



(A Quarterly Newsletter From ICMR - National Institute of Pathology) ,New Delhi

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BIOMEDICAL WASTE MANAGEMENT



DEFINITION

- **Biomedical waste (BMW)** means any waste, which is generated during the diagnosis, treatment, Or
 - Immunization of human beings or animals, Or
 - Research activities ,Or
 - In the production or testing of biologicals ,Or
 - In health camps including the categories mentioned in schedule 1.

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MALPRACTICES



WHO ARE AT RISK?

- Doctors, nurses, researchers and paramedical workers
- Patients in health care establishments
- Visitors in health care establishments
- Workers in allied services eg: laundry, waste handling and transportation and
- Workers in waste disposal facilities (including rag pickers) eg: landfills and incinerators

HEALTH HAZARDS OF HEALTH CARE WASTE:

- Hazards from infectious waste and sharps
 - HIV
 - HepB, HepC
 - Antibiotic resistant bacteria and other pathogens
- Chemical and pharmaceutical waste
 - Corrosives
 - Burns
 - Explosives
- **Genotoxic waste:**
 - Depends upon substance toxicity
 - Amount of exposure
 - Time period of exposure
- Radioactive waste:
 - Headache, dizziness vomiting after small exposure
 - Serious health problems if exposure is high
- Healthcare waste especially anatomical waste

● NEED FOR BMW MANAGEMENT

The reasons due to which there is a great need of management of Biomedical hospital waste are:

- ☐ Injuries from sharps leading to infection in all categories of hospital personnel and waste handlers.
- ☐ Nosocomial infection
- ☐ Risk of infection to general public living in the vicinity of hospitals.
- ☐ Risk associated due to hazardous chemicals, drugs in persons handling such wastes at all levels.
- ☐ “disposables” being repacked and sold by unscrupulous elements without even being washed (Illegal Recycling)
- ☐ Drugs which have been disposed of, being repacked and sold off to unsuspecting buyers.
- ☐ Risk of air, water and soil pollution.

● PRESENT SCENARIO

According to the Ministry of Environment, Forests & Climate Change

- Gross generation of BMW in India is 484 TPD from 1,68,869 healthcare facilities (HCF), out of which 447 TPD is treated
- Almost 38 TPD of the waste is left untreated and is not disposed, thus finding its way in dumps or water bodies and re-enters our system.

● Responsibility for safe disposal of BMW

As per the Bio-Medical Waste (Management and Handling) Rules, 1998,

- It is the duty of the health care facilities generating bio-medical waste to take all necessary steps to ensure that such waste is handled without any adverse effect to human health and environment.
- It can do so either in its own treatment facilities or
- Ensure requisite treatment through a common BMW treatment and disposal facility.

● BIOMEDICAL WASTE MANAGEMENT AND HANDLING RULES NOTIFICATIONS AND AMENDMENTS

- On 20th July 1998 Ministry of Environment and Forests (MoEF), Govt. of India, framed a rule known as **Bio-medical Waste (Management and Handling) Rules**,
- 1st Amendment dated 06/03/2000
- 2nd Amendment dated 17/09/2003
- MoE, F&CC has notified the new BMW(M) rules, on 28th March 2016 under the Environment (Protection) Act, 1986 to replace the earlier rules (1998) and the amendments, thereof.

- Published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i)
- Provide uniform guidelines and
- Code of practice for management and handling of biomedical wastes generated from
 - Hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses,
 - Pathological labs, 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 labs and research labs.
- This new rule is more.....
 - Comprehensive in nature
 - Simplified for user management
 - It Contain important features of BMW(M&H) rules, 1998Several new provisions have been added in the new rules.

● DUTIES OF OPERATOR

- To take all necessary steps to ensure that the BMW collected from the occupier is transported, handled, stored, treated & disposed of without any adverse effect to human health & environment.
- To ensure timely collection of BMW from the health care facilities.
- To inform the prescribed authority immediately regarding the health care establishments/facilities, which are not handing over the segregated BMW.
- To provide training of all its workers.
To undertake appropriate pre-placement & periodic medical examination and immunize all its workers and records for the same.
- To ensure occupational safety by providing protective equipments.
- To develop system of reporting of unintended accidents in Form III with annual report even for nil reporting.
- To maintain a log book of treatment equipment according to weight of batch; categories of waste treated; time; date; duration of treatment cycle & total hours of operation.

