

Module 6. HEALTHCARE WASTE MANAGEMENT

Ministry of Health Liberia
Division of Environmental & Occupational Health

WASH Package – Early recovery & Resilience Building from EVD outbreak



Existing situation



Learning Objectives

- To explain types of healthcare waste and associated risks
- To outline policy & guidelines on Healthcare Waste Management (HCWM) in Liberia
- To discuss key steps for proper HCWM
- To discuss steps in developing HCWM plans



Learning Outcomes

By the end of the session, participants will be able to;

- **Identify types of healthcare waste**
- **Explain policy & guidelines on HCWM in Liberia**
- **Describe key steps for proper HCWM**
- **Understand the planning process for HCWM**



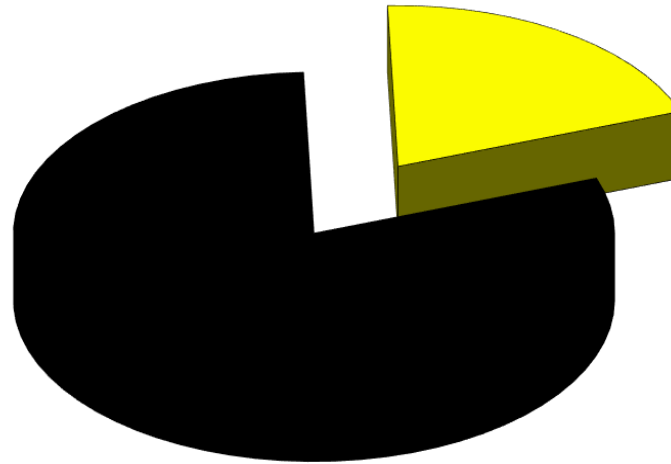
Classification of healthcare waste

75% - 90%

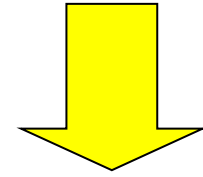


General waste

- Waste materials that are not harmful
- Can be disposed of as household waste/garbage through the available landfills/waste disposal sites set by cities or waste pits at the facility (**space???**)



10% - 25%



Potentially hazardous waste

- Causes various health risks
- Requires special care from the point of generation until final disposal.
- Requires treatment prior to final disposal at the facility (**on-site**)



Types of healthcare waste

General and hazardous waste materials resulting from healthcare and related activities

A. Types of general/non-hazardous waste

1. *Paper.*
2. *Packaging materials.*
3. *Plastic bottles and cans.*
4. *Food remains.*
5. *Cartons.*
6. *Dry grasses and fallen leaves*
7. *Outdated equipment/furniture that does not contain hazardous elements (doors, office cabinets, sofa, etc)*

B. Types of potentially hazardous waste

1. *Infectious waste (sharps waste 1% and non-sharps waste such as contaminated swabs, body fluids, anatomical waste, placenta, etc.).*
2. *Chemical Waste.*
3. *Pharmaceutical Waste.*
4. *Radioactive Waste.*
5. *Pressurized Containers.*
6. *Waste with High Contents of Heavy Metals.*



Example of infectious waste



Examples of chemical waste

Examples of hazardous chemical waste (**toxic, flammable, explosive or reactive**)

- Formaldehyde, glutaraldehyde
- Photographic fixing and developing solutions
- Laboratory solvents
- Pesticides, insecticides
- Mercury in thermometers and sphygmomanometers
- Disinfectants (phenols and bleach)
- Toxic cleaners, degreasers

Examples of non-hazardous chemical waste

- Saline solution, glucose, amino acids, vitamins



Examples of pharmaceutical waste

- Waste that consists of expired, unused, split, and contaminated pharmaceutical products, drugs, vaccines, etc.



Why proper management of HCW?

