WEST BENGAL POLLUTION CONTROL BOARD

WELCOMES ALL

TRAINING PROGRAMME

ON

BIO-MEDICAL WASTE MANAGEMENT RULES 2016

Training conducted by:

West Bengal Pollution Control Board

and

Representative of Common Bio Medical Waste Management Facility (M/s Medicare Environmental Management Pvt. Ltd.

Environmental Legislation in India

- **Water (Prevention and Control of Pollution) Act, 1974**
- **Water (Prevention and Control of Pollution) Cess Act, 1977**
- **Air (Prevention and Control of Pollution) Act, 1981**
- Environment (Protection) Act, 1986
  - Hazardous Wastes (Management & Handling) Rules, 1989
  - Manufacture, Storage & Import of Hazardous Chemicals Rules, 1989
  - Recycled Plastics Manufacture and Usage Rules, 1999
  - Bio-medical Wastes (Management & Handling) Rules, 1998
  - Municipal Solid Wastes (Management & Handling) Rules, 2000
  - Noise Pollution (Regulation and Control) Rules, 2000
  - Batteries Wastes (Management & Handling) Rules, 2001
  - Ozone Depleting Substances (Control & Regulation) Rules, 2001
  - Bio Medical Waste Management Rules 2016

And Orders and Notifications issued under the EP Act 1986

The Bio-Medical Waste (Management & Handling) Rules, 1998 & 2016

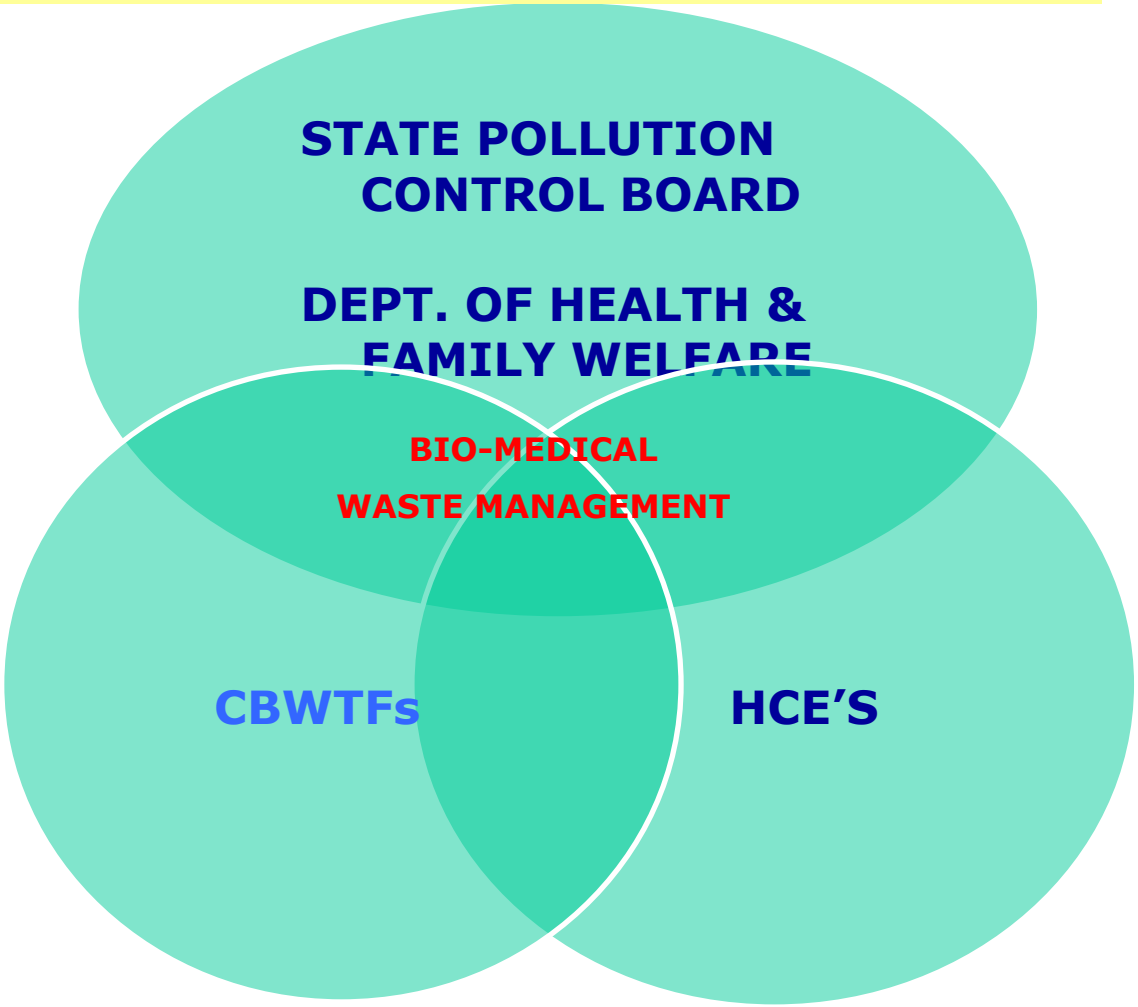
The Environment (Protection) Act, 1986, passed by the Parliament of India, is a Central Act.

The Bio-Medical Waste (Management & Handling) Rules, 1998 were notified under the Environment (Protection) Act, 1986 and amended in the year 2000, 2003 and now in 2016, amended in 2018 and 2019

Definition of BMW : Any waste generated during …

Diagnosis , Treatment or Immunization of Human Beings/ Animals or Research Activities pertaining thereto or in the production or testing of Biologicals or In Health Camps, including categories mentioned in schedule I & Other infected wastes

Authorities



WHO ARE AT RISK ?

