

## REVIEW ARTICLE

# Biomedical Waste Management Rules, 2016: A Brief Review

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## ABSTRACT

Inadequate and inappropriate handling of health care waste may have serious public health consequences and a significant impact on the environment. The Ministry of Environment and Forests (MoEF) has notified the new Biomedical Waste Management rules (BMWM Rules, 2016) on March 28, 2016, under the Environment (protection) Act, 1986, to replace the earlier rules (1998) and the amendments thereof. These rules shall apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle biomedical waste in any form. Sufficient financial and trained human resources, proper monitoring and control of waste disposal are some challenges for the management of biomedical waste. Thus, appropriate management of health care waste is a crucial component of environmental health protection, and it should become an integral feature of health care services. If we want to protect our environment and health of the community, we must sensitize ourselves to this important issue not only in the interest of health managers but also in the interest of community.

**Keywords:** Biomedical waste management, Hospital waste, Hospital waste disposal.

**How to cite this article:** Singh H, Joshi HS, Singh A, Katyal R, Singh R. Biomedical Waste Management Rules, 2016: A Brief Review. *Int J Adv Integ Med Sci* 2017;2(4):201-204.

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

The waste produced in the course of health care activities carries a higher potential for infection and injury than any other type of waste. Inadequate and inappropriate handling of health care waste may have serious public health consequences and a significant impact on the environment.<sup>1</sup> The rules framed by the MoEF, Government of India, known as "Bio-medical Waste (Management and Handling) Rules, 1998" were notified on July 20, 1998.

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First amendment was made on March 6, 2000, and second amendment on September 17, 2003. The MoEF has notified the new BMWM Rules, 2016, on March 28, 2016, under the Environment (protection) Act, 1986, to replace the earlier rules (1998) and the amendments thereof. It was published in the Gazette of India, Extraordinary part II, Section 3, subsection (i).<sup>2</sup> This provides uniform guidelines and code of practice for the whole nation. It is clearly mentioned in this rule that the "occupier" (a person who has control over the concerned institution/premises) of an institution generating biomedical waste shall be responsible for taking necessary steps to ensure that such waste is handled without any adverse effect to human health and the environment. If we want to protect our environment and health of the community, we must sensitize ourselves to this important issue not only in the interest of health managers but also in the interest of community.

## DEFINITION

"Biomedical waste" means any waste which is generated during the diagnosis, treatment, or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological waste or in health camps.<sup>3</sup>

"Biomedical waste treatment and disposal facility" means any facility wherein treatment, disposal of biomedical waste, or processes incidental to such treatment and disposal are carried out, and includes common biomedical waste treatment facilities (CBWTFs).<sup>3</sup>

"Occupier" means a person having administrative control over the institution and the premises generating biomedical waste, irrespective of their system of medicine and by whatever name they are called.<sup>3</sup>

"Authorization" means permission granted by the prescribed authority for the generation, collection, reception, storage, transportation, treatment, processing, disposal, or any other form of handling of biomedical waste in accordance with these rules and guidelines issued by the Central Government or Central Pollution Control Board.<sup>3</sup>

## APPLICATION

These rules shall apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle biomedical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal

houses, pathological laboratories, blood banks, Ayush hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first-aid rooms of schools, forensic laboratories, and research labs.

### NEED FOR BIOMEDICAL WASTE MANAGEMENT

Improper management of health care waste may lead to nosocomial infections to patients from poor infection control practices and poor waste management, drugs which have been disposed, repacked, and sold off to unsuspecting buyers. There is a risk of air, water, and soil pollution directly due to waste, or due to defective incineration emissions and ash and also a risk of infection outside hospital for waste handlers and scavengers and other people.