- Minimizes the spread of infections (Hepatitis B & C, Ebola, etc.) and reduces the risk of accidental injury to staff, patients, visitors and the community
- Reduces the likelihood of contamination of the soil or ground water with chemicals or microorganisms
- Reduces problems of pest (**insects, rodents, and animals**)
- Reduces odors and helps provide clean and attractive appearance environment of the facility
- Reduces smoke and mitigates climate change effects



Who is at risk?

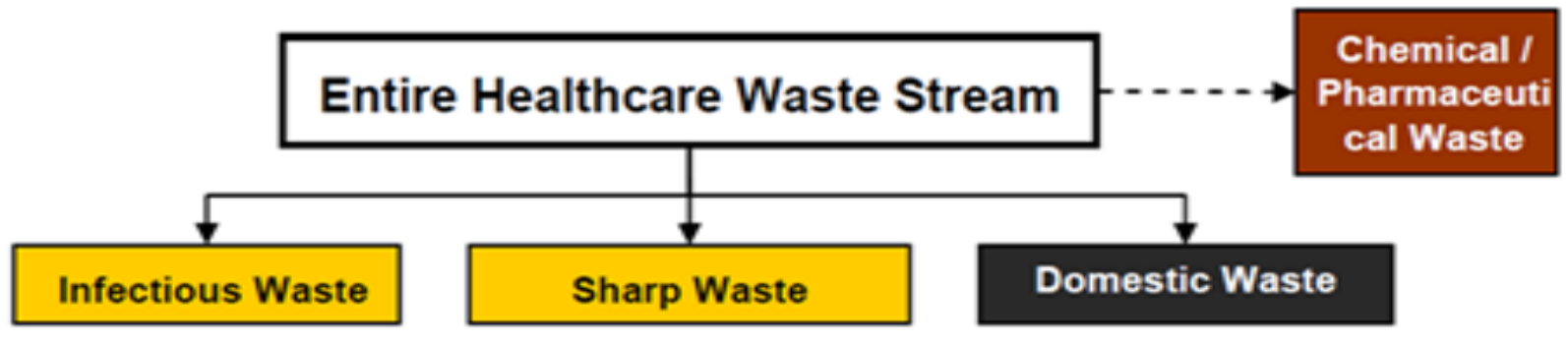
The following individuals are exposed to the risk of infections:

- **Medical and laboratory staff**
- **Health support staff**
- **Waste workers and cleaners**
- **Maintenance personnel, ambulance drivers**
- **Patients**
- **Visitors**
- **Workers at waste pits and dumpsites**
- **Nearby communities**



National policy guidelines on HCWM in Liberia

“Three Bin System” of segregating HCW



- Healthcare waste should be properly segregated
- All healthcare workers have a responsibility to dispose of waste in a manner that poses minimal hazard to patients, visitors, healthcare workers, and community.
- Every healthcare facility shall develop HCWM plan, implement and monitor its implementation



International policy guidelines on HCWM

- **Infectious waste materials shall be treated prior to final disposal to reduce health risks**
- **Waste handlers shall be offered hepatitis B immunization**
- **All healthcare workers shall be familiar and comply with the national public health regulations governing disposal of HCW**
- **All healthcare workers (including those working in private facilities) shall receive orientation and in-service training on healthcare facility waste management.**



Key Steps for proper Healthcare Waste Management

- **Waste Minimization**
- **Segregation**
- **Handling**
- **Collection**
- **Transport**
- **Storage**
- **Treatment**
- **Final disposal**



Waste minimization

- This is the first and best way to reduce HCW quantities and costs
- Reduces environmental impact on air, water and land pollution
- Purchases of material and supplies should be made with waste reduction in mind
- Issuing of supplies should follow FEFO and FIFO rules
- Encouraging the use of tablet medication as an alternative to injection to reduce sharps waste
- Encourage recycling and reuse of non-infectious materials



Waste Segregation at generation points ("Three-Bin System")

Non-Infectious Waste

- Paper/Packaging material
- Bottles/Cans
- Food



Infectious Waste

- Gauze/Dressing
- Blood/IV giving sets
- Gloves
- Pharmaceutical waste



Sharps Waste

- Infusion needles
- Broken slides
- Broken vial
- Broken ampules
- Lancet
- Retractable
- Scalpels
- Blades
- Needles



Waste segregation cont.

