

# MANUAL ON WASTE MANAGEMENT IN THE HOSPITAL:

## I. Introduction

An old saying says “**Cleanliness is next to Godliness**”. The essence of this was aptly captured by Dravidians, who in 5000 BC gave due emphasis to immaculate town planning and safe and effective sewerage systems who got rid of all solid and liquid wastes generated by the pollution. They were indeed the pioneers as far as scientific waste management is concerned ; which is borne out from excavation of Mohanje-Dora and Harapa.

The modern hospitals and health care institutions including research centres use a wide variety of drugs including antibiotics, cytotoxics, corrosive chemicals, radio active substances, which ultimately become part of hospital waste. The advent of disposables in the hospitals has brought in its wake, attendant, ills i.e. inappropriate recycling, unauthorised and illegal re-use and increase in the quantum of waste. All round technological progress has lead to increased availability of health related consumer goods, which have the propensity for production of increased wastes.

The issue of improper Hospital Waste Management in India was first highlighted in a writ petition in the Hon’ble Supreme Court; and subsequently, pursuant to the directives of the court, the Ministry of Environment and Forests, Govt. of India notified the Bio-Medical Waste (Management and Handlings) Rules on 27th July 98; under the provisions of Environment Act 1986. These rules have been framed to regulate the disposal of various categories of Bio-Medical Waste as envisaged therein; so as to ensure the safety of the staff, patients, public and the environment.

The Govt. Medical College Jammu is a referral, tertiary care hospital. It has many associated hospitals like Govt. Medical College Hospital Jammu, SMGS Hospital, Dental Hospital, Psychiatry Disease Hospital and Chest Disease Hospital. The GMC Hospital is biggest of all, with bed strength of 850 beds. It has the clinical specialities like Medicine, Surgery, Orthopaedics, Eye, Radiodiagnosis, Radiotherapy and Anaesthesiology. The para/non-clinical specialities which provide support to the hospital are Anatomy, Physiology, Pharmacology, SPM, Blood Bank, Pathology, Microbiology, Forensic Medicine and Biochemistry.

The indoor complex of the hospital has 1 to 15 wards (Surgery, Medicine, Eye, Ortho & RT). The specialised nursing care units like ICU, CCU, dialysis Unit, spinal and burn ward etc. are also available. The hospital has 11 major operation theatres and 4 minor operation theatres. The major operation theatres are in a separate OT complexes like Main Surgical OT, Ortho OT, Eye OT and Emergency OT.

The separate Out patient department (OPDs) for Medicine, Surgery, Orthopaedics, Eye, Radiotherapy, Physiotherapy and Electro Medical Diagnosis Deptt. (including facilities for ECG, EEG, TMT, Endoscopic procedures etc.) are also available. Almost 1000 patients (average) attend these OPD every day.

The Emergency Department of the hospital runs round the clock with almost more than 400 patients attending the Casualty of the hospital every day. The facilities of emergency lab. X-Ray, ultrasound, ECG, CT Scan and Blood Bank are available 24 hours in the emergency. An emergency indoor ward, post operative recovery ward, emergency OT complex and disaster ward is also attached to the casualty. The OPD Labs. (Pathology/Microbiology/Biochemistry) are also separately located near the OPD blocks for the benefit of OPD patients. The separate Blood Bank and the Immunisation Section (Antirabic) is also available. The hospital has its own CSSD, Laundry, Kitchen, Mortuary and hospital stores.

These activities generate a lot of waste which should be managed properly with care.

## II. WASTE MANAGEMENT POLICY

The Bio-Medical Waste Management policy at GMC has been framed to meet the following broad objectives :-

- (i) Changing an age old “mind set” and attitude through knowledge and training.
- (ii) Defining the various categories of waste being generated in the hospital/health care institution.
- (iii) Segregation and collection of various categories of waste in separate containers, so that each category is treated in a suitable manner to render it harmless.
- (iv) Identifying and utilising proper “treatment technology” depending upon the category of waste.
- (v) Creating a system where all categories of personnel are not only responsible, but also accountable for proper waste management.
- (vi) Changing the use patterns from single usage to multiple usage whenever possible.

## **POLICY STATEMENT**

Summing up, the policy statement aims to provide for a system for management of all potentially infectious and hazardous wastes in accordance with the Bio-Medical Waste (Management and Handling) Rules 1998.

