INTERNATIONAL FORUM FOR ENVIRONMENT, SUSTAINABILITY & TECHNOLOGY

iFOREST

Safe Handling and Disposal of BMW at Health Care Facility

- Salient features of BMW
- Duties of HCFs and penal provisions
- Areas of waste generation at small health care facility and its effective management
- Steps involved in BMW management
- Precautions to be taken while handling waste (Do's and Don'ts)
- Infection control measures to be adopted

Salient Features of BMW Rules, 2016

1	**Application**	These rules shall apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio-medical waste in any form
2	**Authorisation**	• One-time authorisation for non-bedded HCFs is required • For bedded HCFs, the authorisation is synchronised with the validity of consent
3	**Maintenance of records**	It is mandatory for every authorised unit to maintain records on the generation, collection, reception, storage, transportation, treatment, disposal and any other form of handling of bio-medical waste for a period of five (5) years.
4	**Annual report**	• Every occupier shall submit an annual report to the prescribed authority by 30th of June every year • The prescribed authority shall compile, review, analyze and report to the CPCB by 31st July every year • The CPCB shall submit a report on the same to the MoEFCC by 31st August every year • **The Annual reports shall be available on the websites of the occupier, SPCB and the CPCB**
5	**Accident reporting**	Accident o be intimated immediately prescribed authority and forward a report within twenty-four (24) hours in writing about the remedial steps taken

Salient Features of BMW Rules, 2016

- Bio-medical waste has been classified into 4 categories instead of 10 to improve the segregation of waste at source;
- The ambit of the rules has been expanded to include vaccination camps, blood donation camps, surgical camps, or any other healthcare activity;
- Pre-treatment of the laboratory waste, microbiological waste, blood samples, and blood bags through disinfection or sterilization on-site in the manner as prescribed by WHO or NACO;
- Establish a Bar-Code System for bags or containers containing bio-medical waste for disposal

Duties of HCFs

- HCF shall make a provision within the premises for a safe, ventilated and secured location for the storage of segregated biomedical wastes;
- Pre-treat the laboratory waste, microbiological waste, blood samples and blood bags through disinfection or sterilisation on-site in the manner as prescribed by the WHO or National AIDs Control Organisation (NACO) guidelines and then sent to the CBWTF for final disposal;
- Phase-out use of chlorinated plastic bags and gloves within two years from the date of notification of these rules;
- Provide training to all its healthcare workers and others involved in the handling of bio-medical waste at the time of induction and thereafter at least once every year;

