



HEALTH-CARE WASTE MANAGEMENT

PRESENTED BY

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OUTLINE

- Definition of healthcare waste;
- Classify the types of healthcare waste;
- Discuss the risks and hazards of healthcare wastes
- Discuss the key steps in healthcare waste management
 - Waste segregation;
 - Healthcare waste transportation;
 - Healthcare waste storage;
 - Disposal /treatment methods of healthcare waste.
- Overview of healthcare waste management in Nigeria;
- Challenges and recommendations



DEFINITION

- WHO defines **Health Care Waste (HCW)** as the total waste stream from a healthcare or research facility that includes both potential risk waste and non-risk waste materials.
- It is also defined as any waste that is generated in the diagnosis, treatment or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals.

CATEGORIES OF HCWs

| Waste category | Description and examples |
|-----------------------------|--|
| <i>Infectious waste</i> | <i>Waste suspected to contain pathogens:</i> |
| | laboratory cultures; waste from isolation wards; tissues (swabs) , materials, or equipment that have been in contact with infected patients; excreta |
| <i>Pathological waste</i> | <i>Human tissues or fluids:</i> |
| | body parts; blood and other body fluids; fetuses |
| <i>Sharps</i> | <i>Sharp waste:</i> |
| | needles; infusion sets; scalpels; knives; blades; broken glass. |
| <i>Pharmaceutical waste</i> | <i>Waste containing pharmaceuticals:</i> |
| | pharmaceuticals that are expired or no longer needed; items contaminated by or containing Pharmaceuticals (boxes, bottles) |



CATEGORIES OF HCWs

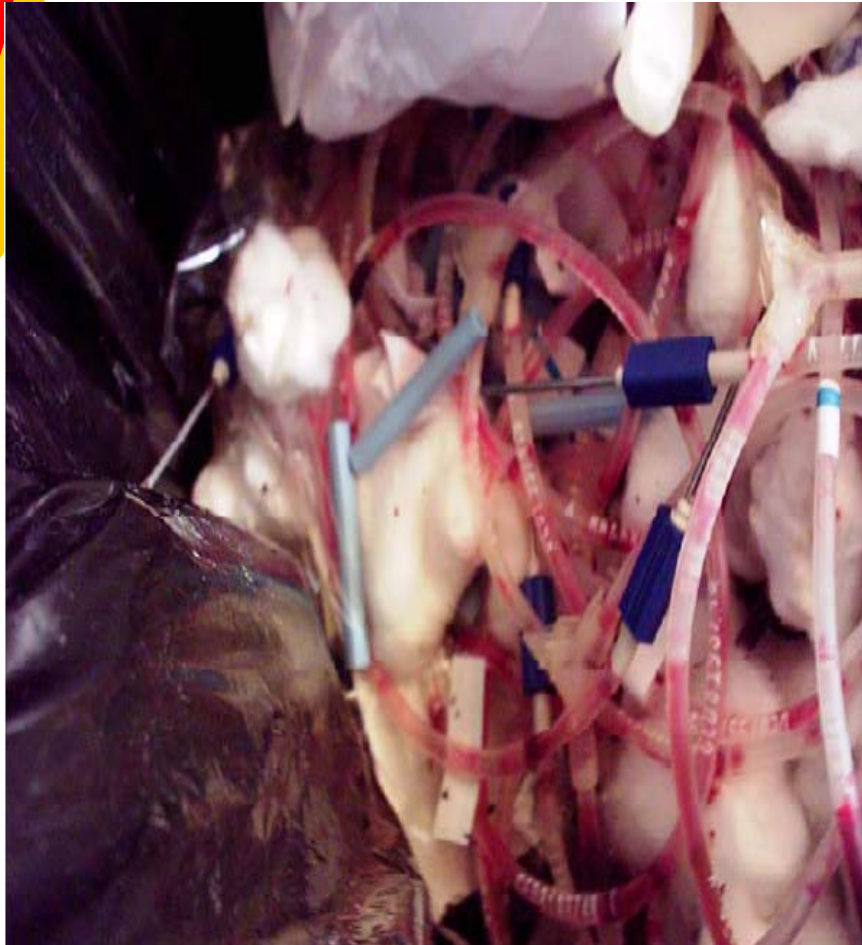
| Waste category | Description and examples |
|--|--|
| <i>Waste with high content of heavy metals</i> | <i>A sub-classification of chemical waste which are usually highly toxic</i> |
| | Batteries, broken thermometers, blood pressure gauges etc |
| <i>Pressurized Containers</i> | <i>Potentially harmful gas in containers</i> |
| | Gas cylinders, gas cartridges and aerosol cans |
| <i>Radioactive waste</i> | <i>Waste from ionizing radiation</i> |
| | unused liquids from radiotherapy or laboratory research; contaminated glassware, packages. Examples include alpha-particles, beta-particles and gamma rays |