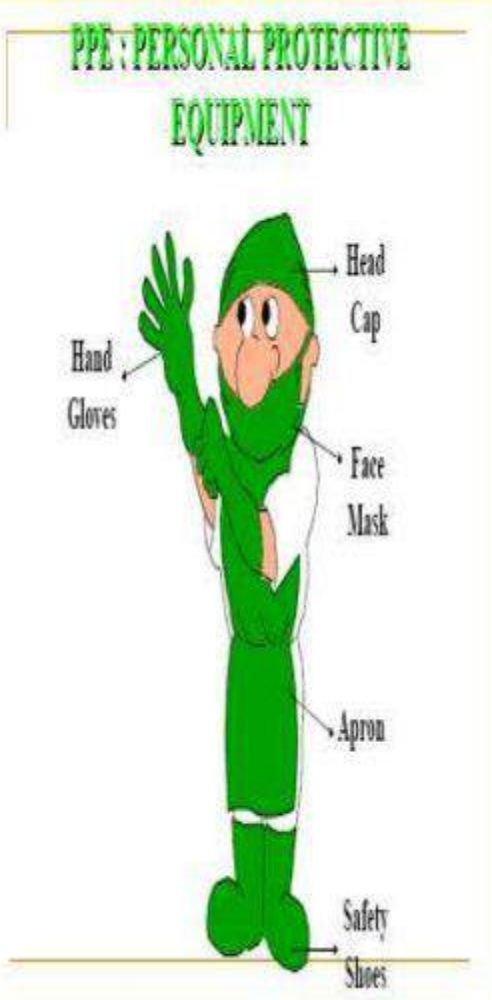
- Doctors
- Para-Medical Staff
- Ward Boys, Sweepers
- Municipal Workers
- Patients
- Attendants
- Public at large

The Risky Business!

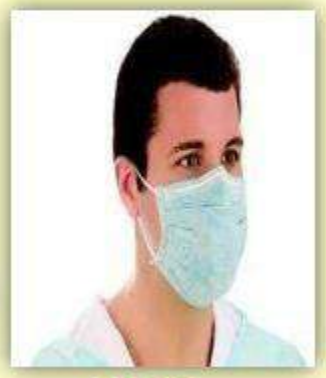
Why BMW management is Important?

80% non infectious,(kitchen waste, paper) **15%** is infectious (dressings, anatomical wastes, blood bags) **5%** is non infectious but hazardous,(chemicals, drugs and mercury) When this **20%** of the hospital infectious material is mixed with **80%** Then all the **100%** waste becomes hazardous and infectious, hence segregation should be at source.

PERSONAL PROTECTIVE EQUIPMENT (PPEs)



GLOVES



MASK

GOOGLES

APRON

HEAD CAP

SAFETY SHOES

Health impacts of Bio-Medical Waste (BMW):

Exposure to infectious BMW can result in disease or injury.

It may contain infectious agents, toxic or hazardous chemicals or pharmaceuticals, radio active wastes and waste sharps. The infectious wastes may contain any of the great variety of pathogenic microorganisms.

Pathogens in infectious wastes may enter the human body through a number of routes like a puncture or cut in the skin, mucous membranes, by inhalation or ingestion.

Sharps may not only cause cuts and punctures but also infect the wounds if they are contaminated with pathogens. Because of this dual risk – of injury and disease transmission – sharps are considered as a very hazardous waste class.

Poor hospital waste management may cause the following:

- Hepatitis B & C
- HIV infection
- Gastro-enteric infection
- Respiratory infection
- Blood stream infection
- Skin infection
- Radio-active toxicity
- Health problems associated with air and water pollution.

