BIO-MEDICAL WASTE MANAGEMENT

Introduction

All human activities produce waste. We all know that such waste may be dangerous and needs safe disposal. Industrial waste, sewage and agricultural waste pollute water, soil and air. It can also be dangerous to human beings and environment. Similarly, hospitals and other health care facilities generate lots of waste which can transmit infections, particularly HIV, Hepatitis B & C and Tetanus, to the people who handle it or come in contact with it.

Most countries of the world, especially the developing nations, are facing the grim situation arising out of environmental pollution due to pathological waste arising from increasing populations and the consequent rapid growth in the number of health care centres. India is no exception to this and it is estimated that there are more than 15,000 small and private hospitals and nursing homes in the country. This is apart from clinics and pathological labs, which also generate sizeable amounts of medical waste.

India generates around three million tonnes of medical wastes every year and the amount is expected to grow at eight per cent annually. Creating large dumping grounds and incinerators is the first step and some progressive states such as Maharashtra, Karnataka and Tamil Nadu are making efforts despite opposition.

Barring a few large private hospitals in metros, none of the other smaller hospitals and nursing homes have any effective system to safely dispose of their wastes. With no care or caution, these health establishments have been dumping waste in local municipal bins or even worse, out in the open. Such irresponsible dumping has been promoting unauthorized reuse of medical waste by the rag pickers for some years now.

Surveys carried out by various agencies show that the health care establishments in India are not giving due attention to their waste management. After the notification of the Bio-medical Waste (Handling and Management) Rules, 1998, these establishments are slowly streamlining the process of waste segregation, collection, treatment, and disposal. Many of the larger hospitals have either installed the treatment facilities or are in the process of doing so.

Bio-medical waste

Bio-medical waste means "any solid and/or liquid waste including its container and any intermediate product, which is generated during the diagnosis, treatment or immunization of human beings or animals.

Biomedical waste poses hazard due to two principal reasons – the first is infectivity and other toxicity.

Bio Medical waste consists of

- Human anatomical waste like tissues, organs and body parts
- Animal wastes generated during research from veterinary hospitals
- Microbiology and biotechnology wastes
- Waste sharps like hypodermic needles, syringes, scalpels and broken glass
- Discarded medicines and cytotoxic drugs
- Soiled waste such as dressing, bandages, plaster casts, material contaminated with blood, tubes and catheters
- Liquid waste from any of the infected areas
- Incineration ash and other chemical wastes

Legal aspect

The Central Government, to perform its functions effectively as contemplated under sections 6, 8, and 25 of the Environment Protection Act, 1986, has made various Rules, Notifications and Orders including the Bio-medical wastes (Management & Handling) Rules, 1998.

A brief summary of the provisions in Bio-medical wastes (Management & Handling) Rules, 1998 is given below.

- Section 3 establishes the authority of the government to undertake various steps for protection and improvement of the environment.
- Section 5 provides for issuance of directions in writing.
- Section 6 empowers the government to make rules.
- Section 8 permits the education of individuals dealing with hazardous wastes regarding various safety measures.
- Section 10 bestows authority to enter the premises and inspect.
- Section 15 allows the government to take punitive steps against defaulters. This involves imprisonment up to five years or penalty of upto rupees one lakh or both. In case the default continues, it would then attract a penalty of rupees five thousand per day up to one year and thereafter imprisonment up to seven years.
- Section 17 provides for punishment in case of violations by government departments.

Even after the June, 2000 deadline most of the large hospitals have not complied with these Rules, as there is no specified authority to monitor the implementation of these Rules. But, the fact is that in most of the states, the pollution control boards that are connected with waste in general do not have adequate powers or commitment to enforce the Rules.

Applicability of BMW Rules, 1998

The BMW Rules are applicable to every occupier of an institution generating biomedical waste which includes a hospital, nursing homes, clinic, dispensary, veterinary institutions, animal houses, pathological lab, blood bank by whatever name called, the rules are applicable to even handlers.

Common Biomedical wastes treatment facility [CBWTFs]

The Common Biomedical wastes treatment facility, (see rules 14, amended in June 2000, which cast the responsibilities on municipal bodies to collect biomedical wastes/treated biomedical wastes and also provide sites for setting up of incinerator.) The owner of CBWTFs are service providers, who are providing services to health care units for collection of BMWs for its final disposal to their site.

Inventory of Tamilnadu

The Tamilnadu Pollution Control Board enforces the Biomedical Waste (Management and Handling) Rules, 1998 as amended in 2000. As part of this process, the Board has so far inventoried 317 Government hospitals and 1,835 private hospitals. The Board has issued directions to the Government and private hospitals to take time-bound action for identifying sites and setting up common facilities for management of biomedical wastes in coordination with the Indian Medical Association.