CLASSIFICATION OF WASTE

- On the basis of their likelihood to cause major health hazards, health care wastes are further classified into
- **RISK WASTE** (fig.1)
 - Infectious Wastes
 - Anatomical Wastes
 - Sharps Wastes (used or unused)
 - Chemical Wastes
 - Pharmaceutical Wastes
 - Radioactive Wastes

Fig.1 Some Examples of Risk Waste





CLASSIFICATION OF WASTE

- Genotoxic Wastes
- Pressurized Containers
- Waste with High Contents of Heavy Metals

○ **LOW RISK WASTE**

- Communal Wastes
- General wastes from offices



RISK OF HCWs

- HCW create a variety of health risks to:
 - The health Care provider
 - The Recipient or Patient
 - The Community /Environment



Implications of healthcare waste: Health implications

- To the health care provider and patients
 - Needle-stick injuries (accidental or intentional as in re-cap, reuse or wrong technique)
 - Cuts from other sharps not properly disposed
 - Blast injury
 - Exposure to radioactive materials
 - Abnormalities of the fetuses in pregnant women



Implications of healthcare waste: Health implications (contd.)

○ Infections:

- Transmission of infections e.g. hepatitis A, B, C, HIV/AIDS
- Enteric infections transmitted by flies feeding on wastes e.g. cholera, dysentery,
- Skin and blood infections resulting from direct contact with waste and infected wounds
- Eye and Respiratory infections resulting from exposure to infected dust, especially during landfill operations
- Zoonoses resulting from bites by wild or stray animals feeding on wastes




Implications of healthcare waste: Health implications (contd.)

○ **Chronic diseases:**

- Incineration operations are especially at risk of chronic respiratory diseases, including cancers resulting from exposure to dust and hazardous compounds

○ **Accidents:**

- Musculoskeletal disorders resulting from the handling of heavy containers
- Wounds, most often infected, resulting from contact with sharp items
- Poisoning and chemical burns resulting from contact with small amounts of hazardous chemical waste mixed with general wastes
- Burns and other injuries resulting from occupational accidents at waste disposal sites, or from methane gas explosion at landfill sites



Implications of healthcare waste: Environmental implications

- Injury from improperly disposed sharps (Fig 2)
- Environmental pollution or degradation, e.g. air, water (fig 3 and fig 4)
- Exposure to radioactive waste
- Injuries from blasts
- Hazards of scavenging
- Toxic waste effects
- Fires
- Public nuisance (offensive smells, unsightly debris)

Fig.2: Risk At The Dump Site



Fig. 3 HCW as Risk to the Environment



Fig.4 HCW as Risk to the Environment




WHO IS AT RISK?