SCHEDULES

SCHEDULE 1- categories of BMW

SCHEDULE 2- color coding


SCHEDULE 3- label of hazardous waste

SCHEDULE 4- label of transport of BMW containers/bags

SCHEDULE 5- standards for incineration, autoclaving, sewerage, deep burial

SCHEDULE 6- deadlines for implementation


TYPES OF BIO-MEDICAL WASTES RULE 2016 SCHEDULE-1

Cat.	Type of Bag/ Container used	TYPE OF WASTE	Treatment /Disposal options
Yellow 	non-chlorinated plastic bags Separate collection system leading to effluent treatment system	a) Human Anatomical Waste b) Animal Anatomical Waste c) Soiled Waste d) Expired or Discarded Medicines e) Chemical Waste f) Micro, Bio-t and other clinical lab waste g) Chemical Liquid Waste	Incineration or Plasma Pyrolysis or deep burial*
Red 	non-chlorinated plastic bags or containers	Contaminated Waste (Recyclable) tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves.	Auto/ Micro/Hydro and then sent for recycling. not be sent to landfill
White 	(Translucent) Puncture, Leak, tamper proof containers	Waste sharps including Metals	Auto or Dry Heat Sterilization followed by shredding or mutilation or encapsulation
Blue 	Cardboard boxes with blue colored marking	Glassware	Disinfection or auto/ Micro/hydro and then sent for recycling.

Biomedical waste poses hazard due to two principal reasons:
– Infectivity and Toxicity

SCHEDULE-IV (2016)
LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS (PART 'A')

BIOHAZARD SYMBOL



BIOHAZARD

CYTOTOXIC HAZARD SYMBOL



CYTOTOXIC

HANDLE WITH CARE

Note : Label shall be non-washable and prominently visible.

PART-B
LABEL FOR TRANSPORTING BIO-MEDICAL WASTE BAGS OR CONTAINERS

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

- Day.....
- Month.....day
- Year.....
- Date of generation.....
- Receiver's Name and Address
- Phone No.....
- Fax No.....
- Contact Person.....

NOTE: label shall be non-washable and prominently visible.

SCHEDULE-VI (1998)/ III(2016)

List of authorities and the corresponding duties

- 1) Ministry of Environment & Forests
- 2) Central/State Ministry of Health & Family Welfare, Veterinary and Animal Husbandry
- 3) Ministry of Defence
- 4) Central Pollution Control Board
- 5) State Gov./Union Territory Gov./Administration
- 6) State Pollution Control Boards/Committees
- 7) Local bodies such as Gram Panchayat, Municipalities.

STEPS TO MANAGE BMW

- waste collection
- segregation
- storage
- treatment
- transport to final disposal site
- final disposal
- All the above should be plan in safe manner to prevent nosocomial or hospital acquired infection.

Segregation

- Segregation refers to the basic separation of different categories of waste generated at source
- Most crucial step
- Effective segregation alone can ensure effective bio-medical waste management. The BMWs must be segregated in accordance to guidelines laid down under Schedule1.

How does Segregation help?

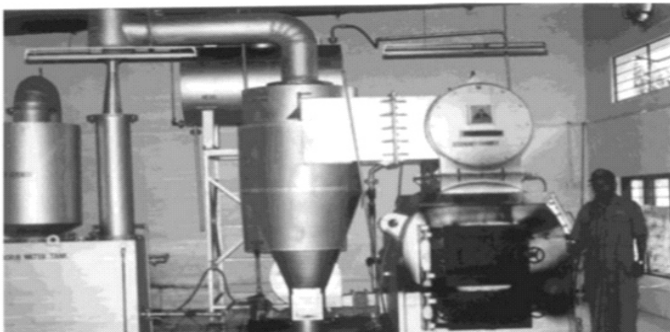
- Segregation reduces the amount of waste that needs special handling and treatment.
- Prevents any mixing of medical waste with general waste.
- Prevents illegal reuse of certain components of medical waste like used syringes.
- Provides an opportunity for recycling certain components of medical waste like plastics after proper and thorough disinfection.
- Reduces the cost of treatment and disposal.