So far 11 sites have been identified for the above said purpose

6 units under operation are

- Thenmelpakkam and Chennakuppam villages in Kancheepuram district
- Kandipedu village in Vellore district
- Sengipatti village in Thanjavur district
- Muthuvoyal village in Ramanathapuram district
- Coonoor in the Nilgiris district

5 units under establishment are

- Orathukuppai village in Coimbatore district (2 facilities)
- Thangayur village in Salem district
- Undirumikkadakulam village in Virudhunagar district
- Ettankulam village in Tirunelveli district.

The components of a common biomedical waste treatment and disposal facility [CBWTFs] are autoclave, shredder, compactor, and incinerator for anatomical waste, secured landfill facility, laboratory and vehicles for transportation of wastes.

The biomedical waste (BMW) management requires its categorisation as a first step. The BMW Rules classify the BMW into ten categories.

CATEGORIES OF BIOMEDICAL WASTE SCHEDULE – I

WASTE CATEGORY	TYPE OF WASTE	TREATMENT AND DISPOSAL OPTION
Category No. 1	Human Anatomical Waste (Human tissues, organs, body parts)	Incineration@ / deep burial*
Category No. 2	Animal Waste (Animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals and colleges, discharge from hospitals, animal houses)	Incineration@ / deep burial*
Category No. 3	Microbiology & Biotechnology Waste (Wastes from laboratory cultures, stocks or specimen of live micro organisms or attenuated vaccines, human and animal cell cultures used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins and devices used for transfer of cultures)	Local autoclaving/ microwaving / incineration@
Category No. 4	Waste Sharps (Needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps)	Disinfecting (chemical treatment@@ / autoclaving / microwaving and mutilation / shredding##
Category No. 5	Discarded Medicine and Cytotoxic drugs (Wastes comprising of outdated, contaminated and discarded medicines)	Incineration@ / destruction and drugs disposal in secured landfills
Category No. 6	Soiled Waste (Items contaminated with body fluids including cotton, dressings, soiled plaster casts, lines, bedding and other materials contaminated with blood.)	Incineration@ / autoclaving / microwaving
Category No. 7	Solid Waste (Waste generated from disposable items other than the waste sharps such as tubing, catheters, intravenous sets, etc.)	Disinfecting by chemical treatment@@ / autoclaving / microwaving and mutilation / shredding# #
Category No. 8	Liquid Waste (Waste generated from the laboratory and washing, cleaning, house keeping and disinfecting activities)	Disinfecting by chemical treatment@@ and discharge into drains
Category No. 9	Incineration Ash (Ash from incineration of any biomedical waste)	Disposal in municipal landfill
Category No.10	Chemical Waste (Chemicals used in production of biologicals, chemicals used in disinfecting, as insecticides, etc.)	Chemical treatment @@ and discharge into drains for liquids and secured landfill for solids.

@@ Chemical treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

Mutilations / Shredding must be such as to prevent unauthorised reuse.

@ There will be no chemical pre-treatment before incineration. Chlorinated plastics shall not be incinerated.

* Deep burial shall be an option available only in towns with population less than five lakh and in rural areas.

COLOUR CODING AND TYPE OF CONTAINER SCHEDULE II

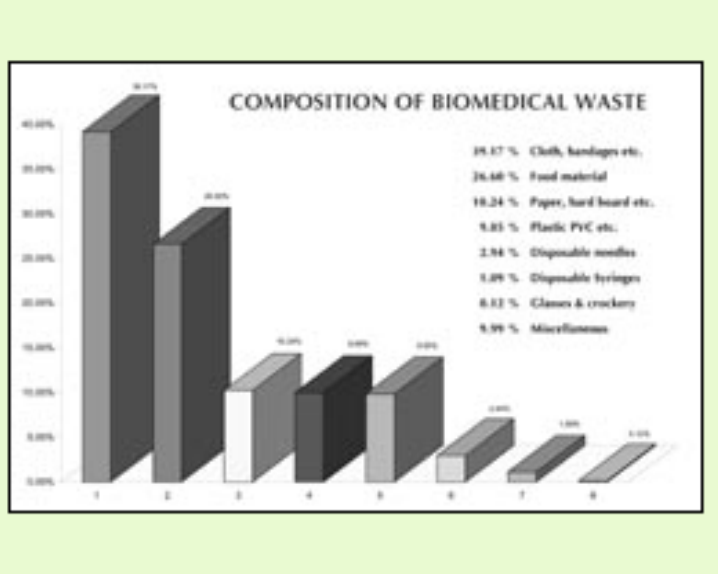
Colour Coding	Type of Container	Waste Category	Treatment options as per Schedule I
Yellow	Plastic bag	Cat.1,Cat.2, Cat.3 and Cat.6	Incineration/ deep burial
Red	Disinfected container/ plastic bag	Cat.3, Cat.6, and Cat.7	Autoclaving/Micro waving/ Chemical Treatment
Blue/ White Translucent	Plastic Bag/ puncture proof container	Cat.4 and Cat.7	Autoclaving/Micro waving/ Chemical Treatment and destruction/ shredding
Black	Plastic bag	Cat.5, Cat.9, and Cat.10 (solid)	Disposal in secured landfill