- Nurses & medical staff
- All workers in the health care facilities
- Patients
- The general public
- Management
- Mortuary workers
- Service provider workers who are involved in the collection & disposal of health care waste
- Waste pickers at general landfill sites



Steps in HCW Management

- 
- **Plan:**
 - Have a HCW Management Plan
 - **Waste Minimization:**
 - Avoid unnecessary waste e.g. use oral drugs instead of injections as much as feasible
 - **Segregation:**
 - Implement a system of Separating sharps, infectious and general waste
 - **Access:**
 - Waste Segregation Materials
 - **Safety:**
 - Make and use personal protective equipment

Steps in HCW Management

- **Transportation:**
 - Onsite and Off site
- **Treatment:**
 - This may be by incineration, microwave or Chemicals
- **Disposal:**
 - Appropriate release of treated waste into soil, water or air.
- **Immunize:**
 - Against Hepatitis B and have post exposure care for HIV
- **Capacity building:**
 - Train all levels of Health Care Staff



WASTE SEGREGATION

○ Definition

- Separating different types of waste at the point of generation and keeping them isolated from each other.
- It is the most important step in the entire process of HCW management.
- Samples of non segregated and segregated waste on fig.5 to fig. 7
- Table 1 shows color coding for segregation of HCW.

Fig. 5

Sample of non-segregated HCW



Fig. 6
Sample of non- segregated HCW

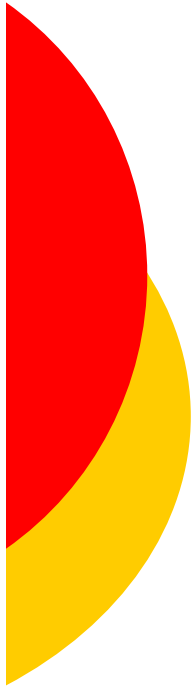


Fig.7

Dumping site within a Hospital



Table 1.WHO RECOMMENDED COLOUR CODING FOR HCW SEGREGATION

| Type of Waste | Color of Container and Markings | Type of Container |
|-----------------------------------|--|---|
| Highly infectious waste | Yellow, Marked "Highly Infectious" Or Red | Strong, leak proof container or bag capable of being autoclaved |
| Other infectious waste | Yellow | Plastic Bag or containers |
| Sharps | Yellow, Marked "SHARPS" | Puncture Proof Containers |
| Chemical and Pharmaceutical waste | Brown | Plastic Bag or Container |
| Radioactive waste | | Lead Box Labeled with the radioactive symbol |
| General Health Care Waste | Black | Plastic Bags |

WASTE TRANSPORTATION

- **On-site**
 - HCW should be transported within the health-care center by means of dedicated wheeled trolleys, containers or Carts, that are easy to load.
 - Vehicles should be cleaned and disinfected daily with appropriate disinfectant.

- **Off-Site (Fig. 10)**
 - safe packaging and adequate labeling of waste to be transported off-site.
 - Set up control strategy to track the waste all along its transportation from the Health facility to the treatment point.
 - A Consignment note should accompany the waste



