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GLOBAL HEALTHCARE WASTE PROJECT

MODULE 9:
Classification of Healthcare Waste

World Health Organization

Health Care Without Harm

UIC UNIVERSITY OF ILLINOIS AT CHICAGO SCHOOL OF PUBLIC HEALTH
Environmental and Occupational Health Sciences Division

Module Overview

- Describe the general classifications of healthcare waste
- Present examples of each classification

Learning Objectives

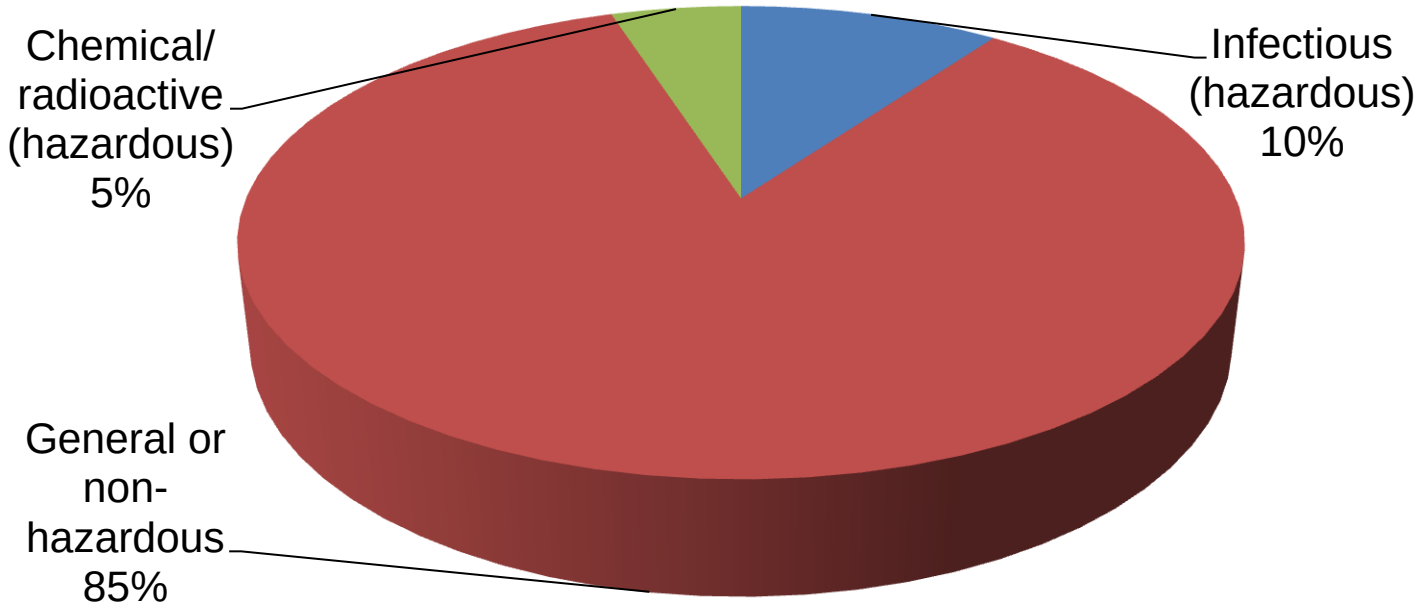
- List the major classifications and typical characteristics of healthcare waste
- Recognize the waste classifications that pose the highest risk
- Apply basic principles to categorize waste items into their proper classifications

Steps in Healthcare Waste Management

- Waste classification
- Waste segregation
- Waste minimization
- Handling and collection
- On-site transport and storage
- Treatment and disposal

General Principles

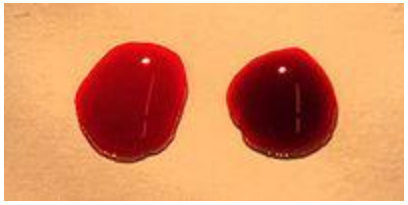
- When properly segregated, 85% or more of healthcare wastes are general waste with the same risk as domestic solid waste.
- Typical breakdown of healthcare waste:



General Principles

- Sharps waste poses the highest risk of disease transmission of all waste categories

- Blood and body fluids are also a significant source of disease transmission.



Why Segregate Healthcare Waste?