Notes:

- Colour coding of waste categories with multiple treatment options as defined in Schedule I, shall be selected depending on treatment option chosen, which shall be specified in Schedule I.
- Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
- Categories 8 and 10 (liquid) do not require containers/bags.
- Category 3 if disinfected locally need not be put in containers/bags.

Composition of BMW

The typical Hospital solid waste composition is as follows (based on CPCB report)



Segregation

Segregation refers to the basic separation of different categories of waste generated at source and thereby reducing the risks as well as cost of handling and disposal. Segregation is the most crucial step in bio-medical waste management. Effective segregation alone can ensure effective bio-medical waste management. The BMWs must be segregated in accordance to guidelines laid down under schedule 1 of BMW Rules, 1998.

How does segregation help?

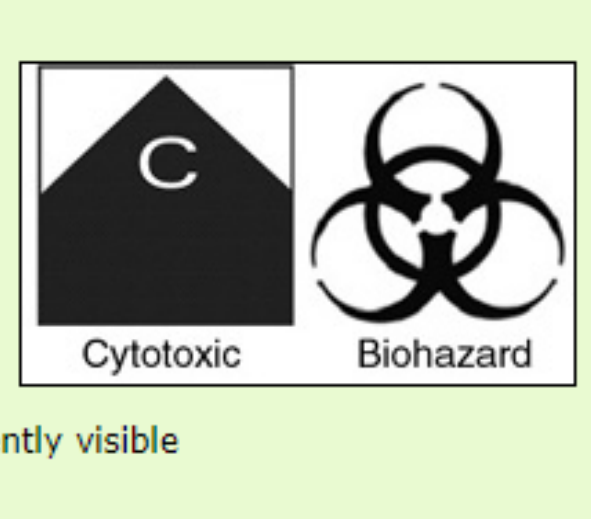
BIOHAZARDOUS
UN - 3291
REGULATED MEDICAL WASTE
DO NOT OPEN
Saf-T Tainer

- Segregation reduces the amount of waste needs special handling and treatment
- Effective segregation process prevents the mixture of medical waste like sharps with the general municipal waste.
- Prevents illegally reuse of certain components of medical waste like used syringes, needles and other plastics.
- Provides an opportunity for recycling certain components of medical waste like plastics after proper and thorough disinfection.
- Recycled plastic material can be used for non-food grade applications.
- Of the general waste, the biodegradable waste can be composted within the hospital premises and can be used for gardening purposes.
- Recycling is a good environmental practice, which can also double as a revenue generating activity.
- Reduces the cost of treatment and disposal (80 per cent of a hospital's waste is general waste, which does not require special treatment, provided it is not contaminated with other infectious waste)

Proper labelling of bins

The bins and bags should carry the biohazard symbol indicating the nature of waste to the patients and public.

Schedule III (Rule 6) of Bio-medical Waste (Management and Handling) Rules, 1998 specifies the Label for Bio-Medical Waste Containers / Bags as:



Label shall be non-washable and prominently visible

Collection

The collection of biomedical waste involves use of different types of container from various sources of biomedical wastes like Operation Theatre, laboratory, wards, kitchen, corridor etc. The containers/ bins should be placed in such a way that 100 % collection is achieved. Sharps must always be kept in puncture-proof containers to avoid injuries and infection to the workers handling them.

Storage

Once collection occurs then biomedical waste is stored in a proper place. Segregated wastes of different categories need to be collected in identifiable containers. The duration of storage should not exceed for 8-10 hrs in big hospitals (more than 250 bedded) and 24 hrs in nursing homes. Each container may be clearly labelled to show the ward or room where it is kept. The reason for this labelling is that it may be necessary to trace the waste back to its source. Besides this, storage area should be marked with a caution sign.