Fig. 8 Locally Constructed Waste Cart





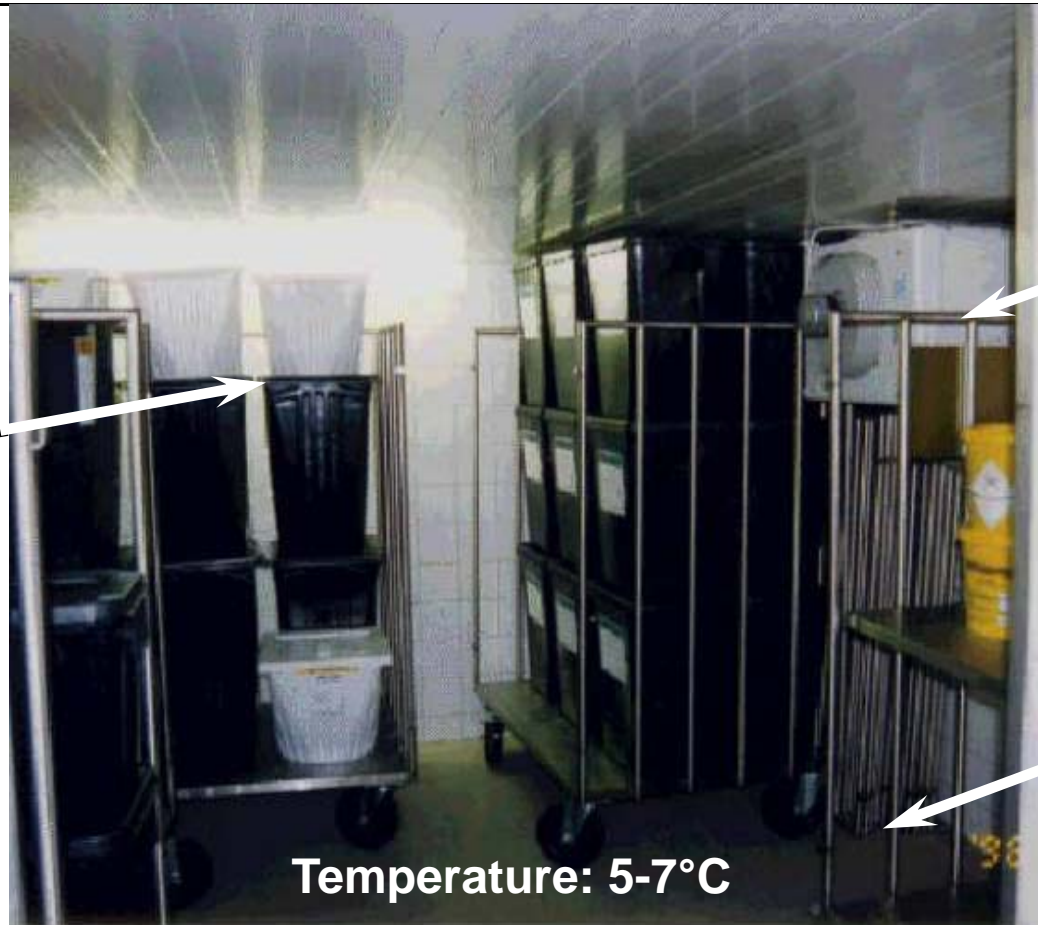
WASTE STORAGE

- Once collected waste should not be kept for too long before disposal
- Max storage times in warm climates like Nigeria is 48 hours during cooler season and 24 hours in the dry/hot season (WHO 1999)
- For longer storage periods waste must be stored in a cold room to minimize decomposition of the waste (Fig. 9)

Fig.9
SAMPLE INFECTIOUS WASTE INTERIM STORAGE



Sterilize able
transport
carts



UN-approved
containers
for infectious
waste

Tiled room,
disinfect able

Temperature: 5-7°C



HCW TREATMENT AND DISPOSAL

- Treatment means any method, technique or process for altering the biological, chemical, or physical characteristics of waste to reduce the hazards it presents and facilitate or reduce the cost of disposal. (Yadav, 2001).
- Disposal of HCW means “burial, deposit, discharge, dumping, or release of any HCW into or on any air, land, or water” (Yadav, 2001)



HCW TREATMENT AND DISPOSAL

○ METHODS

- Controlled Tipping (Sanitary landfill) fig.10
- Thermal processes e.g. autoclaves, microwave treatment fig.11
- Burial pits
- Incineration fig.12
- Encapsulation
- Sorting / Recycling / Pulverization