- Separating waste by type at the place where it is generated
- Waste should be separated **BY THE PERSON GENERATING THE WASTE** immediately according to **“Three-Bin System”**
- Segregation of pharmaceutical waste (expired medications) has to be done at the pharmacy under the supervision of a pharmacist
- Waste handlers should never sort through waste after it has been placed in the bin or collection area/chamber



Where to place segregation containers?

- **Sharps containers should be placed within arm's reach of the injection providers, surgeons or laboratory technicians to prevent needle stick injuries**
- **At least one set of black and yellow containers should be allocated per 20 beds in each ward, in patient's waiting areas, laboratory, toilets, reception, consultation and treatment rooms**
- **Segregation containers should be strategically placed near each other so as to facilitate segregation**
- **Other segregation categories can be set depending on the type of services offered by the facility (radioactive waste, genotoxic waste, waste with higher levels of heavy metals, etc.)**



Where to place segregation containers?

Cont.

- **Infectious waste containers should not be placed in areas where no infectious waste is generated (such as medical records department, administrative offices, etc.)**
- **The nurse's trolley should have the infectious waste container (for contaminated swabs or dressings), a non-infectious waste container (for clean packaging and regular waste) and a sharps container within arms reach for sharps**



Color coding for liner bags and containers

- The same color code must be maintained during all stages of waste management until final disposal

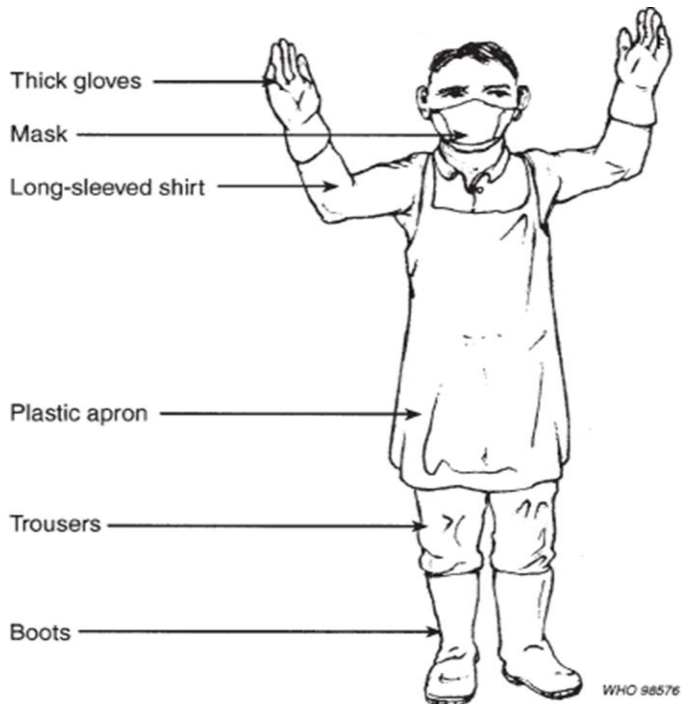
This helps with:

- preventing tampering of waste by unauthorized persons
- easy identification of waste
- preventing accidental mixing of waste



Waste handling tips!

- Wear appropriate protective clothing and handle waste with care
- Wash hands with soap and water after removal of gloves
- Do not re-sort waste!
- Never carry waste bags/containers against body (e.g. on shoulder)
- Report sharps injuries to manager
- Avoid heavy loads (**use transport tools**)



Waste collection

- Waste collection schedule with a notification plan should be set and included in a HCWM plan to allow timely collection of waste
- Waste bags should be collected when 3/4 full or at least daily (except for sharps)
- Sharp waste should be collected when the box is 3/4 full
- Tie infectious waste bags securely (goose-neck method or knot) to reduce risks of infections



Seal bag when filled to the warning line.