Treatment and disposal technologies for BMW

- INCINERATION
 - Double chamber pyrolytic incinerator
 - Rotatory kilns
 - CHEMICAL DISINFECTION
- WET AND DRY THERMAL TREATMENT
- High pressure steam
 - Non- burn, dry thermal disinfection.
- MICROWAVE IRRADIATION
- LAND DISPOSAL
 - Not to be dumped in open dumps
 - Sanitary landfills should be used
 - INERTIZATION
- Mixing with cement and other substances before disposal

BIO MEDICAL WASTES DESTRUCTION BY DOUBLE CHAMBERED INCINERATOR



INCINERATOR ASH DISPOSAL



BIO MEDICAL PLASTIC WASTES DISINFECTION BY SODIUM HYPOCHLORITE



Consequences of poorly managed medical waste disposal

- According to Biomedical Waste Management Rules, 2016: all healthcare units handling Bio- medical waste in any form must pre-treat it onsite through disinfection or sterilization process, failure to which can lead to **imprisonment of five years or fine of Rs. 1 lakh or both to** Head of the institute, management, scientists and researchers, Chairman, Board of Directors, General Managers.

Conclusions

- Safe and effective management of waste is not only a legal necessity but also a social responsibility.
- Proper collection and segregation of bio-medical waste.
- Biomedical waste should not be mixed with other wastes such as municipal waste.
- Try to reduce the waste generation.
- Individual awareness and participation.
- Label with agent, concentration and hazard warnings.
- Transportation of BMW is allowed only in vehicles authorized by the prescribed authority.
- No untreated biomedical waste shall be kept stored beyond 48 hours.
- Communicate about workplace hazards.

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* The views expressed are purely those of the author.

INSTITUTIONAL ACTIVITIES

CONFERENCES/PROCEEDINGS/SEMINARS/TRAINING COURSES ORGANISED/ATTENDED

Guest lecture entitled, “**Drivers of Basal Cell Carcinoma: Possible Novel Therapeutic Approaches**” by Prof. Athar Mohammad, Sr. Scientist UAB Comprehensive Cancer Centre, Co-Director, UAB Skin Disease Research Centre at NIP on 19th January 2018.

6th National workshop on “**Next Generation Sequencing Data Analysis: Integrating Genomics, Transcriptomics and Proteomics Data for Potential Therapeutics Target Discovery**” was organized at NIP from 26th February to 1st March 2018.



A Lecture on **Bio-Hazards Waste** was delivered by Dr. Aroonima Misra, Scientist 'C' in *Swachh Bharat Pakhwara* celebrated at NIP on 13th April 2018.



NIP organized Cancer Awareness Programme on 19th April 2018. Lectures were delivered by Dr. Megha Tandon, Asstt. Prof. Surgery, VMMC & SJH and Dr. Shweta Jaitly, ENT Spl., VMMC & SJH, on **Breast Cancer and Oral cancer**.

18th Smt. Pushpa Sriramachari Foundation Day was celebrated on 2nd May 2018 at NIP.

Smt. Pushpa Sriramachari Foundation Day Oration was delivered on “**Obstructive Sleep Apnea and Metabolic Syndrome**” by Prof. Randeep Guleria, Director, All India Institute of Medical Sciences, New Delhi on 2nd May 2018 at NIP.



Mr. Kumar Avishek was awarded **6th Dr. S. Sriramachari Young Scientist Award** for his research on *“Pre-clinical studies to assess the protective immunogenicity of Centrin-I gene deleted live attenuated Leishmania vaccine candidate in human PBMCs”*.

Awarded by:

Prof. Balram Bhargava

Secretary, DHR & Director General ICMR, New Delhi

ICMR- NATIONAL INSTITUTE OF PATHOLOGY VI Dr. S. Sriramachari Young Scientist Award 2018



On completion of 25 years of service, **“Long Service Award”** was given to **Mrs. Seema Sharma**, S.T.O.