## **III. NEED FOR BIO-MEDICAL WASTE MANAGEMENT**

- (a) **(Statutory) Legal Obligation** : In accordance with the provisions of the Bio-Medical Waste (Management and Handling) Rules 1998, deadline for GMC was 31st December’ 1999, by which the rules must be conformed with, failing which legal action can be initiated.
- (b) **Health hazards** associated with improper hospital waste management: A number of hazards and risks are associated with this viz.
  - \* Injuries from sharps to all categories of hospital personnel and waste handlers.
  - \* Nosocomial infections in patients from poor infection control and poor waste management.
  - \* Risks of infections outside hospitals for waste handlers, scavengers, and (eventually) the general public.
  - \* Risks associated with hazardous chemicals, drugs, being handled by persons handling wastes at all levels.
- (c) **Environmental hazards** : Improper hospital waste management also results in air, water and soil pollution, especially due to imperfect treatment and faulty disposal methods.

## **IV. DEFINITIONS**

It is important to know the definitions so as to be able to understand the categorisation and other steps of waste management subsequently.

- (a) **Bio-Medical Waste** : May be defined as “any solid, fluid or liquid waste, including its container and any intermediate product, which is generated during its diagnosis, treatment or immunisation of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals and the animal waste from slaughter houses or any other like establishments.”
- (b) **Medical Waste** : Is a term used to describe “any waste that is generated in the diagnosis, treatment or immunisation of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals.”
- (c) **Clinical Waste** : Is defined as “any waste coming out of medical care provided in hospitals or other medical care establishments, but does not include waste generated at home.”
- (d) **Hospital Waste** : Refers to all waste, biological or non-biological that is generated from a hospital, and is not intended for further use.
- (e) **Pathological Waste** : Is defined as “waste removed during surgery/autopsy or other medical procedures including human tissues, organ, body parts, body fluids and specimens along with their containers.”

- (f) **Infectious Waste** : Refers to that portion of Bio-Medical Waste which may transmit viral, bacterial or parasitic diseases, if concentration and virulence of pathogenic organisms is sufficiently high.
- (g) **Hazardous Waste** : Refers to that portion of Bio-Medical Waste which has a potential to cause hazards to health and life of human beings.
- In addition, other types of waste generated in hospitals are :*
- (h) **Radioactive Waste** : Which includes waste contaminated with radionuclides, it may be solid, liquid or gaseous waste. These are generated from in-vitro analysis of body fluids and tissues, in-vitro imaging and other therapeutic procedures.
- (i) **Pressurized Waste** : Include compressed gas cylinders, aerosol cans and disposable compressed gas containers.
- (j) **General Waste** : Includes general domestic type waste from offices, public areas, stores, catering areas, comprising of newspapers, letters, documents, cardboard containers, metal cans, floor sweepings and also includes kitchen waste.
- (k) **Recyclable Waste** : Includes the following: Glass after cleaning and disinfection, paper, corrugated cardboard, aluminium, X-ray film, reclaimed silver from X-ray developing solution, Plastics after disinfection and shredding.

## V. CATEGORISATION OF BIO-MEDICAL WASTES

Bio-Medical waste have been categorised into ten different categories as mentioned in the table below :-

OPTION	WASTE CATEGORY	WASTE CONTENT
Category No.1	<b>Human Anatomical</b>	(human tissues, organs, body Wastes parts)
Category No.2	<b>Animal Wastes</b>	(animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, discharge from hospitals, animals houses)
Category No.3	<b>Microbiology &amp; Biotechnology waste</b>	(waste from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, waste from production of biologicals, toxins, dishes and devices used for transfer of cultures)
Category No. 4	<b>Waste Sharps</b>	(needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps).
Category No. 5	<b>Discarded Medicines</b>	(waste comprising of outdated contaminated and discarded medicines)
Category No. 6	<b>Solid Waste</b>	(items contaminated with blood, and body fluids including cotton, dressings, solid linen, plaster casts, linen, beddings, other material contaminated with blood)
Category No. 7	<b>Solid Waste</b>	(Wastes generated from disposable items other than the waste sharps such as tubings, catheters, intravenous sets etc.)
Category No. 8	<b>Liquid Waste</b>	(waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities)
Category No. 9	<b>Incineration Ash</b>	(ash from incineration of any bio-medical waste)
Category No.10	<b>Chemical Waste</b>	(chemicals used in production of biologicals, chemicals used in disinfection, as insecticides, etc.)