Twist firmly then double over.



Hold the twist firmly.



Pass the seal over the neck of the bag.



Tighten the seal manually to create an effective seal.



Waste collection cont.

- After removing the waste bag, place the same size bag in the bin
- But if the bin has visible blood or body fluids, do the following:
 - 1. Bring the bin outside of the ward*
 - 2. Follow steps for cleaning and decontamination*
 - 3. Allow the bin to dry and take it to the ward*

How to clean healthcare waste containers?



Minimum specifications for waste collection containers

Containers for non-sharps waste

- Be leak-proof with a well fitting lid and a pedal
- Be pedal operated to reduce risks of infection
- Made of non-corrosive material (reusable polypropylene bins)
- Lined with color-coded non - PVC plastic (disposable polyethylene liner-bags)
- Cleaned after each use
- Portable (fixed with handle and volume of 25-40 litres)
- Dedicated for waste only



A safety box???

Safety boxes are containers for sharps waste

- **Use cardboard safety boxes if treatment method is incineration**
- **Use metal or plastic reusable containers for autoclave treatment method**
- **Follow the assembling instructions on the side of the box**

Exercise: How to assemble a cardboard safety box?



Transporting healthcare waste

- **On-site:** Transporting waste within the health facility using a covered trolley, wheel barrow, wheeled bin, or a cart
- **Off-site:** Transporting waste outside the health facility.
- Transport equipment should be used for waste transport only.
- The equipment must be cleaned and disinfected at the end of each working day. Equipment should be covered.



Storing healthcare waste

- Infectious waste should be treated within 24 hours during hot climate, 48 hours during cool

General requirements for storage of waste

- Impermeable hard floor for easy cleaning with good drainage
- Water and detergent nearby for cleaning purposes
- Inaccessible to animals, insects and birds
- Well ventilated & protected from rain
- Sign with biohazard symbol
- Prevent access to unauthorized people
- Located close to treatment unit and away from food preparation areas
- Be designated for waste only
- Kept clean, dry and pest free
- Large enough to cater for over-flow waste due to collection and treatment breakdowns.



Treatment technologies

- **Incineration technology:** Burning HCW at higher temperatures of above 800 °C to reduce waste volume and weight to over 80 %. By-products are flue gas, heat, particulates and ash.

According to the National Policy on Management of Healthcare Waste in Liberia, “Burning of the infectious waste in primitive incinerators or barrels shall only allowed on an exceptional, temporary basis with the written permit of the local Environmental Protection Agency, issued in consultation with the County Health Officer.

- **Non-incineration technology/Autoclaving:** Autoclaves/steam sterilization of HCW at 134 – 135 °C with a post-treatment process or shredding to reduce waste volumes.



Criteria for selection

- Type and amount of waste generated
- Waste reduction (*mass and volume*)
- Disinfection efficiency
- Operational requirements (*electricity, fuel, water, spare parts & maintenance, trained operators, monitoring*)
- Sustainability – (*locally available technologies, applicability, infrastructural requirements*)
- Occupational health and safety, public health and environmental issues
- Logistic requirements (*investment cost, training, decommissioning*)
- Acceptability/regulations
- Available disposal options for the end products/materials
- Availability of space
- Location of healthcare facility



Incineration technology

An incinerator should consist of:

- Primary combustion chamber (waste burning chamber)
- Secondary chamber (flue/exhaust gas burning chamber)

Advantages:

- Waste reduction by over 90%
- Appropriate for pharmaceutical, chemical and anatomical waste
- Does not require off-site transport

Disadvantages:

- Air pollution
- Produces toxic ash that requires effective disposal
- Require fuel and electricity (for pyrolytic incinerators)
- Require trained operators



Non-incineration technology/autoclaving

Advantages:

- Environmentally safe

Disadvantages:

