCs not submitting annual report to SPCB ¹²⁸
2013-14	14	17
2014-15	14	17
2015-16	16	17
2016-17 ¹²⁹	15	16
2017-18 ¹³⁰	12	16

(Source: Test-checked hospitals/CHCs)

Table 39 indicates that the DHs/CHCs were not sending the requisite information to the SPCB in contravention of the BMW rules, leading to poor monitoring of the disposal of bio-medical waste in these hospitals.

The Government did not respond regarding non-compliance with the requirements of obtaining authorisation from SPCB regarding the generation of bio-medical waste in the hospitals, but stated that all DHs and CHCs had submitted their annual reports related to the generation and disposal of waste.

The reply was not acceptable as 12 DHs and 16 CHCs had not submitted the annual reports to SPCB during 2017-18.

6.5.2. Segregation of bio-medical waste

The BMW Rules require hospitals to segregate different categories of BM waste in separate coloured bins at the source of generation. The waste is to be stored in appropriate colour coded bags at the point of generation and

¹²⁷ Out of the test-checked 19 hospitals, the information was not provided by five hospitals for 2013-15 and three hospitals for 2015-18.

¹²⁸ Out of the test-checked 22 CHCs, five CHCs (Baharia, Handia, Meja of Allahabad and Campiarganj and Pipraich of Gorakhpur) did not provide the information for 2013-18.

¹²⁹ JH Lucknow sent the information to SPCB in 2016-17, while CHC Gosaiganj, Lucknow sent the information to SPCB during 2016-18.

¹³⁰ Four hospitals (JH, DWH Lucknow and DH, DWH Saharanpur) sent the information to SPCB in 2017-18.

collected by the Common Bio-Medical Waste Treatment Facilitator (CBMWTF).

Audit observed that the segregation of BM waste was done in all the 19 test-checked hospitals and 15 out of the 22 test-checked CHCs¹³¹ in 2017-18 as compared to only 16 hospitals and 10 CHCs in 2013-14.

The Government replied that three checklists have been developed for segregation of bio-medical waste at the generation point but did not clarify the reasons for non-segregation of bio-medical waste in 07 CHCs during 2017-18.

Further, in respect of liquid chemical waste generated in health care facilities, BMW Rules mandate segregation of the waste at source and its pre-treatment or neutralisation prior to mixing with other effluent generated from health care facilities.

Audit observed that in none of the test-checked hospitals an Effluent Treatment Plant (ETPs) was established for pre-treatment of the liquid chemical waste, resulting in drainage of the waste directly into the sewerage system. This was not only a violation of the BMW Rules but also hazardous to public health at large.

The Government replied that 50 DHs have been selected for establishing the ETPs in the first phase.

6.5.3. Collection of bio-medical waste

As per BMW Rules, CBMWTF is responsible for collection and proper disposal of BM waste from the hospitals.

Audit observed that CBMWTF did not collect BM waste throughout the year in 2013-14 in DWH Banda and in 2014-15 in DH and DWH Budaun and DWH Banda. In case of CHCs, BM waste was not collected throughout the year in all the test-checked CHCs of Agra (Baroli Ahir, Jaitpur Kalan and Kheragarh) during 2013-15 as well as CHCs of Budaun (Asafpur, Sahaswan and Samrer) during 2013-16. Further, CBMWTF did not collect BM waste on daily basis in the test-checked hospitals¹³² as detailed in **Table 40**.

Table 40: Non-collection of bio-medical waste on daily basis

Year	Number of hospitals and CHCs in which BM waste was not collected on daily basis	Range of days for which BM waste was not collected
2013-14	7	56 to 221
2014-15	7	52 to 249
2015-16	11	58 to 312
2016-17	14	19 to 351
2017-18	13	52 to 275

(Source: Test-checked hospitals/CHCs)

¹³¹ Segregation not done in CHCs – Baroli Ahir, Jaitpur Kalan and Kheragarh in Agra; Baharia and Handia in Allahabad; Asafpur and Samrer in Budaun

¹³² Out of the 19 test-checked hospitals, the information was not provided by six DHs for 2013-16 and four DHs for 2016-18. Further, out of the test-checked 22 CHCs, 11 CHCs did not provide the information for 2013-14, nine CHCs not provided information for 2014-17 and eight CHCs for 2017-18.

As seen from above, the collection of BM waste on daily basis saw a worsening trend with the number of such hospitals and CHCs almost doubling in 2017-18 as compared to 2013-14. The non-collection of the BM waste on daily basis violated the BMW Rules and also was a health hazard for the patients and staff in the concerned hospitals.

The Government stated that steps for safe and secure collection of bio-medical waste had been taken. Government further stated that the issue would be examined and necessary directions would be issued.

The fact remains that the serious shortfall in the daily collection of bio-medical waste was indicative of the need for stringent and continuous monitoring of BM waste practices.

6.5.4. Training for management of bio-medical waste

As per the BMW Rules, it is the responsibility of the health care facilities to ensure that all the staff are provided regular training on BM waste handling.

Audit, however, observed that no such training was provided in any of the test-checked CHCs during 2013-18 and in case of hospitals, training was provided only in JH Balrampur (2014-18), DWH Lucknow (2015-18), DWH Allahabad (2016-18), DWH Banda (2016-18) and DH Lucknow (2016-18). This lack of training increased the occupational hazard for the concerned staff in the test-checked hospitals.

The Government stated that training for handling BM waste had been conducted for hospital managers, quality managers, nodal officers and matrons of all DHs.

The reply was not acceptable as training was not provided in 14 test-checked DHs and all the test-checked CHCs.

To sum up, the test-checked hospitals and CHCs lacked an environment of infection control. The non-availability of even SOPs/checklists for hygiene and infection control in most of the hospitals and all CHCs was indicative of indifference towards the need for instilling infection control practices. Sterilisation and disinfection in the hospitals and CHCs was mostly limited to boiling and autoclaving. Alarming, four CHCs did not even have the autoclaving available, while a significant number of hospitals and CHCs lacked chemical sterilisation and high level disinfection facility. Cleaning and laundry services, despite outsourcing, were not of a satisfactory level in several hospitals, signaling lack of oversight on the part of the hospital administration. Similarly, bio-medical waste management was inadequate. While segregation of bio-medical waste was being done in a majority of the test-checked hospitals and CHCs, the collection of the waste on daily basis saw a worsening trend during 2013-18.