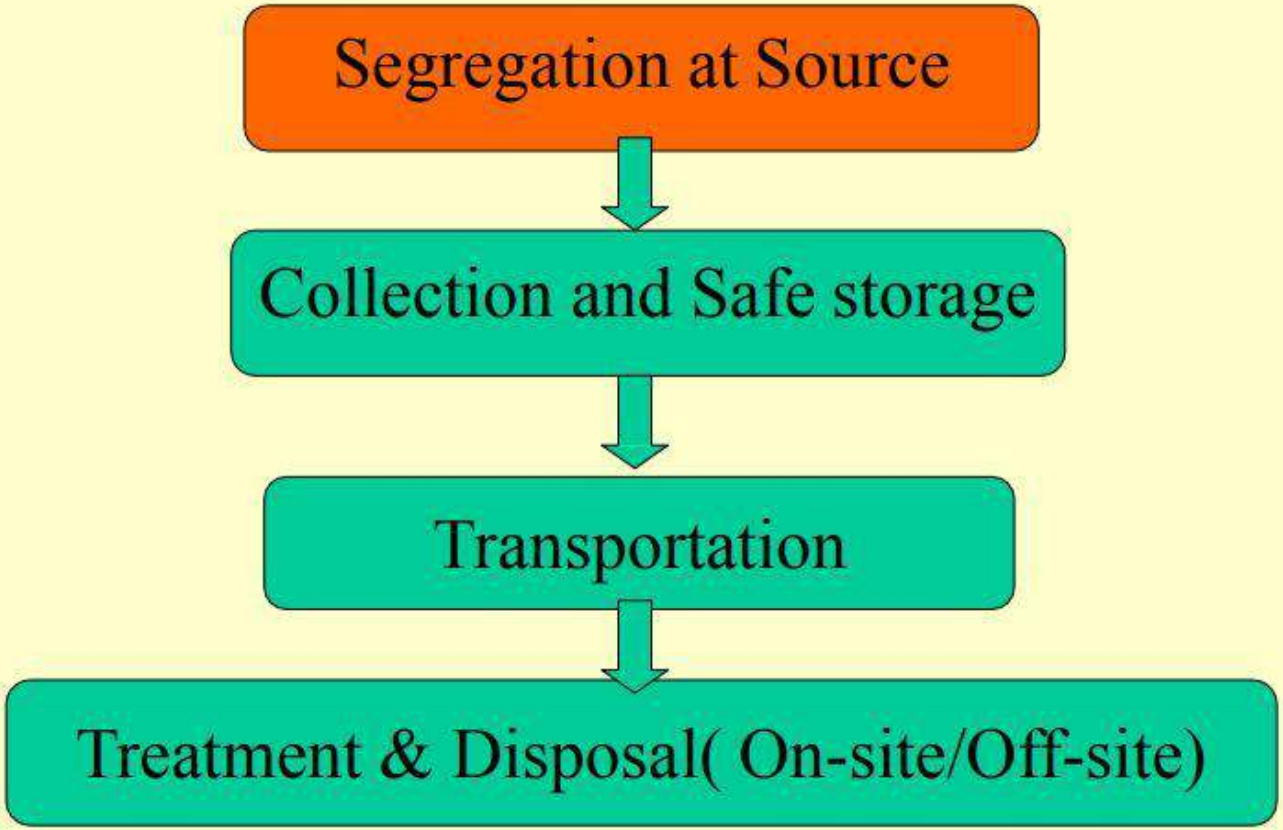
SALIENT FEATURES OF NEW RULE

- ✓ The ambit of the rules has been expanded to include vaccination camps, blood donation camps, surgical camps or any other healthcare activity;
- ✓ Phase-out the use of chlorinated plastic bags, gloves and blood bags within two years;
- ✓ Pre-treat laboratory waste, microbiological waste, blood samples and blood bags through disinfection or sterilization on-site as per WHO guidelines on Safe management of wastes from health care and WHO Blue Book, 2014.
- ✓ Provide training to all its health care workers and immunize all health workers regularly; Display monthly report and Annual report in occupier's/operator's website.
- ✓ Establish a Bar-Code System for bags or containers containing bio-medical waste for disposal;
- ✓ Report major accidents; (g) Existing incinerators to achieve the standards for retention time in secondary chamber and Dioxin and Furans within two years;
- ✓ Bio-medical waste has been classified in to 4 categories instead 10 to improve the segregation of waste at source;

SALIENT FEATURES OF NEW RULE

- ✓ The new rules prescribe more stringent standards for incinerator to reduce the emission of pollutants in environment;
- ✓ Inclusion of emissions limits for Dioxin and furans;
- ✓ No occupier shall establish on-site treatment and disposal facility, if a service of common bio-medical waste treatment facility is available at a distance of seventy-five kilometer.
- ✓ Operator of a common bio-medical waste treatment and disposal facility to ensure the timely collection of bio-medical waste from the HCFs and assist the HCFs in conduct of training .
- ✓ Dead Fetus below viability period (as per MTP Act 1971) can be considered as human anatomical waste. Such waste should be handed over to the operator of CBMWTF in yellow bag, with a copy of the official MTP certificate from the concerned obstetrician or the Medical Superintendent of the hospital.

Components of Bio Medical Waste Management



BASELINE OF BMW MANAGEMENT

SEGREGATION AT SOURCE

- TODAY HEALTH CARE ESTABLISHMENTS GENERATING ALL CATEGORIES OF WASTE EG. BIO-MEDICAL WASTE, MUNICIPAL SOLID WASTE, HAZARDOUS WASTES , E-WASTE AND SO ON.
- SEGREGATION AT SOURCE REMAINS A VITAL ISSUE, NO SECONDARY SEGREGATION IS ALLOWED IN BMW MANAGEMENT FIELD
- WITH IMPROVEMENT OF MEDICAL SCIENCE DISPOSABLE ITEMS INCREASING CONSISTENTLY
- MIXED WASTE MAY CAUSE UNDUE PRESSURE ON MACHINERIES IN CBMWTF, AS WELL AS DETORIATE BMW MANAGEMENT SYSTEM.
- CONSTANT VIGIL BY AUTHORITIES, HAS ENHANCED GROUND LEVEL SEGREGATION IMPROVEMENT.

BIOMEDICAL WASTE MANAGEMENT RULES 2016

CATEGORY	WASTE TYPE	TYPE OF BAG	TREATMENT & DISPOSAL
Yellow	Human Anatomical Waste Human tissues, body parts	Yellow non-chlorinated bag	Incineration
	Animal Waste Animal tissues, carcasses		
	Soiled Waste Cotton, dressings, linen, plaster, blood bags		
	Discarded Medicine Expired drugs, Cytotoxic drugs & it's contaminations		
	Chemical Waste Chemical used in production of biologicals, discarded disinfectants		Incineration/ Encapsulation in haz.. waste facility
	Chemical Liquid Waste Lab washing, cleaning		Leading to effluent treatment plant
	Microbiology , Bio-Technology & Other Clinical Laboratory waste		Pre-Treatment with non-chlorinated chemicals on site & lead to incineration

CAT	WASTE CATEGORY	TYPE OF BAG	TREATMENT & DISPOSAL
Red	Solid Waste Tubing, catheter, intravenous set, urine bag, syringe without needle, vacutainer	Red non-chlorinated bag	Autoclaving followed by shredding or mutilation
White (translucent)	Waste sharp including metal	Puncture & leak proof container	Autoclaving followed by shredding, mutilation or encapsulation in cement concrete
Blue	Any type of glassware except contaminated with cytotoxic drug, & metallic body implant	Blue marked container	Autoclaving

medicare

BIOHAZARD WASTE

STOP

THINK BEFORE YOU THROW.
SEGREGATE WASTE.