## VI. HOSPITAL WASTE MANAGEMENT COMMITTEE

A Hospital Waste Management Committee has been established in each of the associated hospitals with a view to improve and streamline Hospital Waste Management and for proper implementation of Bio-Medical Waste Management Rules' 98, under the chairmanship of the Medical Superintendents. It is a broad based committee with representative from hospital administration, clinical departments, pathology and microbiology departments and has powers to take decisions on all matters related to Bio-Medical Waste Management in the respective hospitals. This smaller core group is responsible for implementation of these rules. The responsibilities of the various categories of the staff involved in the generation, collection, transportation, collection, treatment and disposal of wastes is formulated and implemented by this committee.

## VII. OPERATIONAL ASPECTS

The practical operational aspects regarding proper management of Bio-Medical Wastes has been described under each step starting with the generation and ending with final disposal of wastes.

(A) **Generation of Wastes** : The following table depicts wastes generated at GMC Hospitals :-

Type	Site of Generation	Disposal by
(i) Non-Hazardous (General)	Office, Kitchen Cafeteria, Billing, Administration, Cashier, Rest rooms Hostels, Residential areas, Pantries in wards, Stores, etc.	Municipal/ Civic Authorities
(ii) Hazardous (Infectious and toxic)	Wards, Treatment room, nursing station, Isolation rooms, Operation theatres, Intensive Care Units and post operative recovery room, Minor OTs, Blood Bank Pharmacy and Medical Stores, All laboratories, Pharmacology OPDs' Injection rooms and procedure rooms, Dialysis and Endoscopy rooms, CT Scan, MRI rooms and various followup clinics	GMC-as per Bio-Medical Waste Rules

### \* Quantum of Wastes :

Studies carried out have indicated that about 2 Kg. of wastes are generated per bed per day which gives an idea about the tremendous volume of waste generated on a day to day basis.

(B) **Segregation of Wastes** : Segregation or the separation of different types (categories) of waste by sorting at the point of generation, has been considered as the "key" for the entire process as it allows special attention to be given to the relatively small quantities of infections and hazardous waste, thus reducing the risks and cost of waste management. Conversely small errors at this stage can create lot of subsequent problems.

It is now universally accepted that segregation is the responsibility of the generator of wastes

i.e. the doctor, nurse or para-medical personnel. However, in reality, this job is always relegated to the sanitation staff; and it becomes a truly Herculean task to segregate or sort out various categories, once they have been mixed up.

\* Factors affecting segregation at source:

- (i) Hospital policy and procedures
- (ii) Motivation and training of “generators” i.e. doctors, nurses and paramedics.
- (iii) Facilities provided for segregation

\* Proposed system for segregation:

**SITECONTAINER      RESPONSIBILITY**

**I. Wards**

<p>– Treatment Room and sluice room</p> <p style="padding-left: 40px;">black) large size containers lined with priate colour polythene bags</p> <p>in a day these are replaced by</p>	<p>*Colour coded bins (with cover) of capacity are present lined with appropriately coloured polythene bags.</p> <p>*Sister I/C should ensure that at both these places, two large hundred ltrs. capacity are present lined with appropriately coloured polythene bags.</p> <p>*She should ensure that twice the centralised gang and sign in the register.</p>
<p>– Bathroom and Toilets bags</p>	<p>*Only black coloured bins lined by black polythene bags</p>
<p>– Nursing station</p>	<p>*Needle destroyer (electric / manual) *Puncture proof containers (double bin) with 1% Hypochlorite sol.</p> <p>*Colour coded (yellow, blue and black) large size bins</p> <p>*Sister I/C should ensure that the equipment is functional at all times. In case of fault she should inform the Officer I/C to get it replaced.</p> <p>*She should ensure that puncture proof container contains 1% Sod Hypochlorite solution, which should be changed at least once in a day.</p> <p>*Doctors / nurses and para-medical staff should be instructed to use the same; to destroy the needle; and put the syringe in the puncture proof container.</p>
<p>II. Laboratories and Sample Collection centres incl. Blood Banks</p>	<p>*Colour coded (yellow, and black) medium sized bins lined with coloured polythene bags</p> <p>*Officer Incharge of the lab/unit to ensure that the polythene bags are regularly replaced and sent for treatment/disposal</p>
<p>stroyer and put in</p>	<p>*Electrical/manual *Clinical &amp; Para Clinical staff should segregate the waste needle de-generated at source appropriate container</p>