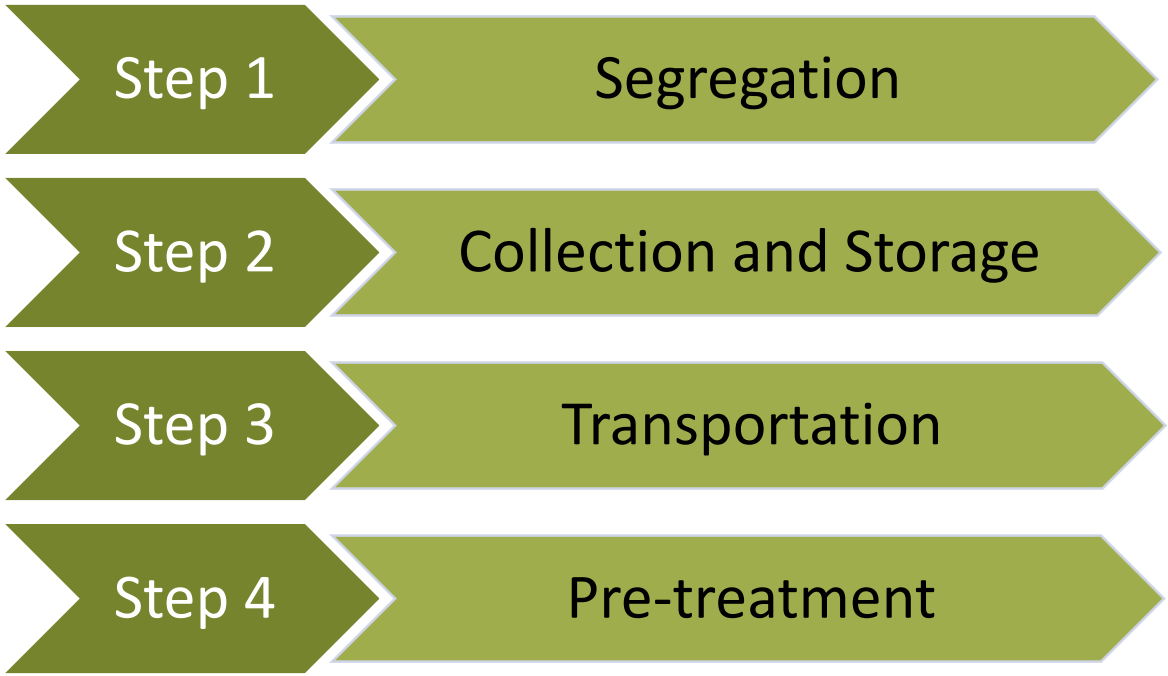
Duties of HCFs

- Immunise all its healthcare workers and others involved in handling of bio-medical waste for protection against diseases, including Hepatitis B and Tetanus that are likely to be transmitted by handling of bio-medical waste;
- Establish a Bar-Code System for bags or containers containing bio-medical waste to be sent out of the premises;
- Report major accidents, including accidents caused by fire hazards and blasts during handling of bio-medical waste and the remedial action taken to SPCB;
- To form a committee and ensure that the committee formed for monitoring and review of BMW management is functioning properly.