Awarded by:

Prof. Balram Bhargava

Secretary, DHR & Director General ICMR, New Delhi



Library activities

- Mrs. Anita Sharma, ALIO participated and presented paper in the National Seminar on “**Access & Availability of Medical Literature in Electrical Environment**” organized by B.B. Dikshit Library, AIIMS, New Delhi on 17th April 2018 at AIIMS.



- Mrs. Anita Sharma, ALIO participated in National Conference on “**ERMED: Digital Health India: A Reality**” organized by NML, New Delhi from 3rd-4th May 2018.





"एक कदम स्वच्छता की ओर"

स्वच्छ भारत अभियान

"EK KADAM SWACHHTA KI AOR"

Mrs. Valsamma Mathew

Introduction

India is a big populated country and we are proud to be its citizens. In this modern world, where globalization is going very fast due to the rapid race for development, everyone has forgotten their duty towards nation and nature's beauty. If we do not maintain cleanliness, whether it is our homes, surrounding areas or whole nation, we shall always remain in the fear of diseases and this shall also give rise to the social issues such as poverty, inequality, illiteracy, etc.

Swachh Bharat Abhiyan is also called as the Clean India Mission or *Swachh Bharat* campaign. This campaign was officially launched by the Hon'ble Prime Minister, Mr. Narendra Modi on the 145th birth anniversary of Mahatma Gandhi (Bapu) on 2nd October 2014 at Rajghat, New Delhi. *Swachh Bharat Abhiyan* was started by the government to make India a completely cleaner India. "**Clean India**" was a dream seen by Mahatma Gandhi regarding which he said that, "*Sanitation is more important than independence*". Unfortunately, India lacks cleanliness and sanitation even after 67 years of independence.

This mission has been targeted to be completed by the 150th birth anniversary of Bapu (2nd October 2019) as urged by the government to its people to spend only 100 hours of the year towards cleanliness in their surrounding areas or places of India to really make it a successful campaign.

Objectives of *Swachh Bharat Abhiyan*

- *Public awareness will be provided about the drawback of open defecation and promotion of latrine use. For project on sanitation, the mission will aim at changing people's attitudes, mind-sets and behaviours.*
- *To keep villages clean, the solid and liquid waste management will be ensured through Gram Panchayats.*
- *To lay water pipelines in all villages, and ensuring water supply to all households by 2019.*

Need of *Swachh Bharat Abhiyan*

- *It is very essential to eliminate the open defecation in India as well as making available toilet facility to everyone.*
- *It is needed in India to convert the insanitary toilets into flushing toilets.*
- *It is necessary in order to eradicate the manual scavenging system.*
- *It is to implement the proper management through the scientific processes, hygienic disposal, reuse, and recycling of the municipal solid wastes.*
- *It is to bring behavioral changes among Indian people regarding maintenance of personal hygiene and practice of healthy sanitation methods.*
- *It is to create global awareness among common public living in rural areas and link it to the public health.*

- ☐ *It is to make India a clean and green India.*
- ☐ *It is necessary to improve the quality of life of people in rural areas.*
- ☐ *It is to bring the dream of Bapu to really come true.*

We can do little things

- ☐ *Organize different awareness programmes on cleanliness and sanitation.*
- ☐ *Construction of toilets in schools and public places.*
- ☐ *Programme to eliminate open defecation.*
- ☐ *Make people aware about the health issues raised because of open defecation.*
- ☐ *Solid and liquid waste management.*
- ☐ *Always keep our home and workplace clean.*
- ☐ *Make sustainable sanitation practices by motivating communities and Panchayati Raj institutions through the awareness programmes like health educators.*
- ☐ *Clean India would draw more tourists and improve its economical conditions.*
- ☐ *Improve GDP growth and generate variety of sources of employment.*
- ☐ *Reduce death rate, health expenses and lethal disease rate.*

How our youth can contribute to Swachh Bharat Mission

Lets come together and help the government achieve this great initiative; here is how:-