III. Operation theatres and Intensive Care Unit	*Colour coded medium or large sized bags (depending upon quantity of waste generated) with bags-yellow, & black  *Electrical/manual needle destroyer *Puncture proof container with 1% Sod. Hypochlorite	Supervisor/Sister I/c to ensure that these are present, polythene bags are changed regularly. *Clinical and Para Clinical staff to segregate the waste generated at source and put in appropriate container.  *Sharps like needles to be destroyed by using the destroyer. *Syringes to be put in puncture proof container with 1% Sod. Hypochlorite solution.
---	---	--

### WHAT GOES WHERE ? – A GUIDE

**TABLE: COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTES**

Colour Coding	Identification	Waste Category & Constituents	Treatment Option
Yellow colour polythene bags of different sizes in yellow colour bins/drums	Plastic bag with inscription "for Cytotoxic"	<b>Category No. 1-Human Anatomical Wastes i.e.</b> all human tissues, incineration only" along with symbol "Biohazard" and all animals tissues, organs, body parts carcasses bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, discharge from hospitals, animal houses. <b>Category No. 2-Animal Wastes i.e.</b> all animals tissues, organs, body parts carcasses bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, discharge from hospitals, animal houses. <b>Category No. 3-Microbiology &amp; Biotechnology Wastes i.e.</b> wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins. (If disinfected locally, need not to be put into bags) <b>Category No. 6-Solid Waste i.e.</b> all items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, linen, beddings, other material contaminated with blood except plastics, disposables and sharps.	Incineration organs, body parts which are generated in patient care areas
Blue colour polythene bags of different sizes in blue coloured bins/ drums. Puncture	Inscription on bag "For autoclaving only" with symbols. (This includes both used and hazard" and Cyto-	<b>Category No. 4-Waste Sharps i.e.</b> Auto-all needles, syringes, scalpels, blades glass etc. that may cause puncture & unused sharps)	

proof container toxic". Puncture proof container all wastes generated from dis- should be inscri- bed. "For sharps only" intravenous sets etc. (should be cut into smaller pieces with the help of scissors) possible items (other than the waste sharps) such as tubings, catheters,

Black colour plastic bags of different sizes No inscription **Category No. 7-Solid Waste i.e. Medicines and Cytotoxic drugs** Secure land fill  
**Category No. 5- Discarded** i.e. all wastes comprising of out-dated, contaminated and discarded medicines. (should be returned back to medical stores for further disposal)  
**Category No. 9-Incineration Ash** i.e. ash from incineration of any Bio-Medical Waste  
**Category No. 10-Chemical Waste** i.e. all chemicals used in production of biological used in disinfection, as insecticides, etc.  
**All General Wastes** Civil Authorities

**NOTE :** Autoclave facility not available in the hospital so the waste after chemical treatment would be put in yellow bins.

**(C) Collection of Waste :** Collection of Bio-Medical Wastes should be done as per rules in colour coded plastic bags as mentioned in the earlier table. There is a need to be vigilant so that intermixing of different categories of waste is not done inadvertently by the patients, attendants or visitors. The containers for collection should be strategically located at all points of generation as mentioned in the earlier table.

**\* Operational Aspects:**

- From these sites the sanitation staff from the centralised gang will collect the waste during morning and afternoon, under supervision of the staff nurse and sanitation supervisor.
- The process of collection should be documented in a register, the coloured polythene bags should be replaced and the garbage bin should be cleaned with disinfectant regularly.

**(D) Storage of Waste :** Storage refers to the holding of Bio-Medical Waste for a certain period of time, after which it is sent for treatment and disposal. In other words it means the duration of time wastes are kept at the site of generation and transit till the point of treatment and final disposal.