Transportation

The waste should be transported for treatment either in trolleys or in covered wheelbarrow. Manual loading should be avoided as far as for as possible. The bags / Container containing BMWs should be tied/ lidded before transportation. Before transporting the bag containing BMWs, it should be accompanied with a signed document by Nurse/ Doctor mentioning date, shift, quantity and destination.

Special vehicles must be used so as to prevent access to, and direct contact with, the waste by the transportation operators, the scavengers and the public. The transport containers should be properly enclosed. The effects of traffic accidents should be considered in the design, and the driver must be trained in the procedures he must follow in case of an accidental spillage. It should also be possible to wash the interior of the containers thoroughly.

BIO MEDICAL WASTE
KEEP
Bio-

Personnel safety devices

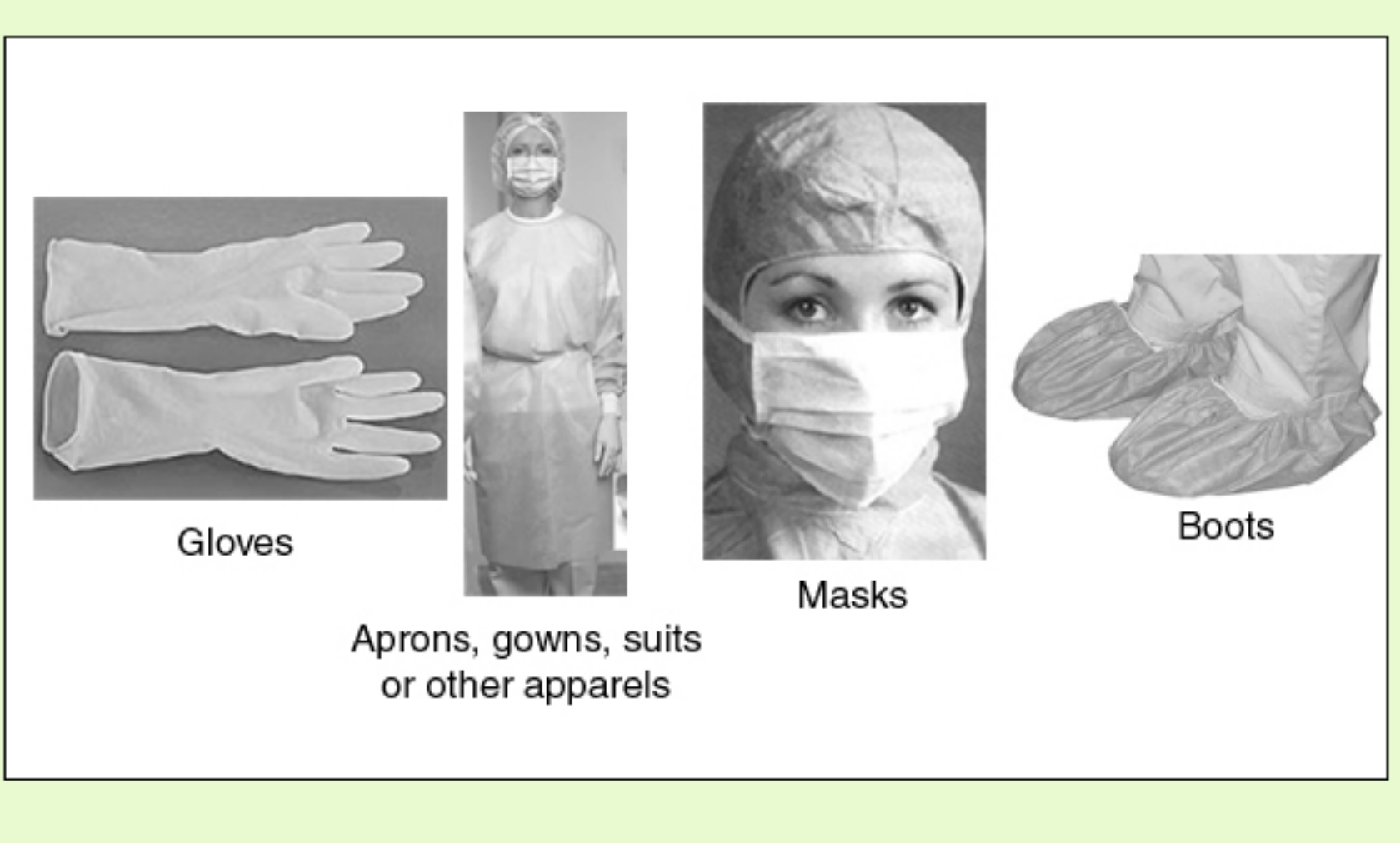
The use of protective gears should be made mandatory for all the personnel handling waste.