- ☐ *The streets should not have even a single plastic waste, the garbage should be cleared out daily by the municipality people.*
- ☐ *Delegate the responsibilities and just don't settle for anything less than perfect.*
- ☐ *Keep a check and involve other people of the society as well.*

Educating people for the better future

- ☐ *Educate your domestic help and workers in and around your housing colony.*
- ☐ *Go to small villages which are close to where you live and explain to them how important it is to use a toilet.*
- ☐ *Tell them that they are polluting the environment and you are getting affected too.*

Talk to the Local Government Officer

- ☐ *You can always talk to the local government officials and offer them your help and support.*
- ☐ *A couple of volunteers can be of great help in covering a bigger area in spreading the awareness and spearheading the campaign.*
- ☐ *Help them in taking surveys and doing other important bits of the campaign.*

- *Industrial Pollution:* Reach out to higher authority who can go and check the factories which according to you pollute the environment. Keeping a track of so many factories can be a tough job, naming them for the government can be of great help.
- *Stop other people:* The moment you see someone littering or polluting the environment, throwing in some major health risks and other problems which might occur due to pollution.
- **How is this making swachh Bharat Abhiyan effective?**
Well, I am sure I don't need to explain how a clean environment will benefit all of us, the other things which make it effective are:
 - **Government and nation share the same interest:-** If we all are working towards a common goal, we can ensure that the objective is met by 2019 or even before that.
 - **Unity in diversity:-** This coming together of all of the people for one cause can be transferred to various causes and we can finally see some actual work happening in the country putting a proper system in place.
 - **Carry forward:-** The youth can carry forward this abhiyan as a regular project and pass it on to the future generations because we want this initiative to last forever.
 - **Uniformity in implementation:-** The youth is all over the country, so they can ensure that this campaign is successful in every state, city and village of the country. The reach of the youth is way beyond political barriers and reach of technology.
Swachh Bharat can become way bigger if only we give it a chance to become big. We need to be an active part of the campaign for it to become effective on a nationwide level. We are the nation and like Mahatma Gandhi rightly said, 'We should be the change we wish to see in the society'.
- The President of India, Mr. Pranab Mukherjee said in June 2014, while addressing the parliament that *"For answering hygiene, waste management and sanitation across the nation, a Swachh Bharat Mission will be launched. This will be our tribute to Mahatma Gandhi on his 150th birth anniversary to be celebrated in year 2019"*. In order to fulfill the vision of Mahatma Gandhi and to make India an ideal country in the world, the Prime Minister of India initiated this campaign Swachh Bharat Abhiyan on the birthday of Mahatma Gandhi. Through the campaign, Prime Minister, Mr. Narendra Modi selected notable public figures to propagate this campaign.
 - Anil Ambani
 - Baba Ramdev
 - Kamal Hassan
 - Mridula Sinha
 - Priyanka Chopra
 - Sachin Tendulkar
 - Salman Khan
 - Shashi Tharoor
 - Team of TV series Tarak Mehta Ka Ulta Chashmah

CONCLUSION:

- We can say Swachh Bharat Abhiyan is a nice welcome step to clean and green India till 2019. **“Cleanliness is next to Godliness”**: We can say surely that the Clean India campaign (Swachh Bharat Abhiyan) will really bring wonders if it is followed by the people of India in an effective manner.
- So, the cleanliness activities to welcome the godliness have been started but do not need to be ended if we really want godliness in our lives forever. A healthy country and a healthy society need its people to be healthy and clean in every walk of life. It is a good theme and we can see so many posters and pamphlets regarding this. Awareness campaigns are taking place and people are understanding their importance. So now, this mission has been very good for this country and the country is improving in cleanliness.

*** The views expressed are purely those of the author.**

New Joinings at NIP

- **Ms. Veena Bhatt (w.e.f. 1st January 2018) and Mr. Ravinder Kumar (w.e.f. 12th February 2018) joined as UDC**



**We bid farewell to Mrs. Madhu Badhwar,
Technical Officer on her superannuation on 27th April 2018**