At GMC Hospital, waste is stored in the areas of generation (as mentioned in table 1) for an interim period varying from two to twelve hours, after which it is transported for treatment and disposal by the sanitation staff of centralised gang. During this period it is the responsibility of the clinical and para-medical staff to check that there is proper segregation and no subsequent recycling of disposables and other items.

Subsequently, during transportation of the waste, there is a lag period of two to three hours, during which the waste is "stored" opposite the mortuary. It is the responsibility of the sanitation staff and security staff to ensure that rag pickers and other unscrupulous elements do not gain entry and sort out the waste for "recycling" purposes.

**(E) Transportation of Waste :** Transportation of Bio-Medical Waste can be divided into intramural (internal) and extra mural (external) transportation.

- \* **Intramural (internal) transport** : The sanitation staff from the centralised gang will be responsible for transporting the different coloured polythene bags in garbage bins from the sluice room, nursing station and treatment room of each ward on push carts and garbage trollies. From all the floors and wings, the waste will be taken through main ramp in covered trollies to the ground floor; and from there to the area near the incinerator/mortuary. The general waste (in black polythene bags) should be deposited at the municipal dumps, opposite the mortuary adjacent to the incinerator site. Any spillage or leakage should be reported to Sanitation Inspector Incharge, and it is his/her responsibility to get the respective trolleys/carts cleaned and disinfected.
- \* **Extramural (external) transport** : This will be required only for the general waste collected in the black coloured plastic bags. These bags will be transported in the vehicle by the Municipality authorities.

The request will be made to the Municipal authorities to send the vehicle once in day without any failure.

**(F) Treatment and Disposal of Hospital Waste :**

- \* **Civic Authorities** : Most of the waste (about 80%-90%) generated in the hospital is general waste which is similar to the waste generated in house and offices. This waste is non toxic and non infectious, and comprises of paper, left over food articles, peels of fruits, disposable and paper containers for tea/coffee etc., card boards boxes, outer cover or wrapping of disposable items like syringes, needles sets etc. These general wastes should be put into black coloured polythene bags and are deposited at the municipal dump opposite to the mortuary. It is subsequently collected by the local municipal authorities for disposal every day. The Sanitation Officer is responsible for proper co-ordination between municipal authorities and GMC. However, it is the responsibility of the hospital security(Police/contractor) to ensure that rag pickers are not allowed entry into the dumps.
- \* **Incineration** : The waste collected in yellow coloured bags is transported to the site of incineration, adjacent to the generator room. The incinerator is maintained on contract basis by the Engineering services department and is manned by a supervisor and workers. After the waste (in yellow coloured bags) is deposited in the custody of the supervisor, the sanitation staff should obtain a proper receipt, and the entire process should be documented. It is the responsibility of the supervisor to ensure that rag pickers and other unwanted elements do not rummage through the waste for re-using of disposables and plastics. The functioning of the incinerator and the number of cycles operated per day should be documented in a log book. Regular monitoring of the process should be carried out by the engineers as per J&K Pollution Control Board norms and feed back provided to officer incharge. The ash produced by incineration should be sent for secure land filling.
- \* **Autoclaving and Shredding** : Once the autoclave facility is installed in the hospital, the waste collected in blue bags will be transported to the site of autoclaving and shredding for treatment. The process of deposition of the waste for autoclaving and shredding will also be documented and a register will be maintained for the same. The supervisor will ensure that rag pickers and other unwanted persons do not gain access to the waste stored there, prior to autoclaving and shredding. The functioning of the autoclave and shredder including the number of cycles per day will be maintained in a log table and periodically monitored by engineers as per J&K PCB norms.

- \* **Radioactive Waste** : Radioactive wastes are generated during the process of body organ imaging, tumour localisation, therapeutic processes in Radiotherapy Department. These applications of radioactive materials generate some solid radioactive waste i.e. vials, syringes, absorbent paper, protective clothing etc. Concentration and storage under strict supervision in a large drum/container till it has decayed is principally used. The radioactive material in liquid form (including patients urine) are generally diluted and dispersed in the sewers. Gaseous radioactive waste can be diluted through dispersal in the outside atmosphere. Under normal circumstances, urine and faeces can be handled as non-radioactive waste so long as the room is routinely monitored for radioactive contamination.
- \* **Liquid and Chemical Wastes** : These wastes should be disinfected by chemical treatment using at least 1% sodium hypochlorite solution; and then discharged into drains/sewers where it is taken care of by the principle of dilution and dispersal. The responsibility for proper disposal of liquid wastes lies with the sanitation supervisor in case of weekly “gang” cleaning of indoor patient care areas; and with the nursing staff in case of routine cleaning. Responsibility of chemical waste should be with the persons/staff using the chemicals and generating the waste.