In India, on an average 0.3 to 3.5 kg/bed/day of solid waste is produced which contains up to 13% of BMW, 20% sharp objects, 2% discarded instruments and containers, 0.3% radioactive waste, and rest as garbage. Approximately 4 to 250 L/bed/day of liquid waste is produced which contains sewage from isolation wards, intensive care unit toilets and urinals, bed bath, bathrooms, hospital laundry, wash water from labs, outpatient departments, dressing rooms, and operation theaters.<sup>4</sup>

### GROUP AT RISK

The environment, medical doctors, nurses, health care auxiliaries, and hospital maintenance personnel, patients in health care establishments, visitors to health care establishments, workers in support service, such as laundries, waste handling, and transportation; and workers in waste disposal facilities, such as landfills or incinerators.<sup>5</sup>

### PRESENT SCENARIO

Gross generation of BMW in India is 501 tonnes per day from 188,098 health care facilities (HCFs), out of which 486 TPD of the waste is treated. Hence, almost 15 TPD of the waste is left untreated and reenters to our system. There are 203 CBWTFs in operation, and 32 are under construction. As reported, 6,074 HCFs/CBWTFs are observed to be violating the provision of the BMW rules.<sup>6</sup>

### BIOMEDICAL WASTE MANAGEMENT RULES, 2016

The BMW Rules, 2016 contain 4 schedules, 5 forms, and 18 rules, which tell us about applications; definitions; duties of operators and authorities; segregation, packaging, transportation, and storage of waste; standards for treatment and disposal; list and duties of prescribed authority; procedure for authorization; advisory committee; monitoring of implementation of the rules in HCFs; maintenance of records; appeal; and annual and accidental reporting.<sup>3</sup>

Schedules are

- Biomedical waste management categories, segregation, color coding, collection, treatment, and disposal—Schedule I (Table 1)
  - Standards for treatment and disposal—Schedule II (Table 2)
  - Prescribed authorities and responsibilities—Schedule III (Table 3)
  - Labels for BMW containers and bags—Schedule IV
- Forms are
- Accidental reporting—Form I
  - Application and authorization documents—Forms II and III
  - Annual reporting—Form IV (Fig. 1)
  - Appeal—Form V

Steps for Bio medical Waste Management are explained in Flow Chart 1.

### Annual Report

Submit an annual report to the prescribed authority in Form IV by 30 June of every year, to include information about the categories and quantities of biomedical wastes handled.

### Accident Report

In any accidents, authorized person shall intimate immediately to the prescribed authority, and forward a report within 24 hours in writing regarding the remedial steps taken in Form I.

### Authorization

An authorization shall be granted for a period of 3 years, including an initial trial period of 1 year from the date of issue.

### PENALTY

Penalty is imposed on persons, owners, or occupiers, those who are found to be cause of pollution. Punishment may extend to 5-year imprisonment or fine up to 1 lakh rupees or both under IPC Section 15, 16, and 17. If not complied, a fine of Rs. 5,000 per day extra and if not complied for more than 1 year, then imprisonment may extend up to 7 years.<sup>7</sup>

### CHALLENGES FOR BMW

Establishing robust waste management policies within the health care facility/organization, wide awareness about the health hazards, sufficient financial and trained human resources, proper monitoring and control of waste disposal, clear responsibility and traceability for appropriate handling and disposal of waste are some challenges for the management of biomedical waste.

**Table 1:** Schedule I—BMWM categories, segregation, color coding, collection, treatment, and disposal

Category	Type of waste	Type of bag or container to be used	Treatment and disposal options
Yellow	(a) Human anatomical waste (b) Animal anatomical waste (c) Soiled waste (d) Expired or discarded medicines (e) Chemical waste (f) Discarded linen, mattresses, beddings contaminated with blood or body fluid (g) Microbiology, biotechnology, and other clinical laboratory waste (h) Chemical liquid waste ➡	Yellow-colored nonchlorinated plastic bags or containers	Incineration or plasma pyrolysis or deep burial  After resource recovery, the chemical liquid waste shall be pretreated before mixing with wastewater; the combined discharge shall conform to the discharge norms
Red	Contaminated waste (recyclable) tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles), and vacutainers (with their needles cut) and gloves	Red-colored nonchlorinated plastic bags or containers	Autoclaving or microwaving/hydroclaving followed by shredding or mutilation or combination of sterilization and shredding; plastic waste should not be sent to landfill sites
White (translucent)	Waste sharps including metals, needles, syringes with fixed needles, needles from needle-tip cutter or burner, scalpels, blades	Puncture-proof, leak-proof, tamper-proof containers	Autoclaving or dry heat sterilization followed by shredding or mutilation or encapsulation in metal container or cement concrete
Blue	(a) Glassware (b) Metallic body implants	Cardboard boxes with blue-colored marking	Disinfection or through autoclaving or microwaving or hydroclaving and then sent for recycling