Gloves: Heavy-duty rubber gloves should be used for waste handling by the waste retrievers. This should be bright yellow in colour. After handling the waste, the gloves should be washed twice. The gloves should be washed after every use with carbolic soap and a disinfectant. The size should fit the operator.

Aprons, gowns, suits or other apparels: Apparel is worn to prevent contamination of clothing and protect skin. It could be made of cloth or impermeable material such as plastic. People working in incinerator chambers should have gowns or suits made of non-inflammable material.

Masks: Various types of masks, goggles, and face shields are worn alone or in combination, to provide a protective barrier. It is mandatory for personnel working in the incinerator chamber to wear a mask covering both nose and mouth, preferably a gas mask with filters.

Boots: Leg coverings, boots or shoe-covers provide greater protection to the skin when splashes or large quantities of infected waste have to be handled. The boots should be rubber-soled and anti-skid type. They should cover the leg up to the ankle.



Cleaning devices

Brooms: The broom shall be a minimum of 1.2 m long, such that the worker need not stoop to sweep. The diameter of the broom should be convenient to handle. The brush of the broom shall be soft or hard depending on the type of flooring.

Dustpans: The dustpans should be used to collect the dust from the sweeping operations. They may be either of plastic or enamelled metal. They should be free of ribs and should have smooth contours, to prevent dust from sticking to the surface. They should be washed with disinfectants and dried before every use.

Mops: Mops with long handles must be used for swabbing the floor. They shall be of either the cloth or the rubber variety. The mop has to be replaced depending on the wear and tear. The mechanical-screw type of mop is convenient for squeezing out the water.

Vacuum cleaners: Domestic vacuum cleaners or industrial vacuum cleaners can be used depending on the size of the rooms.

Storage devices

Dustbins:

It is very important to assess the quantity of waste generated at each point. Dustbins should be of such capacity that they do not overflow between each cycle of waste collection. Dustbins should be cleaned after every cycle of clearance of waste with disinfectants. Dustbins can be lined with plastic bags, which are chlorine-free, and colour coded as per the law.

Handling devices

Trolleys

Wheel Barrow

The use of trolleys will facilitate the removal of infectious waste at the source itself, instead of adding a new category of waste.

Wheelbarrows:

Wheelbarrows are used to transfer the waste from the point source to the collection centres. There are two types of wheelbarrow – covered and open. Wheelbarrows are made of steel and provided with two wheels and a handle. Care should be taken not to directly dump waste into it. Only packed waste (in plastic bags) should be carried. Care should also be taken not to allow liquid waste from spilling into the wheelbarrow, as it will corrode. These are ideal for transferring debris within the institution. Wheelbarrows also come in various sizes depending on the utility.

Chutes:

Chutes are vertical conduits provided for easy transportation of refuse vertically in case of institutions with more than two floors. Chutes should be fabricated from stainless steel. It should have a self-closing lid. These chutes should be fumigated everyday with formaldehyde vapours. The contaminated linen (contaminated with blood and or other body fluids) from each floor should be bundled in soiled linen or in plastic bags before ejecting into the chute.

Alternately, elevators with mechanical winches or electrical winches can be provided to bring down waste containers from each floor. Chutes are necessary to avoid horizontal transport of waste thereby minimizing the routing of the waste within the premises and hence reducing the risk of secondary contamination.

Treatment

What technology to use?

Technology options for 'treatment'

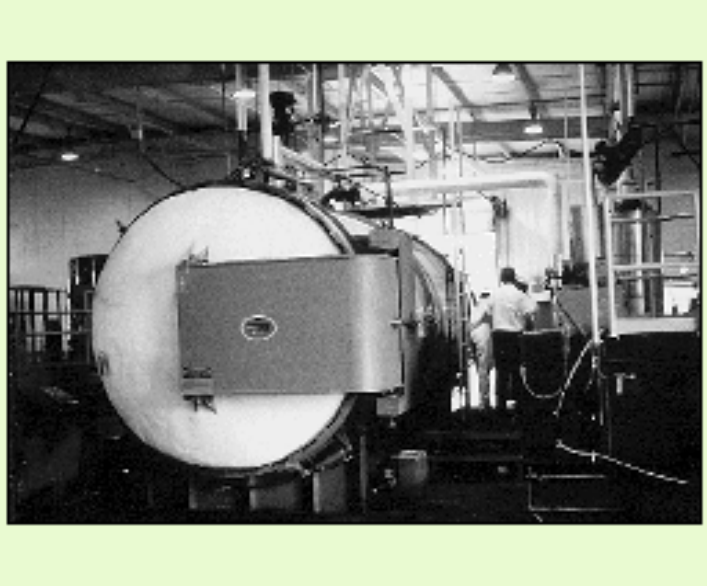
There are mainly five technology options available for the treatment of Bio-Medical Waste or still under research can be grouped as