### **VIII.ROLE OF PERSONNEL INVOLVED IN WASTE MANAGEMENT**

The following paras outline the roles and responsibilities of the various personnel in confirmation to the Bio-Medical Waste Management (management and handling) Rules 1998:-

#### **(A) Role of Medical Superintendent, GMC Hospital**

He has the overall responsibility for the formulation and implementation of guidelines for hospital waste management and has to ensure that waste is handled without any advance effect to human health and environment. As the “occupier”, he is responsible for applying for grant of authorisation (in Form I) to the prescribed authority i.e. J&K Pollution Control Board. He is also responsible for submitting an annual report in Form II to the J&K Pollution Control Board (prescribed authority) by 31st January regarding information about categories and quantities of Bio-Medical Wastes handled during the previous year. He is answerable to the higher authorities in the Ministry.

#### **(B) Functions of Hospital Waste Management Committee**

1. To ensure the circulation of enough copies of Bio-Medical Waste Rules and guidelines for implementation of the same in Clinical Departments. The responsibilities of the individual professionals will be highlighted in these guidelines.
2. To conduct “Awareness Programme”: Clinical combined/grand round will be held for making the Faculty and the Residents aware of the “Biomedical Waste (Management & Handling) Rules’ 98.”
3. To conduct training programmes for Medical Professionals, Nursing Professionals and Sanitation Professionals.
4. To hold meeting of the Hospital Waste Management Committee and formulate the detailed plan of action in regard to segregation, collection, storage and transport of waste from all the patient care areas. To procure the items required in this regard and make them available in all patient care areas.
5. Each Clinical Department (Unit), Lab Services, Blood Bank, Microbiology, Pathology will make one Faculty Member responsible for supervision of segregation in their area of activities.

6. Floor wise one Nursing Sister (Nursing Supervisor) will be responsible for supervision of segregation in the wards of each floor. In each and every OT the same instruction of supervision will be followed and one Sister Incharge will be responsible.

**(C) Role of Officer Incharge of Waste Management**

The Officer Incharge of waste management will be incharge of implementation and will liaise with the Heads of Departments, Infection Control Officer and Matron. He will be the member of the Hospital Waste Management Committee. He will be responsible for monitoring the programme from time to time at various levels i.e. generation, segregation, collection, storage, transportation and treatment including disposal. He will be responsible for circulation of all policy decisions and the hospital waste management manual. He will be responsible for accident reporting in Form III to the prescribed authority.

**(D) Role of concerned Heads/Incharge of Labs; Units/Deptts.**

They will be responsible for the formulation and implementation of waste management procedures for their departments in conformity with the general guidelines issued by administration. They will also be responsible for getting all staff, doctors, nurses, paramedics and group-D staff, trained in hospital waste management, and will liaise with the Officer Incharge of waste management for administrative support. With regard to the departments which generate radioactive waste one of the consultants should be designated as Radiation protection officer and he will be responsible for implementation of the necessary guidelines.

**(E) Role of Matron**

The Matron will designate one of the senior administrative level deputies as Sister Incharge of Hospital Waste Management, who will be responsible for close monitoring of the activity. She will conduct surprise rounds and will review and evaluate the various aspects of scientific hospital waste management at all levels from generation and segregation to final disposal. She will also attend the meetings of Hospital Waste Management Committee on behalf of the Matron and co-ordinate the training of nurses on Hospital Waste Management with administration.

**(F) Role of I/c Sanitation Inspector**

The Incharge Sanitation Inspector will be responsible for the implementation, monitoring and evaluation of hospital waste management from collection and storage of hospital waste to its final disposal. He will attend the Hospital Waste Management Committee meetings and will ensure the training of the staff posted under him. Regular in-service training and evaluation of the sanitation attendants will be carried out by him. He will also provides feed back information to Officer Incharge Waste Management in case of accidents and spills.