**Table 2:** Schedule II—standards for treatment and disposal

Standards for incineration
Operating and emission standards for disposal by plasma pyrolysis or gasification
Standards for autoclaving of biomedical waste
Standards of microwaving
Standards for deep burial
Standards for efficacy of chemical disinfection
Standards for dry heat sterilization
Standards for liquid waste

**Table 3:** Schedule III—list of prescribed authorities

Ministry of Environment, Forest and Climate Change, Government of India
Central or State Ministry of Health and Family Welfare, Central Ministry for Animal Husbandry and Veterinary or State Department of Animal Husbandry and Veterinary
Ministry of Defence
Central Pollution Control Board
State Government of Health
State Pollution Control Boards
Municipalities or Corporations

**BIOHAZARD SYMBOL**  
जैविक परिसंकेत चिन्ह



A

**CYTOTOXIC HAZARD SYMBOL**  
कोषिकाविष परिसंकेत चिन्ह



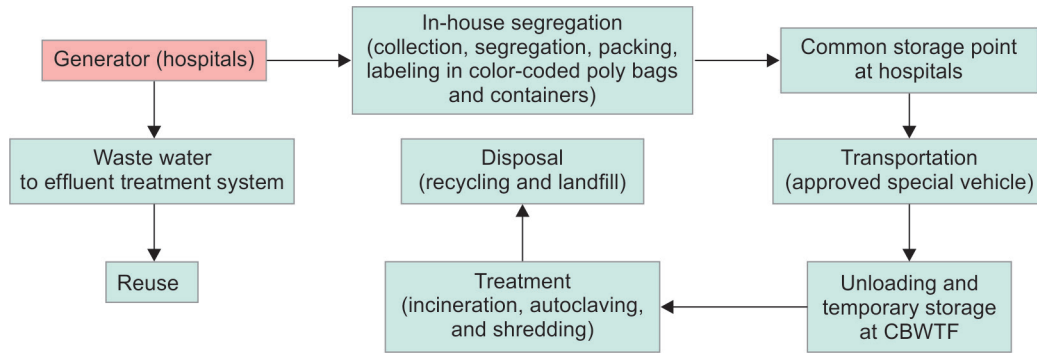
B

Label shall be non-washable and prominently visible

Day..... Month..... Year..... Date of generation.....

Waste Category No.....	In case of emergency please contact
Waste quantity.....	Name and Address:
Sender's Name and Address	Phone No.
Phone No.....	Receiver's Name and Address
Telex No.....	Phone No.....
Fax No.....	Telex No.....
Contact Person.....	Fax No.....
	Contact Person.....

**Figs 1A and B:** Schedule IV—label for biomedical waste containers or bags

**Flow Chart 1:** Flow chart for biomedical waste management

## CONCLUSION

Key to BMWWM is the segregation as individual categories of waste are to be treated and disposed of in different specific ways. Biomedical waste handling has hazardous effect on the health of both medical professionals and general public. Appropriate management of health care waste is a crucial component of environmental health protection, and it should become an integral feature of health care services. Biomedical waste management is generally neglected, but it can cause serious health problems, significant impact on environment, and extra burden to the country. Proper disposal of biomedical waste can significantly reduce the harmful effects of health consequences and will also reduce the economic loss of country. Biomedical waste management program cannot be successfully implemented without the willingness, self-motivation, and cooperation from all sections of employees of any health care setting. Government commitment and support is needed to reach an overall and long-term improvement of the situation, although immediate action can be taken locally.

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