- Body Parts
- Placenta
- Human Tissues
- Specimens
- Blood Bag
- Surgical Waste
- Cotton Waste
- Bandages
- Linen / Bedding
- Dressings
- Solid Plaster
- Casts
- Expired Medicine
- Cytotoxic Drug

- IV Tube
- Saline Bottles
- Syringes W/o needle
- Vaccutainers
- Urine Bags
- Catheters
- Stents
- Gloves
- Aprons
- Any other tubings

- Blades
- Scalpels
- Lancets
- Needle Tip after burning

- Broken Glass
- Vial / Ampule
- Broken Slide
- Metallic Implant
- Glass Bottle Excluding Cytotoxic Residue

INCINERABLE WASTE | AUTOCLAVE WASTE | WHITE BOX | BLUE MARKED BOX

WASTE CAN BE HAZARDOUS. HANDLE WITH CARE.

Bio-Medical Waste Management Rules 2016

www.medicareenviro.com

Basic differences between Old & New Rule from the aspect of proper segregation of Bio-Medical Waste

OLD RULE

- BMW categorized in 10 categories(based on waste type)
- Two types of bags were specified for infected waste **Yellow** & **Blue**
- **Blue bag** was recommended to handover disposables like, gloves, catheter, IV set, urine bag, needleless syringe, vacutainer
- Discarded blood bag was disposed through **Blue bag**
- Glass item with out sharp edge comes in **Blue bag**, glass with sharp edge comes in puncture proof container. **White container (PPC)**
- Chemical treatment with 1% sodium hypochlorite solution was recommended for preliminary disinfection
- Fetus beyond viability period as per MTP Act 1971 was accepted as Human Anatomical Waste

NEW RULE

- BMW categorized in 04 categories(based on colour code)
- Two types of bags are specified for infected waste **Yellow** & **Red**
- Instead of **Blue bag**, **Red bag** will be use to handover disposables like gloves, catheter, IV set, needle less syringe, vacutainer
- Discarded blood bag will come in **Yellow bag**
- Any kind of glass item except contaminated with cytotoxic waste will come in **Blue mark** box
- Chemical treatment with 1-2% sodium hypochlorite solution is recommended for preliminary disinfection
- Fetus beyond viability period as per MTP Act 1971, will not accept as Human Anatomical Waste

BMW Authorization

Biomedical Waste Authorization applications shall be submitted to WBPCB through its online portal

https://wbocmms.nic.in

Annual Report (IV) shall be submitted to WBPCB through its *https://wbocmms.nic.in*

Introduction : Covid19 Waste Management

Covid19 waste introduced as Bio-Medical Waste in March'20

New Guidelines for Covid19 Waste Management as Revision1 has been issued by CPCB in March'20

Amendment of Covid19 Waste Management as Revision2 has been issued by CPCB in

Amendment of Covid19 Waste Management as Revision3 has been issued by CPCB in June'20

Amendment of Covid19 Waste Management as Revision4 has been issued by CPCB in July'20

Source : Covid19 Waste

- Dedicated Covid19 Hospitals / Isolation Wards
- Central / Home Quarantine Centre / Safe Houses
- Covid19 Testing Centers

Covid19 Waste Management

• Do's

- ✓ Take HMHDPE Yellow Bag & put it in a yellow bin dedicated for Covid19 waste
- ✓ Segregate following items from other household items & keep into the HMHDPE Yellow Bags:-
- ✓ Used Mask/Gloves/PPE Kit
- ✓ Drain/Urine Bag/Diaper
- ✓ Used Syringes / Catheter
- ✓ Blood or body fluid soaked tissues/cottons
- ✓ Vials or ampules
- ✓ Expired / Discarded medicines

• Don'ts

- ❖ Do not mix following general/household solid waste with Bio-medical wastes
- ❖ Waste vegetables and other left over food products
- ❖ Empty pet bottles, juice bottles/tetra pack
- ❖ Disposable utensils / plates / glass
- ❖ Floor cleaning dust
- ❖ Polybags/Plastic wrapper
- ❖ Empty medicine strips
- ❖ Card board box etc.

Covid19 Waste Management

Covid19 BMW Management:

Keep separate color coded bins (with foot operated lids)/ bags / containers in wards and maintain proper segregation of waste as per BMW Mgmt. Rules,2016 as amended and CPCB guidelines for implementation of BMW Management Rules.

As precaution double layered bags (using 2 bags) should be used for collection of waste from COVID19 isolation wards so as to ensure adequate strength and no-leaks.

Collect and store biomedical waste **separately** prior to handing over the same CBWTF. Use a dedicated collection bin labelled as "COVID19" to store COVID19 waste and keep separately in temporary storage room prior to handing over to authorized staff of CBWTF.

Register in CPCB mobile application namely 'COVID19BWM' to update the details of COVID19 Bio-medical waste generation & handover.