**IX TRAINING ON HOSPITAL WASTE MANAGEMENT**

In order to be able to comprehend and implement the Bio-Medical Waste (Management and Handling) Rules' 1998, it is mandatory to provide training to all categories of staff i.e. resident doctors, nurses, paramedical staff, hospital and sanitation attendants, patient and their attendants, canteen staff, operation of Bio-Medical Waste treatment facilities. Before the training is carried out the training needs to be identified content varied accordingly. It should be interactive and should include awareness sessions, demonstrations and behavioural science inputs. It should definitely include the following :

- (i) Awareness of different categories of waste and potential hazard
- (ii) Waste minimization, reduction in use of disposables

- (iii) Segregation policy
- (iv) Proper and safe handling of sharps
- (v) Use of protective gear
- (vi) Colour coding of containers
- (vii) Appropriate treatment of waste
- (viii) Management of spills and accidents
- (ix) Occupational health.

**References :**

1. Basu R.N. Issues involved in Hospital Waste Management : an experience from a large teaching Institution, Journal of Academy of hospital Administration. July 1995, Jan. 1996 7(2), \*(1) ; 79-83.
2. Draft Bio-medical wastes (Management and Handling) rules 1998. Gazette of India Extraordinary, Part II Section 3 Sub-section (ii) dated 27th July, 1998.
3. Jain T.P., Aggarwal R. Hospital Waste Management; A holistic view. Proceedings of National Workshop as Management of hospital waste, 1998 Apr. 16-18 Jaipur, IIRD and Shristi 1998.
4. Hospital Waste Management–A holistic approach. Anand R.C., S. Satpathy 1998 edition, Book published by Department of Hospital administration, AIIMS, New Delhi.
5. Management of Waste from Hospitals and other health care establishments. Euro Report and Studies No. 97 WHO, 1985 ; 1-61.
6. Module on Hospital Waste Management by Sulabh International Institute of Health and Hygiene, New Delhi.
7. Problems in community waste management, Public Health Paper; No. 38 W.H.O. Geneva 1969.
8. Report of high power committee on Urban based Waste Management, Planning Commission, Govt. of India, 1995 ; Hospital Waste Management ; 35-47.
9. Sarma R.K., Mathur S.K. Management of Hospital Waste, Journal of Academy of Hospital Administration, 1998 July 1(2), 55-7.
10. Suess M.J., Huisman J.W. Legal and administrative requirements in management of Hazardous Waste, WHO Regional Publication No. 14, 1983 ; 25-35.

**Points to remember for Waste Management in the Hospital**

1. Do segregate waste at point of generation to :
  - (a) Infection
  - (b) Non-Infectious/Garbage
  - (c) Sharps/Needles.
2. Do collect waste in color coded containers/bags :
  - (a) Yellow – Infectious waste for incineration.
  - (b) Black – Garbage for dumping in municipal bin.
  - (c) Blue (inner perforated) – Sharps/needles.
3. Do decontaminate all sharps and plastic waste by chemical/autoclave.
4. Do shred plastic waste (cut all tubings into pieces by scissors).
5. Do use syringe and needle destroyer.
6. Do incinerate blood soaked dressings/body parts etc.
7. Do cover waste collection containers.
8. Do transport through covered trolleys/wheel barrows.
9. Do provide protective wear (mask, gloves, plastic aprons, gum boots to transporters and handlers).
10. Do immunise all waste handlers.

### **Dont's for handing and Disposal of Hospital Waste**

1. Don't mix the infectious with non-infectious waste.
2. Don't throw sharps in the trash or into non-puncture proof containers.
3. Don't recap the needle or bend or break needles by hand.
4. Don't fill the waste container more than 3/4th of capacity.
5. Don't allow unauthorised persons access to waste collection/storage areas.
6. Don't use open buckets for infectious waste or sharps.
7. Don't incinerate plastic waste.

### **Do's and Dont's for Chemical Treatment**

1. Do apply to sharp or infectd plastic waste.
2. Do use 1% hypochlorite or equivalent disinfectant. Proper concentration is essential.
3. Do ensure all surfaces come in contact with chemical (including lumen).
4. Do let the contact time be atleast 30 minutes.
5. Do change chemical solutions frequently (with every shift).
6. Do handle with gloves and mask. Wear apron and boots if splashing is expected.
7. Don't chemically treat incinerable waste.