Fig 10 LANDFILL

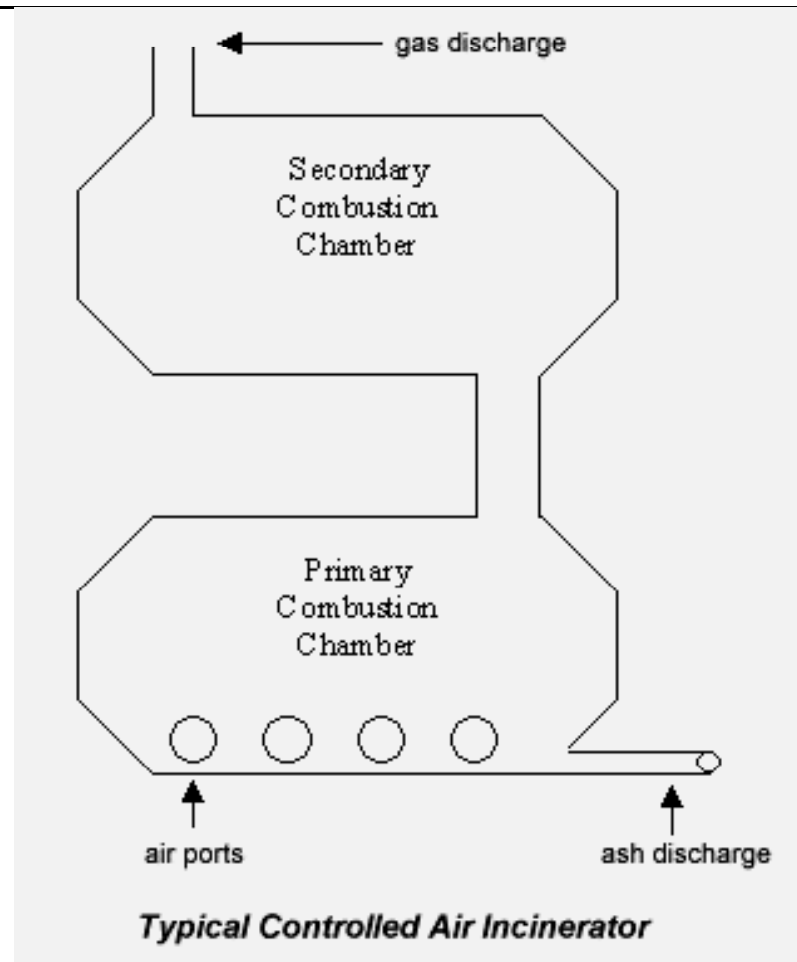


Fig.11

Different Autoclaves



Fig.12 An Improved Incinerator





HCW MANAGEMENT IN ABUJA NIGERIA

- A cross sectional study was carried out in Abuja by B.E Bassey et al. in march 2006 in five selected Hospitals. Result shows;
 - Average waste generated per person per day was 2.78kg
 - 26.5% was found to be hazardous.
 - Waste segregation was zero.
 - 18.3% has locally built brick incinerator.
 - 9.1% bury waste.
 - 3.63% burn waste.
 - 36.3% dispose in municipal.