In addition to mandatory labelling, bags/containers used for collecting biomedical waste from COVID-19 wards, should be labelled as "COVID19 Waste". This marking would enable CBWTFs to identify the waste easily for priority treatment and disposal immediately upon the receipt.

The (inner and outer) surface of containers/bins/trolleys used for storage of COVID-19 waste should be disinfected with **1% sodium hypochlorite solution** daily.

Segregation of biomedical waste and general solid waste should be done at the point of generation in wards / isolation rooms. There should be no segregation of biomedical waste and solid waste at temporary waste collection / storage area of Healthcare Facility to ensure occupational safety.

Covid19 Waste Management

Covid19 General Solid Waste Management:

General solid waste comprising of wrappers of medicines/syringes, fruit peel offs, empty juice bottles or tetra packs, used water bottles, discarded papers, carton boxes of medicines, empty bottles of disinfectants, left-over food, disposable food plates etc., should be collected separately as per **Solid Waste Management Rules, 2016**.

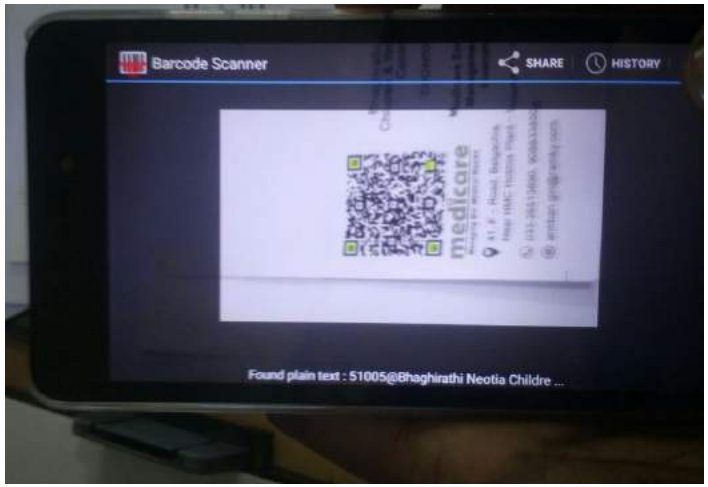
In order to minimize waste generation, as far as possible, non-disposable items must be used for serving food, which are to be handle with appropriate precautions and cleaned and disinfected as per hospital guidelines. If use of disposable items is inevitable, use bio-degradable cutlery.

The wet and dry solid waste bags to be tied securely in leak-proof bags, sprayed with **1% sodium hypo-chlorite solution** and hand over to authorized waste collector of ULB's on daily basis. **Yellow colored bags** should not be used for collecting general solid waste. Compostable bags should be used for collecting wet-waste.