1. Chemical processes
2. Thermal processes
3. Mechanical processes
4. Irradiation processes
5. Biological processes

1. Chemical processes

These processes use chemical that act as disinfectants. Sodium hypochlorit, dissolved chlorine dioxide, peracetic acid, hydrogen peroxide, dry inorganic chemical and ozone are examples of such chemical. Most chemical processes are water-intensive and require neutralising agents.

2. Thermal processes



These processes utilise heat to disinfect. Depending on the temperature they operate it is been grouped into two categories, which are Low-heat systems and High-heat systems
Low-heat systems (operates between 93-177°C) use steam, hot water, or electromagnetic radiation to heat and decontaminate the waste.

- Autoclave & Microwave are low heat systems.

Autoclaving is a low heat thermal process and it uses steam for disinfection of waste. Autoclaves are of two types depending on the method they use for removal of air pockets are gravity flow autoclave and vacuum autoclave.

Microwaving is a process which disinfect the waste by moist heat and steam generated by microwave energy

High-heat systems (operates between 540-8,300°C) employ combustion and high temperature plasma to decontaminate and destroy the waste.

Incinerator & Hydroclaving are high heat systems. Hydroclaving - is steam treatment with fragmentation and drying of waste

Hydroclave

Incineration - is a burn technology

3. Mechanical processes

These processes are used to change the physical form or characteristics of the waste either to facilitate waste handling or to process the waste in conjunction with other treatment steps. The two primary mechanical processes are

Compaction - used to reduce the volume of the waste

Shredding - used to destroy plastic and paper waste to prevent their reuse. Only the disinfected waste can be used in a shredder.

4. Irradiation processes

exposes wastes to ultraviolet or ionizing radiation in an enclosed chamber. These systems require post shredding to render the waste unrecognizable.

5. Biological processes -

using biological enzymes for treating medical waste. It is claimed that biological reactions will not only decontaminate the waste but also cause the destruction of all the organic constituents so that only plastics, glass, and other inert will remain in the residues.

Points to ponder in processing the waste

Incineration

- Incinerators should be suitably designed to achieve the emission limits.
- Wastes to be incinerated shall not be chemically treated with any chlorinated disinfectants.
- Toxic metals in the incineration ash shall be limited within the regulatory quantities
- Only low sulphur fuel like Diesel shall be used as fuel in the incinerator.

Autoclaving

The autoclave should be dedicated for the purpose of disinfecting and treating biomedical waste.

1. When operating a gravity flow autoclave, medical waste shall be subjected to:
   - A temperature of not less than 121 oC and pressure of about 15 pounds per square inch (psi) for an autoclave residence time of not less than 60 minutes; or
   - A temperature of not less than 135 oC and a pressure of 31 psi for an autoclave residence time of not less than 45 minutes; or
   - A temperature of not less than 149 oC and a pressure of 52 psi for an autoclave residence time of not less than 30 minutes.

2. When operating a vacuum autoclave, medical waste shall be subjected to a minimum of one per vacuum pulse to purge the autoclave of all air. The waste shall be subjected to the following :
   - A temperature of not less than 121 oC and a pressure of 15 psi per an autoclave residence time of not less than 45 minutes; or
   - temperature of not less than 135 oC and a pressure of 31 psi for an autoclave residence time of not less than 30 minutes; or Medical waste shall not be considered properly treated unless the time, temperature and pressure indicate stipulated limits. If for any reason, these were not reached, the entire load of medical waste must be autoclaved again until the proper temperature, pressure and residence time were achieved.

Microwaving

- Microwave treatment shall not be used for cytotoxic, hazardous or radioactive wastes, contaminated animal carcasses, body parts and large metal items.
- The microwave system shall comply with the efficacy tests/routine tests
- The microwave should completely and consistently kill bacteria and other pathogenic organism that is ensured by the approved biological indicator at the maximum design capacity of each microwave unit.