- Require reliable electricity and water (*175 liters/cycle*)
- Require off-site transport and landfills for disposal of autoclaved materials
- Additional time requirement for shredding
- Shredder reduces volume by 60–80%
- **No mass** reduction attained
- Require additional liner bags for autoclaved materials
- Require trained operators to operate both an autoclave and the shredding device
- **Inadequate for pharmaceutical, chemical and anatomical waste**



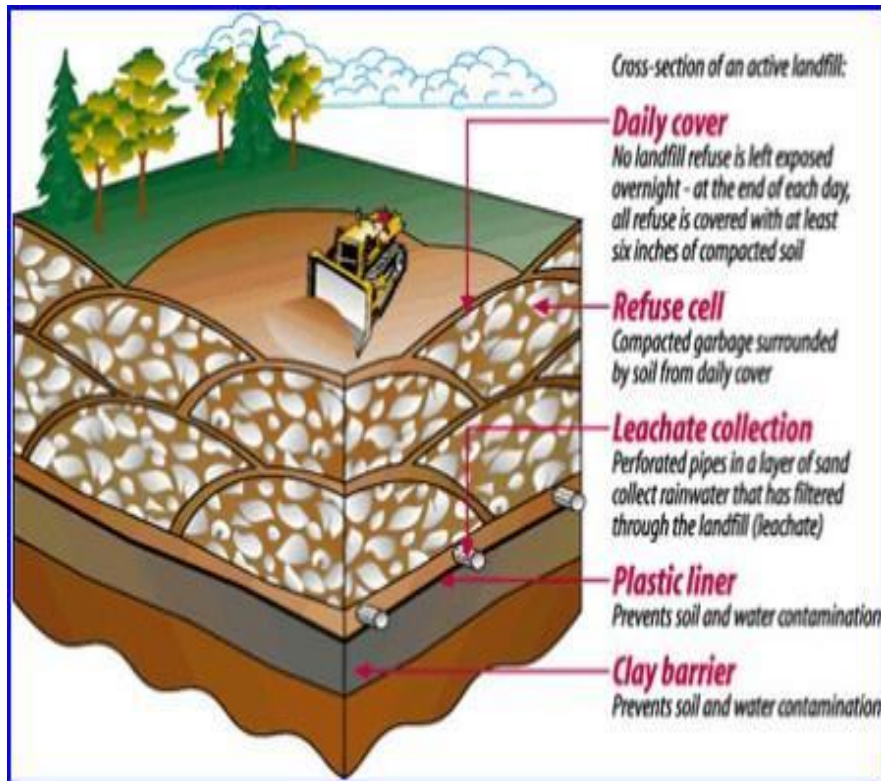
Final disposal methods

- **Ash pit:** Disposal of incineration ash
- **Land fill or waste burying pit:** Disposal of general waste including the autoclaved waste
- **Burning pit:** Disposal of waste during emergency in the absence of incinerators/autoclaves. It causes higher smoke pollution and other health risks
- **Encapsulation:** Disposal of expired vaccines, medications by adding immobilizing materials e.g. cement and seal the container
- **Placenta pit:** Disposal of placenta and body parts



Final disposal methods

- Lined to prevent leachate from contaminating the environment
- Incineration ash should not be disposed of in municipal landfill
- Anatomical waste and placenta should be dropped into a concrete lined pit inside the HCF compound.



Cross-section of an active Landfill

www.blueenvironmental.com/images/imgLandfillD



Developing County HCWM Plan

- **The economic situation of the country**
- **The legal framework**
- **The roles of actors involved in the healthcare waste management system**
- **The treatment processes of healthcare waste**
- **Strategies for sharing waste management infrastructure and related facilities within the county**



Developing Facility HCWM Plan

- **Involve IPC-WASH committee members in developing, implementing and supervising facility waste management plan**
- **Outline current healthcare waste management status at facility (WASH Safety plans)**
- **Outline ideal practices: Establishing standards**
- **List improvements needed and requirements for training**
- **Assessment of healthcare waste management cost**
- **Outline monitoring schedule**



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Discussion

~ END