HCW MANAGEMENT IN LAGOS

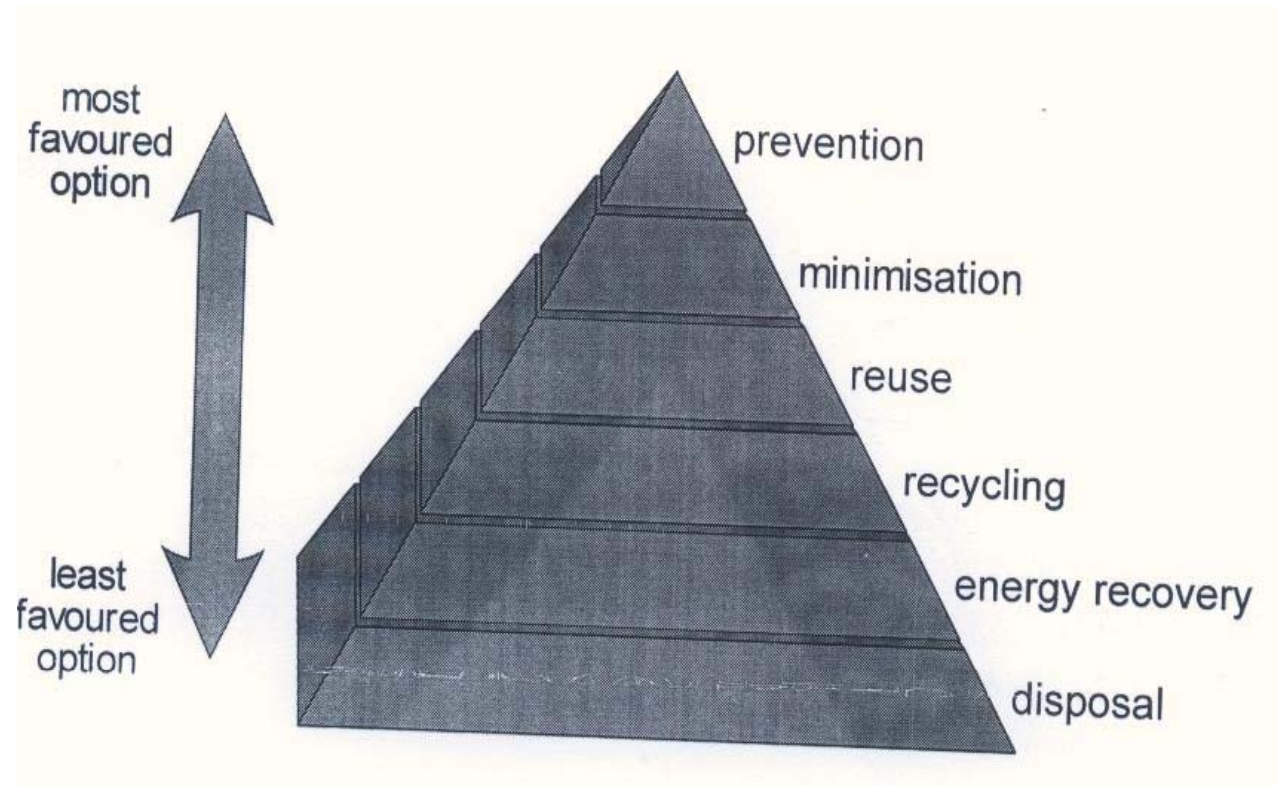
- A similar study was carried out in Lagos by E.O Longe et al same year in 4 selected Hospitals. Result shows;
 - 26% to 37% by vol. was found to be infectious.
 - 3 Hospitals segregate their waste.
 - 2 Hospitals treat their Hazardous waste by incineration before disposal.
 - Average waste generated per person per day ranges from 0.562kg to 0.670kg.



PRESENT SITUATION

- Health-care waste management in Nigeria is Below standard. There is need for awareness and sustainable solution to this problem.

Waste Hierarchy





Importance of proper waste disposal

- Minimizes the spread of infections 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 micro-organisms;
- Attracts fewer insects and rodents and does not attract animals;
- Reduces odors;
- Helps provide an aesthetically pleasing atmosphere.

RECOMMENDATIONS TO SQHN

- Development of standards on HCWM for Hospitals
- Disseminate this Standards to various Hospitals
- Encourage various Hospitals to conduct a critical self appraisal of their HCWM in accordance with set standards
- To deploy multi pronged strategies in encouraging HC facilities to bridge identified gaps in their waste mgt.
- To serve as a lobby group for ensuring passage of National HCWM Plans and Guidelines bill currently before the house
- Formulate partnership with organizations committed to HCWM



**Fig.16 BEFORE
HCWM**



**Fig.17
AFTER HCWM**





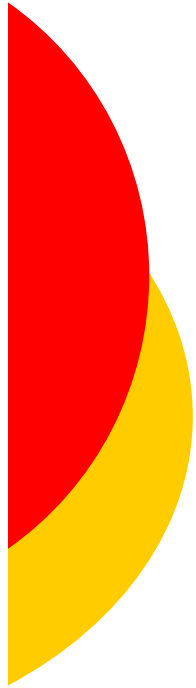
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