Deep Burial

- A pit or trench should be dug about 2 m deep. It should be half filled with waste, and then covered with lime within 50 cm of the surface, before filling the rest of the pit with soil.
- It must be ensured that animals do not have access to burial sites.
- Covers of galvanised iron/wire meshes may be used.
- On each occasion, when wastes are added to the pit, a layer of 10cm of soil be added to cover the wastes.
- Burial must be performed under close and dedicated supervision.
- The site should be relatively impermeable and no shallow well should be close to the site.
- The pits should be distant from habitation, and sited so as to ensure that no contamination occurs of any surface water or ground water.
- The area should not be prone to flooding or erosion.
- The location of the site will be authorized by the prescribed authority.
- The institution shall maintain a record of all pits for deep burial.

Disposal of Sharps

Needle Cutter

- Blades and needles waste after disinfection should be disposed in circular or rectangular pits.
- Such pits can be dug and lined with brick, masonry, or concrete rings.
- The pit should be covered with a heavy concrete slab, which is penetrated by a galvanized steel pipe projecting about 1.5 m above the slab, within internal diameter of upto 20 mm.
- When the pipe is full it can be sealed completely after another has been prepared.

Radioactive waste from medical establishments

- It may be stored under carefully controlled conditions until the level of radioactivity is so low that they may be treated as other waste.
- Special care is needed when old equipment containing radioactive source is being discarded.
- Expert advice should be taken into account.

Mercury control

Wastes containing Mercury due to breakage of thermometer and other measuring equipment need to be given

- Proper attention should be given to the collection of the spilled mercury, its storage and sending of the same back to the manufacturers.
- Must take all measures to ensure that the spilled mercury does not become part of biomedical wastes]
- Waste containing equal to or more than 50 ppm of mercury is a hazardous waste and the concerned generators of the wastes including the health care units are required to dispose the waste as per the norms.

Standard For Liquid Waste

The effluent generated from the hospitals must confirm to the following:

Parameter	Permissible limit
pH	6.5 – 9.0
Suspended solids	100 mg/l
Oil and grease	10 mg/l
BOD	30 mg/l
COD	250 mg/l
Bioassay test	90% survival of fish after 96 hours in 100% effluent

These limits are applicable to those hospitals which are either connected with sewers that have no terminal sewage treatment plant or not connected to public sewers that have terminal facilities. In addition, the general standards as notified under the Environment (Protection) Act, 1986 shall be applicable.

Waste minimization: Waste minimization is an important first step in managing wastes safely, responsibly and in a cost effective manner. This management step makes use of reducing, reusing and recycling principles. There are many possible routes to minimize the amount of both general waste and biomedical wastes within the health care or related facility. Alternative technologies for biomedical waste minimization (e.g., microwave treatment; hammer mill) have been investigated and are not considered to be practical. Some of the principles of waste minimization are listed below and will be developed further in the long-term strategy.

Different Types of BMW according to WHO

The World Health Organisation (WHO) has classified medical wastes according to their weight, density and constituents into different categories. These are:

Infectious: material-containing pathogens in sufficient concentrations or quantities that, if exposed, can cause diseases. This includes waste from surgery and autopsies on patients with infectious diseases, sharps, disposable needles, syringes, saws, blades, broken glasses, nails or any other item that could cause a cut;

Pathological: tissues, organs, body parts, human flesh, foetuse, blood and body fluids, drugs and chemicals that are returned from wards, spilled, outdated, contaminated, or are no longer required;

Radioactive: solids, liquids and gaseous waste contaminated with radioactive substances used in diagnosis and treatment of diseases like toxic goiter; and

Others: waste from the offices, kitchens, rooms, including bed linen, utensils, paper, etc.

Health hazards

According to the WHO, the global life expectancy is increasing year after year. However, deaths due to infectious disease are also increasing. A study conducted by the WHO reveals that more than 50,000 people die everyday from infectious diseases. One of the causes for the increase in infectious diseases is improper waste management. Blood, body fluids and body secretions which are constituents of bio-medical waste harbour most of the viruses, bacteria and parasites that cause infection.

This passes via a number of human contacts, all of whom are potential 'recipients' of the infection. Human Immunodeficiency Virus (HIV) and hepatitis viruses spearhead an extensive list of infections and diseases documented to have spread through bio-medical waste. Tuberculosis, pneumonia, diarrhea diseases, tetanus, whooping cough etc., are other common diseases spread due to improper waste management.

Occupational health hazards

The health hazards due to improper waste management can affect

- The occupants in institutions and spread in the vicinity of the institutions
- People happened to be in contact with the institution like laundry workers, nurses, emergency medical personnel, and refuse workers.
- Risks of infections outside hospital for waste handlers, scavengers and (eventually) the general public
- Risks associated with hazardous chemicals, drugs, being handled by persons handling wastes at all levels
- Injuries from sharps and exposure to harmful chemical waste and radioactive waste also cause health hazards to employees.