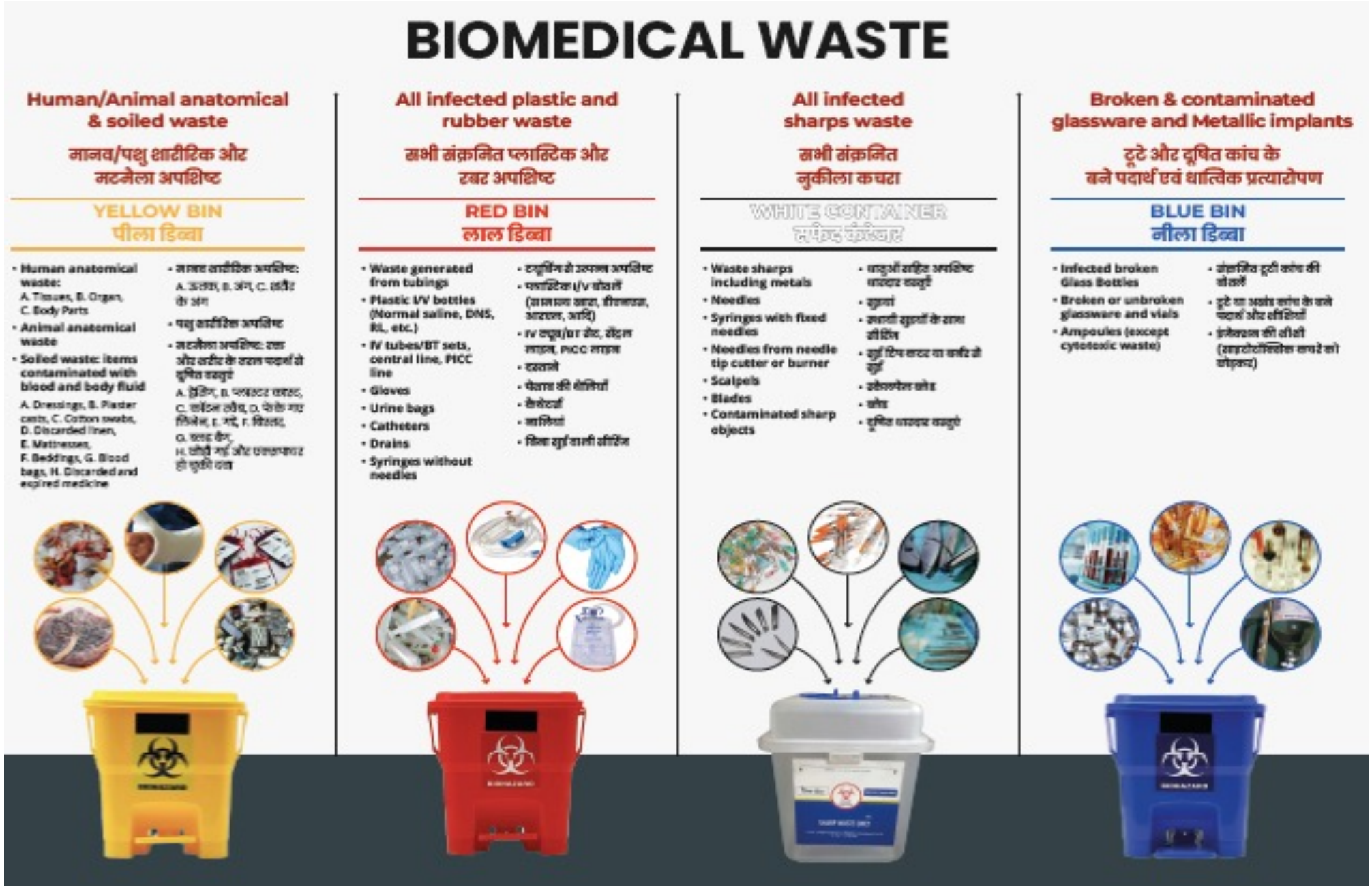
Areas of waste generation

Sr. No.	Areas of waste generation	Activities performed	Type of biomedical waste generated
1	Operation Theatre	Family planning procedures, cataract surgeries. Minor Surgical Procedures	Blood and body fluids, soiled waste, swabs, cotton, syringes and needles, blades, gloves and masks
2	OPD	Out Patient services, emergencies, and routine examination of patients	Syringes and needles, slides and lancets, ampoules, vials, blood and body fluids, broken glasses, plaster cast waste, gloves, swabs and liquid waste
3	Labour room	Child birth and other related activities	Placenta, blood and body fluids, soiled waste, cotton, swabs and liquid waste, syringes and needles, blades, masks and gloves
4	Injection Room	Immunization and curative injections	Syringes and needles, ampoules, vials, broken glasses, gloves and vaccine waste
5	Ward	In-patient services and routine examination of patients	Blood and body fluids, syringe and needle, slides, ampoules, vials, chemical waste, liquid waste, broken thermometer and soiled waste
6	Store	Store	Discarded medicine
7	Laboratory	Malarial smears, TB testing and other essential laboratory services	Blood and body fluids, syringes and needles, gloves, slides, sputum and sputum cups, chemical waste and liquid waste

Steps involved in BMW Management



Segregation



Collection

Time of collection

- Bio-medical waste should be collected on daily basis from each ward of the hospital at a fixed interval of time. Human anatomical waste, animal anatomical waste, soiled waste and biotechnology waste should be disposed off within 48 hours .
- General waste should not be collected at the same time or in the same trolley.
- General waste collection, must be done immediately after the visiting hours of the HCFs
- The collection timings must enable the HCF to minimize or nullify the use of interim storage of waste in the departments.
- Staffs collecting Bio-medical waste, should be provided with PPEs.

Packaging

- Bio-medical waste bags and sharps containers should be filled to no more than three quarters.
- Plastic bags should never be stapled but may be tied or sealed with a plastic tag or tie.
- Replacement bags or containers should be available at each waste-collection location so that full ones can immediately be replaced.
- Colour coded waste bags and containers should be printed with the bio-hazard symbol, labelled with details such as date, type of waste, waste quantity, senders name and receivers details as well as bar coded label for tracking till final disposal.
- Ensure that Bar coded stickers are pasted on each bag as per the guidelines of CPCB

Labelling

- All the bags/ containers/ bins used for collection and storage of bio-medical waste, must be labelled with the Symbol of Bio Hazard or Cytotoxic Hazard as per the type of waste in accordance with the BMWM Rules, 2016.
- Bio-medical waste bags / containers are required to be provided with bar code labels in accordance with CPCB guidelines for **“Guidelines for barcode System for Effective Management of Biomedical Waste”**

Storage

Interim Storage

Waste generated in a healthcare facility has to be shifted to an interim storage point within its premises or offsite to ensure that there is no secondary handling, pilferage of recyclables or inadvertent scattering or spillage by animals. A few things need to be taken care:

- Interim storage of bio-medical waste is discouraged in the wards / different departments of HCF.
- If waste is needed to be stored on interim basis in the departments it must be stored in the dirty utility/sections for not more than 48 hours before handling it to CBWTF.
- No waste should be stored in patient care area and procedures areas such as Operation Theatre. All infectious waste should be immediately removed from such areas.
- In absence of dirty utilities/ sections such BMW must be stored in designated place away from patient and visitor traffic or low traffic area.

Central Waste Collection Room for Bio-medical Waste

Each Healthcare facility should ensure that there is a designated central waste collection room situated within its premises for storage of bio-medical waste, till the waste is picked and transported for treatment and disposal at CBWTF.

The following points may be considered for construction of central waste collection room:

- The space allocation for this room must be as per the quantity of waste generated from the hospital.
- The planned space must be sufficient so as to store at least two days generation of waste. Central waste collection room must be roofed and manned
- Exhaust fans should be provided in the waste collection room for ventilation.
- It is to be ensured by the health care facility that such central storage room is safely inspected for potential fire hazard
- There should also be provision for water supply adjacent to central waste storage area for cleaning and washing of this station and the containers. The drainage from the storage and washing area should be routed to the Effluent Treatment Plant.
- Sign boards indicating relevant details such as contact person and the telephone number should be provided.
- The entrance of this station must be labelled with “Entry for Authorized Personal Only” and Logo of Bio-medical Waste Hazard.
- It is to be ensured that no general waste is stored in the central waste collection area.
- Healthcare facilities need to maintain the record of waste generated and handed over to the authorized recyclers.
- To ensure protection against the pests it is to be ensured by the HCFs that it has engagement of the pest control agency for taking the pest control measures in the central storage area on regular basis.