- To reduce the amount of waste that must be treated as hazardous waste
- To reduce the risks of exposure to hazardous healthcare waste for workers
- To lower the cost of treatment and disposal of healthcare waste
- To make possible the recycling of non-hazardous general waste

General Principles

Classifications are based on:

- National regulations
- International guidelines, if national regulations do not exist

- Types of risk associated with waste
  - Infectious disease transmission
    - Waste contaminated with blood and body fluids
  - Physical injury
    - All sharps waste
  - Chemical exposure
    - Cleaning solvents

General Principles

Classifications are useful for deciding:

- Treatment approaches
  - Steam disinfection – infectious waste, blood or body fluids, microbiological waste
  - Burial – anatomical waste, human tissues
  - Incineration with pollution control – cytotoxic waste
- Waste minimization options
  - Recycling – paper, glass, aluminum
  - Composting – kitchen waste, yard waste
  - Materials recovery – silver from x-ray waste

Country-specific Waste Classifications

INSERT SLIDES SHOWING THE CLASSIFICATIONS UNDER EXISTING LAWS AND REGULATIONS

Waste Classifications

World Health Organization Classifications

Biological (infectious) risks			Chemical risks			Low risk
Sharps Waste	**Infectious Waste**	**Pathological Waste**	**Pharmaceutical Waste**	**Chemical Waste**	**Radioactive Waste**	**Non-Hazardous General Waste**
EXAMPLES			EXAMPLES			
Needles **Blades** **Broken glass**	**Waste contaminated with blood** **Cultures** **Isolation waste**	**Body parts** **Human tissue** **Animal carcasses**	**Expired drugs** **Expired vaccines** **Cytotoxic waste**	**Chemical solvents** **Mercury** **Cleaners** **Batteries**	**Radio-nuclides** **Vials with radioactive residues**	**Recyclable and compost-able waste** **Non-recyclable waste**

Infectious Wastes

Healthcare wastes that are suspected to contain pathogens (or their toxins) in sufficient concentration to cause diseases to a potential host after exposure.

Subcategories of Infectious Wastes

- Waste contaminated with blood or other body fluids
- Cultures and stocks of infectious agents from laboratory work
- Wastes from infected patients in isolation wards

➢ (Sharps and pathological waste are given their own classifications because of special methods needed to handle and treat them)

Waste Contaminated with Blood/Body Fluids

- Examples:
  - Liquid waste blood
  - Cotton, gauze, or dressings saturated with blood or body fluids
  - Gloves, gowns, or face masks covered in blood

- Body fluids considered infectious
  - Blood, blood products (e.g., plasma, red blood cells), semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, amniotic fluid, and body fluids that cannot be differentiated from the above-mentioned fluids

Cultures and Stocks

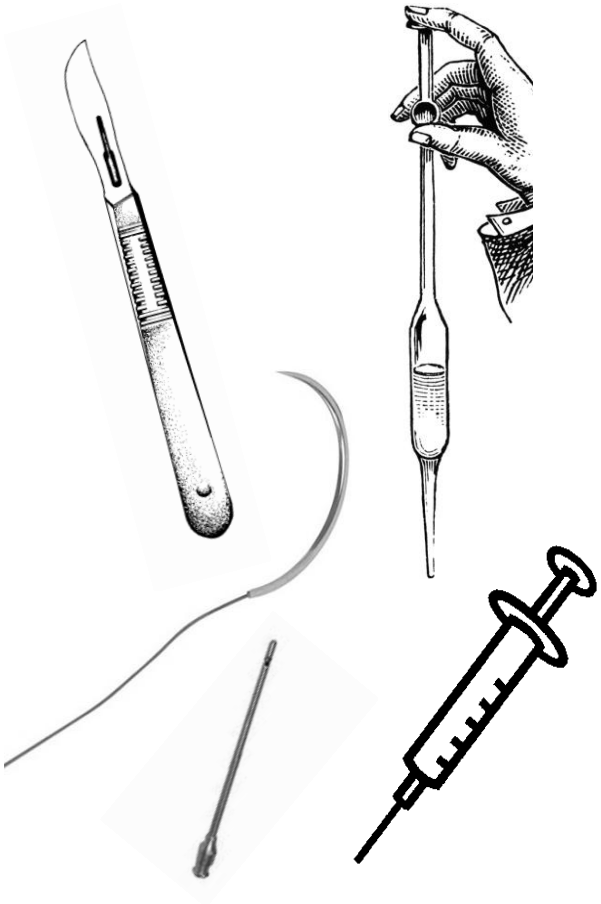
- Examples:
  - Laboratory cultures used for growing microbiological agents
  - Culture dishes and devices used to transfer, inoculate and mix cultures
  - Stocks of infectious agents
  - Discarded live and attenuated vaccines