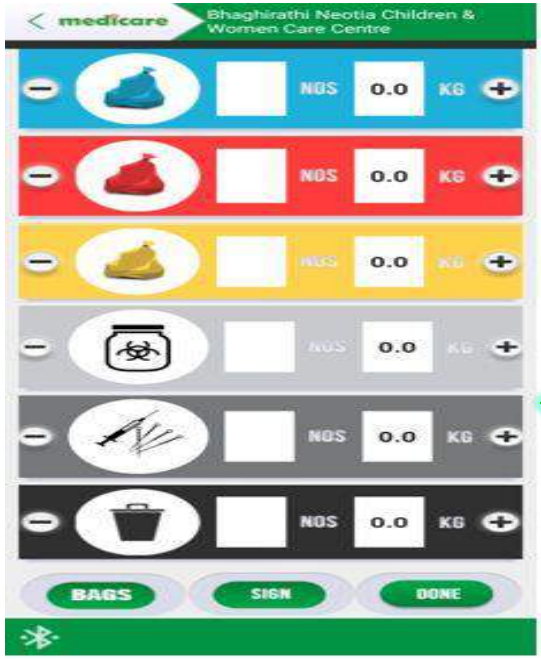
NEW BMW MANAGEMENT RULE 2016 INTRODUCES

COLLECTION AUTOMATION SYSTEM

UNIQUE QR CODE FOR EACH HCE



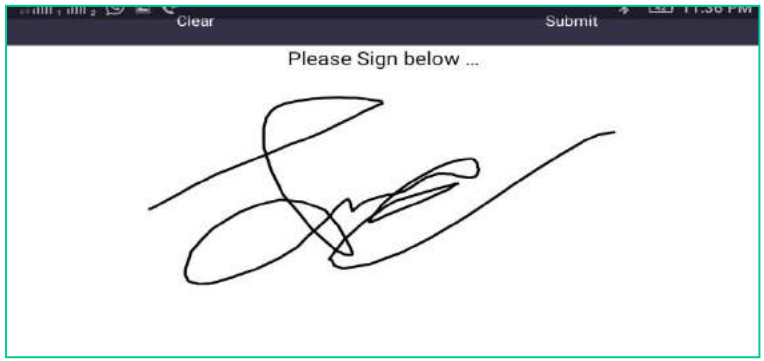
QR CODE SCANING TO IDENTIFY HCE



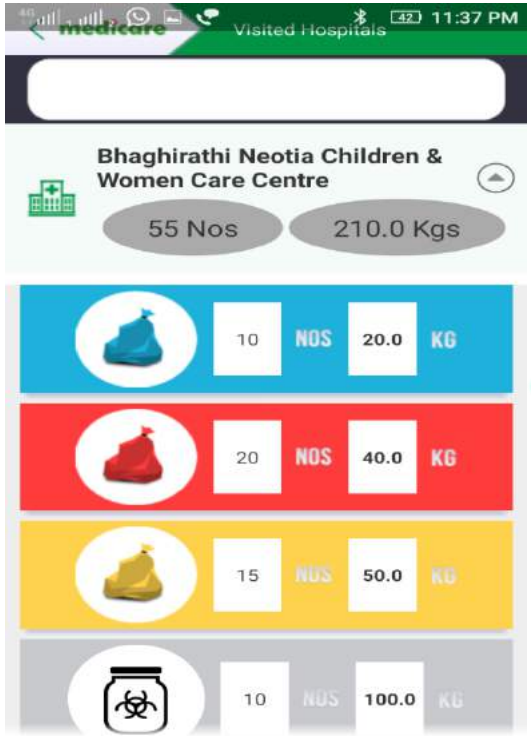
BAR CODE SCANING TO IDENTIFY WASTE CATEGORY

COLLECTION AUTOMATION SYSTEM

INPUT NO & WEIGHT OF BAG



CAPTURING CUSTOMER SIGN.



FINAL MANIFEST SEND ONLINE

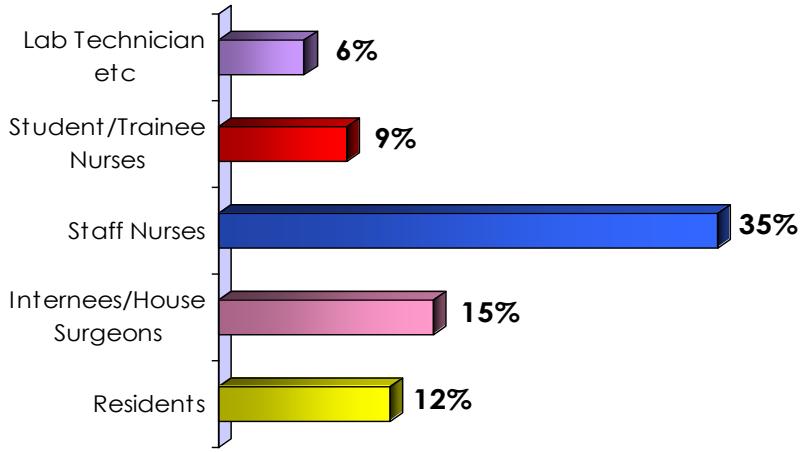
SHARP WASTE MANAGEMENT

DO YOU KNOW ?

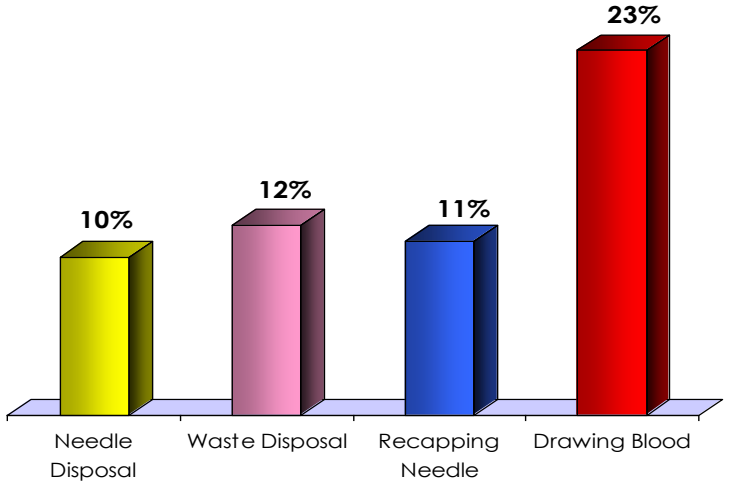
- Sharps have the highest potential to spread infection
- Sharps have the potential to induce the microorganism directly into the blood
- 80% of the infection spreading is due to cross contamination,

  i.e. using an infected needle or by accidental needle prick injuries

Category Of Hospital Staff likely exposed to Needle Prick injuries



Medical procedure capable of causing Needle Prick injuries



DOS AND DONTS OF SHARPS MANAGEMENT

- HANDLE SHARPS VERY CAREFULLY
- WHILE DISPOSING OFF SYRINGES, BURN THE NEEDLE BY INSERTING INTO ELECTRICAL NEEDLE DESTROYER. SEVER THE NECK OF THE SYRINGES, IN THE CUTTER PORTION OF THE DESTROYER.
  DO NOT LEAVE IT AFTER BENDING, IT CAN BE RE-CAPPED AND RE-USED.
- THROW THE CUT PORTION, USED SCALPELS, BLADES ETC. INTO PUNCTURE PROOF CONTAINERS. GLASSWARE & METALLIC BODY IMPLANTS INTO BLUE MARKED BOX FILLED UP WITH 10% SODIUM HYPOCHLORITE SOLUTION, THIS IS REQUIRED FOR PRIMARY DISINFECTION AT SITE. THROW THE PLASTIC BODY OF THE SYRINGE IN RED BAG.
- CHANGE HYPO SOLUTION EVERY TWO DAYS OR AFTER HANDING OVER OF THE WASTE.
- DO NOT PUT UNCUT NAKED SYRINGES IN RED BAGS, THIS WILL RESULT TO PRICK INJURY, PUNCTURE OF THE BAGS AND SPILLAGE OF THE WASTE.
- IN CASE OF ANY PRICK INJURY, INFORM HIGHER AUTHORITIES IMMEDIATELY FOR NECESSARY MONITORING AND TREATMENT.