Transportation of waste

In-house transportation of bio-medical waste from the site of waste generation/ interim storage to central waste collection centre within the HCF must be done in closed trolleys/containers preferably fitted with wheels for easy manoeuvrability.

- Patient trolleys must not be used for BMW transportation
- Size of such waste transport trolleys should be as per the volume of waste generated from the HCFs.

Route of intramural transportation of bio-medical waste should be planned in such a way that

- Transportation does not occur through high-risk areas
- Supplies and waste are transported through separate routes
- Waste is not transported through areas having high traffic of patients and visitors
- Central waste collection area can be easily accessed through this route
- Safe transportation of waste is undertaken to avoid spillage and scattering of waste

Pre-treatment

Segregated waste should be pre-treated before being sent for further treatment and disposal at a CBWTF. The pre-treatment procedures are to be selected depending on the composition of the waste (solid or liquid).

Sl. No	Category of Waste	Pre-treatment
1	Microbiological waste Biotechnology waste Other clinical laboratory waste	Autoclave Or Non chlorinated disinfectant to achieve log104 reduction efficiency of microorganisms
2	Discarded linen, mattresses, beddings contaminated with blood or body fluid.2	Non chlorinated chemical disinfection or sterilization and shredding
3	Spill management	Chemical treatment with sodium hypochlorite solution
4.	Blood and liquid samples	Chemical disinfection / autoclave / ETP

Making of disinfectant solution

1% hypochlorite solution is used as disinfectant solution

For preparing 1% hypochlorite solution from the available sodium hypochlorite solution in the market following formula can be used, V1 X C1 = V2 X C2

where, V1 = Volume of available sodium hypochlorite solution

C1 = Strength of available sodium hypochlorite solution (in percentage)

V2 = Volume of water to be used as disinfecting solution

C2 = Strength of disinfecting solution (i.e. 1%)

In case sodium hypochlorite solution is not available and the disinfectant has to be prepared by bleaching powder. For preparing 1% Chlorine solution, we need to mix 10 gm of Chlorine with 1 litre of water and assuming the Bleaching Powder as containing 30% available chlorine, 10 gm of chlorine can be available in 3.3 X 10 = 33 gm of Bleaching Powder. This 33 gm of bleaching powder when added to 1 litre of water gives a 1% chlorine solution which can be used as disinfectant.

Precautions to be taken while handling waste (Do’s and Don’ts)

i) Segregation

Do's

1. Always segregate waste into infectious and non-infectious waste at source of generation

2. Non-infectious (General) waste like waste similar to household waste including packaging material, cartons, fruit and vegetable peels, syringe and needle wrappers, medicine covers into separate bins as per SWM rules

3. Segregate infectious waste into:
   a. Sharps like needles, blades, lancets in puncture proof and leak proof white coloured container
   b. Non-Sharps (soiled waste) like syringes, gloves, mask, these are to be disposed in red plastic bins/bags
   c. Broken glass, empty viols, slides, metallic body parts in puncture proof and leak proof containers with blue colour marking
   d. Anatomical waste like placenta in yellow plastic bins/bags

Don'ts

Never mix infectious and non-infectious waste at source of generation, during waste collection, waste storage, waste transportation or during final disposal of waste

Good and bad practices of segregation (Source segregation should be adopted)

ii) Collection and Storage

Do's

1. Always collect the waste in covered bins
2. Fill the bins upto the 3/4th level
3. Clean the bins regularly with soap and water

Don'ts

1. Never overfill the bins
2. Never mix infectious and non-infectious waste in the same bin
3. Never store waste beyond 48 hrs

Good and bad examples of waste collection and storage

iii) Transportation

Do's

1. Always carry/transport the waste in closed containers from the source of generation to final disposal.
2. Use dedicated waste collection bins for transporting waste