Isolation Ward Waste

- Materials contaminated with blood, excretion, exudates or secretions from patients who are isolated to protect others from highly communicable diseases
- Some countries may limit these to diseases that can be easily transmitted by waste;
  Other countries may limit these to Class 4 (biosafety level 4) agents, such as smallpox, Marburg virus, Ebola virus, and other hemorrhagic diseases

Sharps Wastes

- Items that could cause cuts or puncture wounds whether or not they are infected
  - Needles, hypodermic needles, syringes
  - Scalpels and other blades
  - Knives
  - Infusion sets
  - Saws
  - Broken glass, pipettes



Review of Infectious Wastes

Waste categories	Descriptions and examples
Sharps waste	Used or unused sharps e.g. hypodermic, intravenous or other needles; auto-disable syringes; syringes with attached needles; infusion sets; scalpels; pipettes; knives; blades; broken glass
Infectious waste	Waste suspected to contain pathogens and that pose a risk of disease transmission , including • waste contaminated with blood and other body fluids • laboratory cultures and microbiological stocks • waste including excreta and other materials that have been in contact with patients infected with highly infectious diseases in isolation wards
Pathological waste	Human tissues, organs or fluids; body parts; fetuses; unused blood products

Chemical Wastes

- Discarded solid, liquid and gaseous chemicals from diagnostic and experimental work and from cleaning and disinfection

Chemical Wastes

- Hazardous chemical waste are chemicals with at least one of the following properties:
  - Toxic
  - Corrosive
    (e.g. acids of pH < 2 and bases of pH > 12)
  - Flammable
  - Reactive
    (explosive, water-reactive, shock-sensitive)
  - Oxidizing
- Non-hazardous chemical wastes do not have any of the above properties

Chemical Wastes

- Examples of Hazardous Chemical Waste
  - Formaldehyde, glutaraldehyde
  - Photographic fixing and developing solutions
  - Laboratory solvents
  - Pesticides
  - Mercury in thermometers and sphygmomanometers
  - Disinfectants (phenols and bleach)
  - Toxic cleaners, degreasers
- Examples of Non-Hazardous Chemical Waste
  - Saline solution, glucose, amino acids, vitamins

Pharmaceutical Wastes

- Waste that consists of expired, unused, split, and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer used
- Discarded items used in the handling of pharmaceuticals, such as bottle or boxes with residues, gloves, masks, connecting tubing, and drug vials
- Cytotoxic (chemotherapeutic or antineoplastic) drug waste

Radioactive Wastes

- Solid, liquid, and gaseous materials contaminated with radionuclides
- Includes sealed radioactive sources, low-level waste (swabs, vials, etc.), residues, excreta from patients treated or tested with unsealed radionuclides, low-level radioactive wastewater from washing
- Body fluids of patients undergoing radiation therapy

Non-Hazardous General Waste

- Waste that has not been in contact with infectious agents, hazardous chemicals, or radioactive substances, and that does not pose a sharps hazard
- Typically, more than half of non-hazardous general waste is paper, cardboard, and plastics

Examples of Non-Hazardous General Wastes

- Cellulosic materials
  - Office paper, computer printout, newspapers, magazines, corrugated cardboard
- Metals
  - Aluminum beverage cans, aluminum containers, food tin cans, metal containers
- Plastics
  - PET water and soft drink bottles, HDPE milk containers, PP plastic bottles for saline solutions, PS packaging
- Glass
  - Empty glass bottles, soft drink bottles
- Wood
  - Shipping pallets, construction debris
- Durable goods
  - Old furniture, bed frames, carpets, curtains, dishware
- Compostable waste
  - Food waste, flowers, yard waste

General Wastes

- Recyclable waste
  - Mixing recyclables at point of generation with other wastes prevents recyclables from being recovered.
  - Collected, segregated and stored away from infectious and hazardous wastes to prevent cross-contamination.
- Biodegradable waste
  - Kitchen waste, food scraps, yard trimmings
- Non-recyclable waste
  - Aerosol cans may be included in general waste, providing that they are not destined for incineration.

Typical Waste Characteristics

- Total waste generated in hospitals:
  - 2 - 4 kg per bed per day
- Infectious waste generated in hospitals (with good segregation):
  - 0.2 - 0.4 kg per bed per day
- Average bulk density
  - 100 - 200 kg per cubic meter

Discussion

- Facility specific waste classification and segregation activities
- What color-coding do you use in your facility?
- Do you have sufficient resources (color-coded bags, bins, containers)?
- How can you improvise if you do not have resources?
- Do you monitor the segregation of your wastes?
- What works in your setting to improve segregation? What does not work?
- Does your facility recycle? How can you initiate or improve recycling?