DESTROYS METAL TIP
THROUGH HIGH VOLTAGE
DC PULSE

CUTS NECK OF THE SYRINGE
RENDERING IT UNUSABLE

COLLECTION TRAY FOR SYRINGE
HEADS CUT BY THE CUTTER

A TYPICAL ELECTRICAL NEEDLE DESTROYER

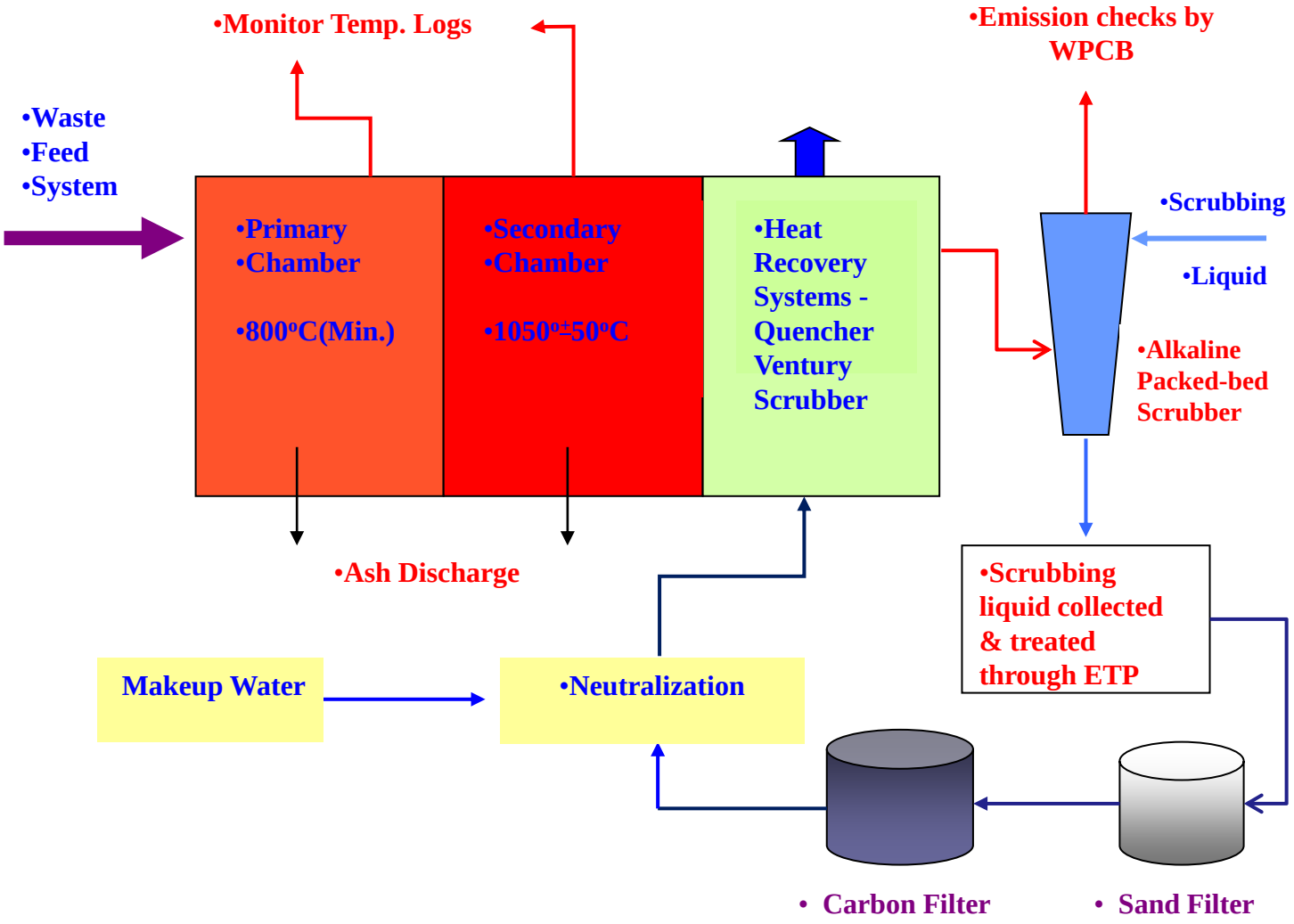
A TYPICAL PUNTURE PROOF CONTAINER FOR STORING CONTAMINATED SHARPS EXCEPT GLASSWARE & METALLIC BODY IMPLANTS

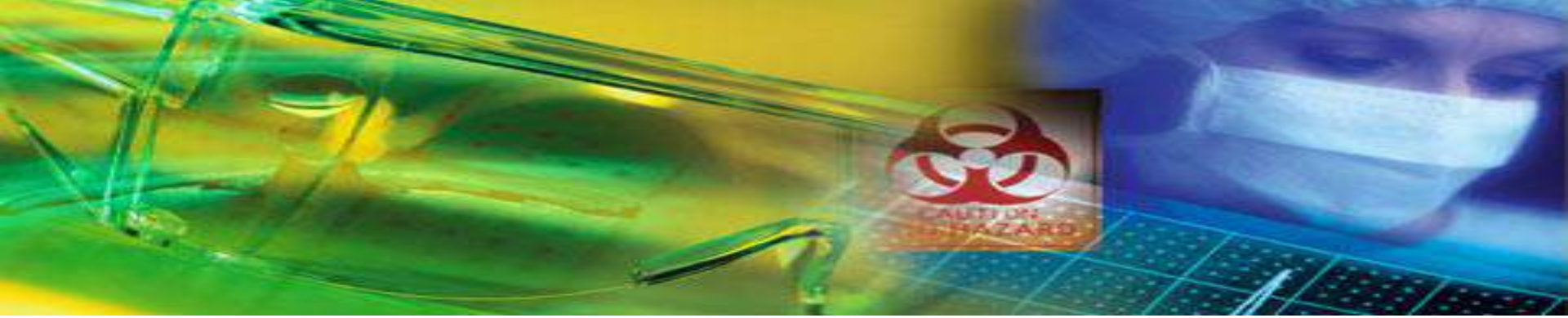
- EASILY IDENTIFIABLE
- STORES ALL KINDS OF SHARPS
- USEFUL FOR TEMPORARY DISINFECTION, USUALLY CONTAINS 10% SOD. HYPO SOL.
- PREVENTS PRICK INJURY
- USER FRIENDLY