Don'ts

1. Never transport the waste in open containers or bags, it may spill and cause spread of infections
2. Never transport waste with sterile equipment

iv) Needles and syringes

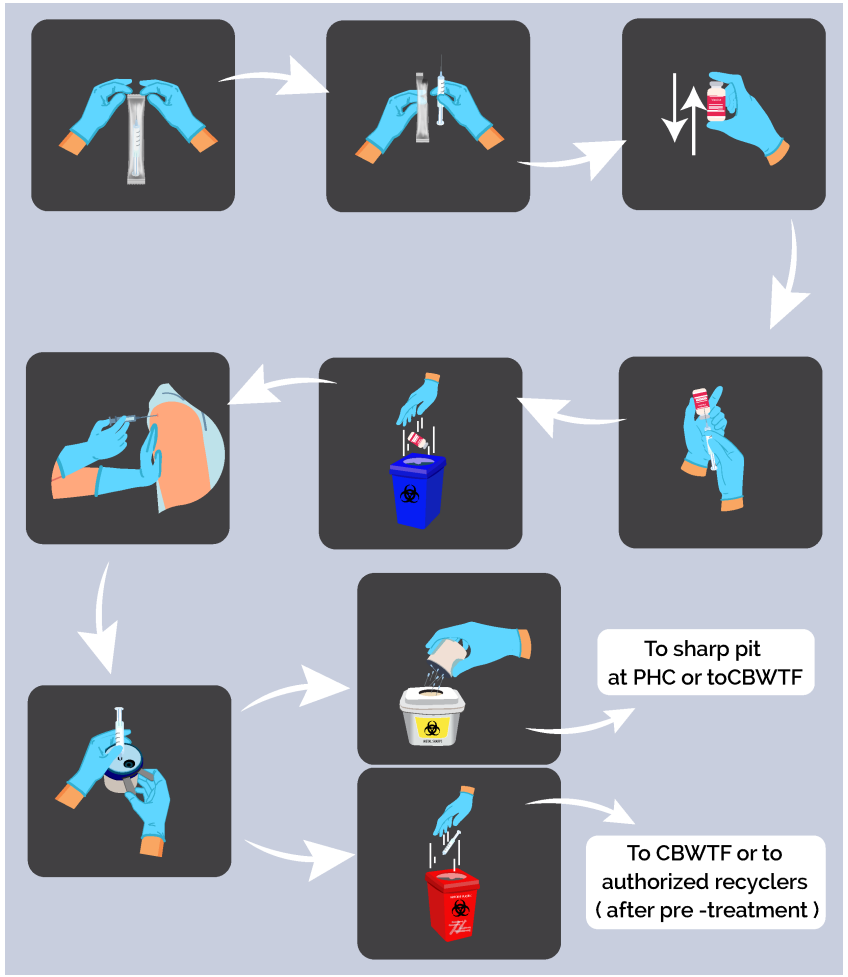
Do's

1. Always wear protective gears like gloves while handling needles and syringes
2. Always collect the needles and syringes in puncture proof containers
3. Disinfect the mutilated needles and the syringes with 1% bleaching powder solution for at least an hour
4. Collect the mutilated and disinfected needles in puncture proof containers for final disposal in sharps pit

Don'ts

1. Never mix sharps with other waste streams
2. Never discard the sharps in non-puncture proof containers like polybags
3. Never recap or bend the syringes
4. Never burn the syringes
5. Never dispose the syringes in open areas