Hazards to the general public

The general public's health can also be adversely affected by bio-medical waste.

- Improper practices such as dumping of bio-medical waste in municipal dustbins, open spaces, water bodies etc., leads to the spread of diseases.
- Emissions from incinerators and open burning also lead to exposure to harmful gases which can cause cancer and respiratory diseases.
- Exposure to radioactive waste in the waste stream can also cause serious health hazards.
- An often-ignored area is the increase of in-home healthcare activities. An increase in the number of diabetics who inject themselves with insulin, home nurses taking care of terminally ill patients etc., all generate bio-medical waste, which can cause health hazards.

Bio-medical waste can cause health hazards to animals and birds too

- Plastic waste can choke animals, which scavenge on open dumps.
- Injuries from sharps are common feature affecting animals.
- Harmful chemicals such as dioxins and furans can cause serious health hazards to animals and birds.
- Heavy metals can even affect the reproductive health of the animals
- Change in microbial ecology, spread of antibiotic resistance

What you can do?

- Use only disposable syringes. After use throw the syringes after breaking them
- Bandages, cotton and other blood stained materials should not be thrown with general garbage
- Use black plastic bags to dispose biomedical wastes
- Keep trash out of reach of small children and infants
- Diapers, Sanitary napkins etc. should also be disposed separately
- Drugs that are past date of expiry must never be used

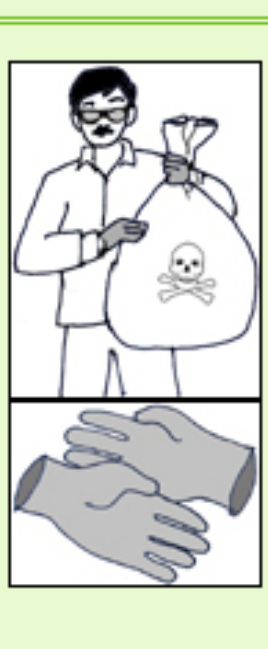
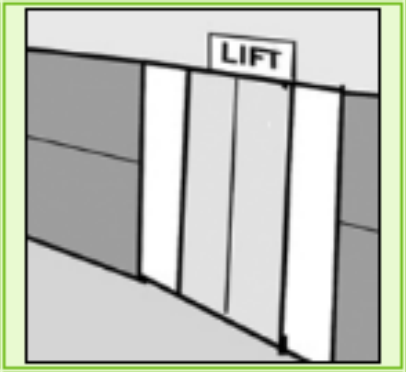
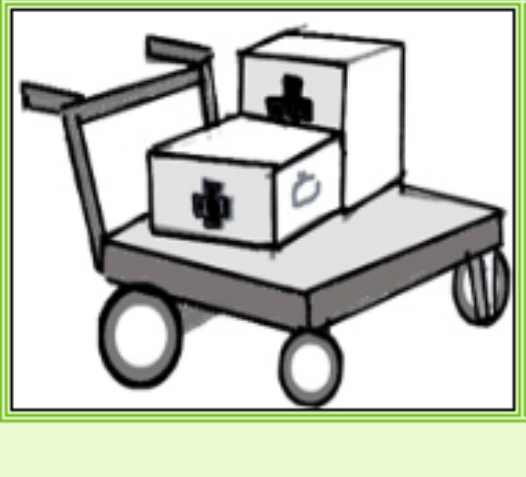
Dos and Don'ts

Ensure

1. that the used product is mutilated.
2. that the used product is treated prior to disposal.
3. that the used product is segregated

Do not

1. reuse plastic equipment.
2. mix plastic equipment with other wastes.
3. burn plastic waste.

	
Use protective gear when handling waste	Avoid needle stick injuries
	
Collect waste when the bin is 3/4 th full	Avoid using common lift to move waste
Avoid spillage	Clean spills with disinfectant
	Use trolleys & do not drag waste bags

Conclusion:

We need innovative and radical measures to clean up the distressing picture of lack of civic concern on the part of hospitals and slackness in government implementation of bare minimum of rules, as waste generation particularly biomedical waste imposes increasing direct and indirect costs on society. The challenge before us, therefore, is to scientifically manage growing quantities of biomedical waste that go beyond past practices. If we want to protect our environment and health of community we must sensitize our selves to this important issue not only in the interest of health managers but also in the interest of community.

Sources for the materials and illustrations used in this publication are the following:

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