A TYPICAL BLUE MARKED BOX FOR STORING CONTAMINATED GLASSWARE (EXCL. CYTOTOXIC RESIDUE) & METALLIC IMPLANT

- EASILY IDENTIFIABLE
- USEFUL FOR TEMPORARY DISINFECTION, USUALLY CONTAINS 10% SOD HYPO SOLUTION
- USER FRIENDLY

INCINERATOR OPERATION


•Monitor Temp. Logs
•Emission checks by WPCB
•Waste
•Feed
•System
•Primary
•Chamber
•800°C(Min.)
•Secondary
•Chamber
•1050°±50°C
•Heat Recovery Systems - Quencher Ventury Scrubber
•Scrubbing
•Liquid
•Alkaline Packed-bed Scrubber
•Ash Discharge
•Scrubbing liquid collected & treated through ETP
Makeup Water
•Neutralization
• Carbon Filter
• Sand Filter



AUTOCLAVE OPERATION

The autoclave should be dedicated for the purposes of disinfecting and treating bio-medical waste

When operating a gravity flow autoclave, BMW shall be subjected to :

(i) a temperature of not less than 121°C and pressure of 15 pounds per square inch (psi) for an autoclave residence time of not less than 60 minutes; or

(ii) a temperature of not less than 135°C and a pressure of 31 psi for an autoclave residence time of not less than 45 minutes; or

(iii) a temperature of not less than 149°C and a pressure of 52 psi for an autoclave residence time of not less than 30 minutes.

When operating a vacuum autoclave, BMW shall be subjected to a minimum of one pre-vacuum pulse to purge the autoclave of all air. The waste shall be subjected to the following:

(i) a temperature of not less than **121°C** and pressure of **15 psi** for an autoclave residence time of not less than **45 minutes**; or

(ii) a temperature of not less than **135°C** and a pressure of **31 psi** for an autoclave residence time of not less than **30 minutes**;

Medical waste shall not be considered properly treated unless the time, temperature and pressure indicators indicate that the required time, temperature and pressure were reached during the autoclave process.

FAQ's: Where & how to dispose the following items :

1.

- Gluco-strips -

✓ Yellow Bag

- Pregnancy test Kit –

✓ Yellow Bag

- HIV kit -

✓ Yellow Bag & should be marked with HIV tag

- Other Rapid test –

✓ Yellow Bag

- Zelco Plastic (contaminated) –

✓ Red Bag

- Copper T -

✓ Blue Marked Box

- X-ray plate (if any) -

✓ X-ray film developing liquid should be treated in ETP before discharge. X-ray film should be disposed to any silver nitrate recycling unit since it is not a BMW.

- Blood sample container / Blood clotting vials(does it need decontamination before disposal) –

✓ Yellow Bag post pre-treatment with non-chlorinated chemical as per NACO guideline

2. Residual blood in syringe after drawing a sample, whether pre-treatment is needed or not?

✓ Not necessary

3. Whether rubber goods (Gloves or Folley's catheter) need pre-treatment before disposal or not?

✓ Not necessary

4. Whether Blue Bin need to filled with chlorine solution or not, especially at Lab?

✓ Yes

5. Whether PPC should be kept dry or filled with 1% chlorine solution?

✓ Filled with 1% Sod. Hypo. Solution

6. In absence of ETP how to treat Laboratory wastes and other hazardous wastes?

✓ Chemical pre-treatment to attain norms as specified in schedule III

7. Whether Black and Green bucket for general wastes are needed?

✓ Yes

8. Burning of tip of the syringe is indicated or not?

✓ Burning / Cutting of needle & syringe neck is necessary

9. Where to dispose plastic wrapper of syringe & needle?

✓ Black Bag as per SWM Rules, 2016

10. Where to dispose empty medicine strips?

✓ Black Bag as per SWM Rules, 2016

11. How to decontaminate – Hypochlorite solution / Glutaraldehyde before disposal ?

✓ Not specified in BMW Rules

12. How to dispose Hospitals e-wastes (like batteries, small broken electrical instruments like pulse oximeter, glucometer machine etc.)

✓ As specified in E Waste Management Rules, 2016

13. How to dispose – Half transfusion blood bag & full expired blood bag? – [as per norms its need to be autoclaved before disposal but if facility of autoclave is not available – how to dispose ?

✓ Pre-treatment with non chlorinated chemical as per NACO guidelines

14. Does plastic items like IV bottles need to cut before disposal or not ?

✓ Yes

AUTOMATED LIQUID WASTE TREATMENT SYSTEM FOR PRE-TREATMENT

Effluent Treatment Unit for Liquid Medical Waste

Bio-Medical Waste Management Rules, 2016

THANK YOU