Disposal of used needles and syringes in the HCFs



v) Metal Sharps

Bad examples of disposing metal sharps

vi) Anatomical waste

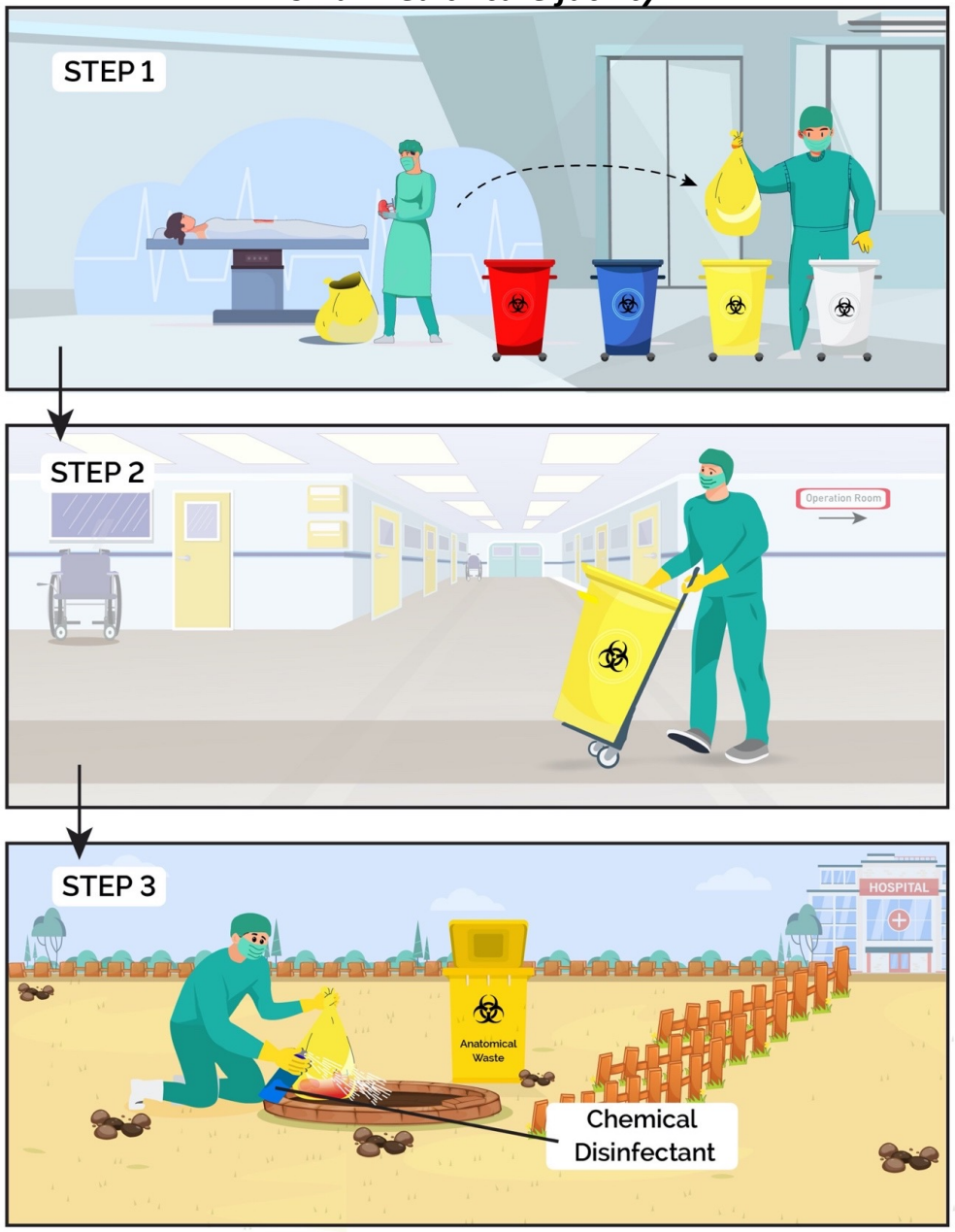
Do's

1. Always segregate infectious waste and anatomical parts like placenta from other waste streams at the source of generation
2. Collect placenta in closed bags/covered bins at the source of generation
3. Carry the placenta in covered bins/bags to final disposal site
4. Dispose the placenta along with disinfectant in secure deep burial pit or send it to CBWTF for incineration

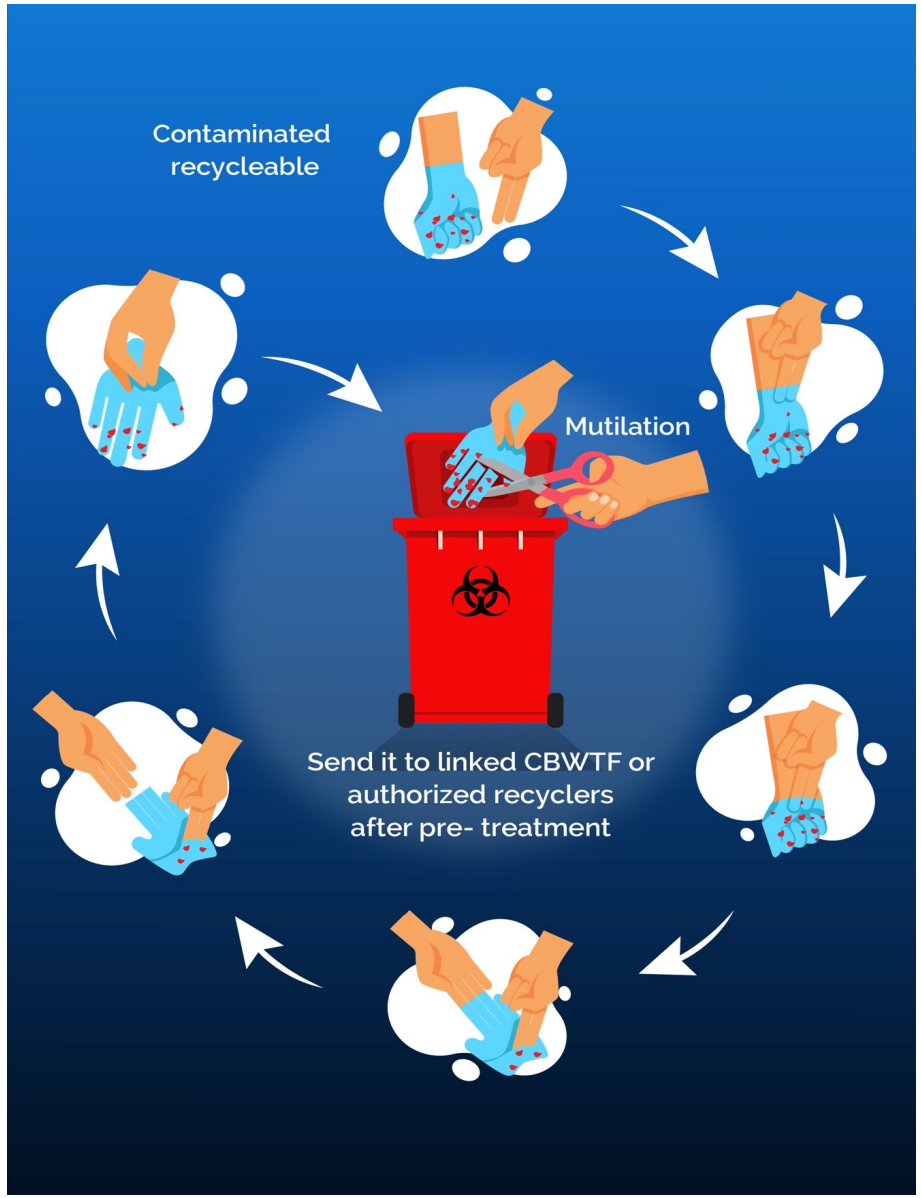
Don'ts

1. Never mix the waste at source of generation or later during collection and transportation
2. Never dispose the anatomical waste in un-secure open areas or in water bodies

Process of disposing anatomical waste at small health care facility



vii) Contaminated recyclables waste



Process of disposing contaminated recyclables waste at HCF

viii) Liquid waste spills

Liquid waste is any blood, body fluid, pus, any discharge from wounds or liquid chemicals.

Do's

1. Determine the nature of spill
2. Evacuate all the people not involved in cleaning up, if the spillage involves a particularly hazardous substance
3. Use a pair of non-sterile gloves, tongs and brush to sweep up
4. Use disposable absorbent paper towels to absorb as much of the fluids as possible
5. Wipe the area with water and detergent until it is visibly clean
6. Saturate the area again with sodium hypochlorite solution

Don'ts

1. Never clean liquid waste spills without adding disinfectant to the spills
2. Never reuse the cloth used for cleaning the spills for any other purpose without proper disinfection.

Infection Control

Precautions to be adopted

Use of Personal Protective Equipment (PPEs)

a. Always wear personal protective gears while handling waste

b. Wearing head gears, eye covers(glasses), mask, apron , gloves and boots these constitute the barrier for transmission of infections

c. Taking immunization against Hepatitis B and Tetanus are important universal precautions

Training of healthcare workers on proper use of PPE regarding:

a. When to use
b. Type of PPE to be used
c. How to use properly
d. The limitations of the equipment
e. Proper care, maintenance, useful life and disposal of the PPE

Type of PPEs used in HCF

When to use different PPE

Procedure	Glove	Gown	Mask	Goggles
Taking BP	-	-	-	-
Temperature, pulse	-	-	-	-
Counting respiration	-	-	-	-
IM injection	√	-	-	-
Starting IV line or taking blood or IV injection	√	-	-	-
Controlling minor bleeding	√	-	-	-
Cleaning an incontinent patient with diarrhoea	√	-	√	-
Handling soiled laundry	√	√	√	√
Cleaning contaminated instruments*	√	√	√	√
Controlling massive bleeding	√	√	√	√
Irrigating a wound	√	√	√	√
Conducting Delivery	√	√	√	√
Intubation	√	√	√	√
Suctioning	√	√	√	√
Liquid spill management	√	√	√	√
Mercury spill management	√	√	√	√
Handling waste (support staff)	√	√	√	√

Hand Washing

a. Hand washing is one of the most important infection control precaution to be followed by all health care workers.

b. Always wash your hands before and after any procedure, examining two patients, handling waste, eating and drinking, collecting lab samples and handling blood and body fluids.

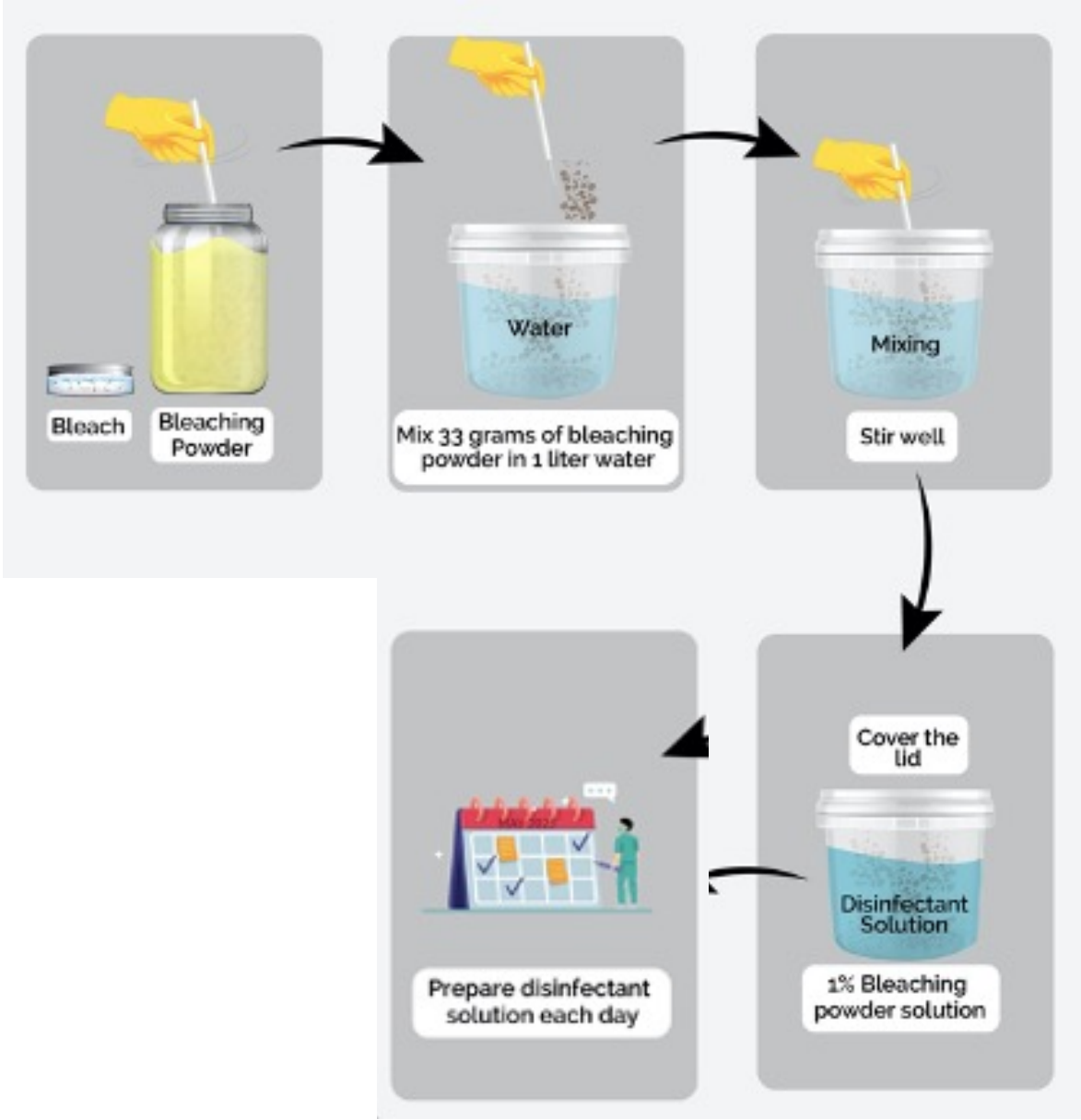
c. Routine hand washing can be done by using soap and water.

Process of proper hand-washing to keep infection away

Use of Disinfectants

a. Store bleaching powder in dry, dark and cool places
b. The bleaching powder container should always be kept closed
c. While preparing 1% bleaching powder solution add 33 grams of bleaching powder in 1 litre water
d. Stir the solution well
e. Always remember to prepare new bleaching powder solution every day. Only use freshly prepared bleaching powder solution each day and keep it covered with. Minimal agitation of the prepared liquid

Process of preparing disinfectant solution at the HCFs



Cleaning of floors

a. Wear Personal protective gears like gloves and apron while cleaning the floors
b. Clean the floors regularly
c. Use hot water and soap for routine cleaning of the floors
d. Add disinfectants to water for cleaning critical area like labour room, operation theatre
e. Mop/ cloth needs to be disinfected after every use

Proper cleaning of floor with disinfectant should be done in areas with high risk of infection regularly

Health Hazards

Health Hazards

a. Spread of infection

b. Infection and injury to waste handlers

c. Dispersal of harmful chemicals

d. Occupational hazards and patient safety

e. Unsafe recycling

f. Uncontrolled burning and emission of harmful pollutants

Hazards of improper handling of BMW

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Thanks

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