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Reducing UPOPs and Mercury Releases from The Health Sector in Africa

Definition and classification of healthcare wastes

UNDP

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GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET



Module Overview

- ▶ Define healthcare waste
- ▶ Describe sources and examples of healthcare waste
- ▶ Describe general characteristics of healthcare waste
- ▶ Provide examples of different classifications of healthcare waste



Definition of Healthcare Waste

What is **healthcare** waste?

- Total waste stream from major healthcare establishments and from minor scattered healthcare activities



How do we classify waste?

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



Why do we classify waste?

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



General Types of Healthcare Waste

Healthcare waste can be

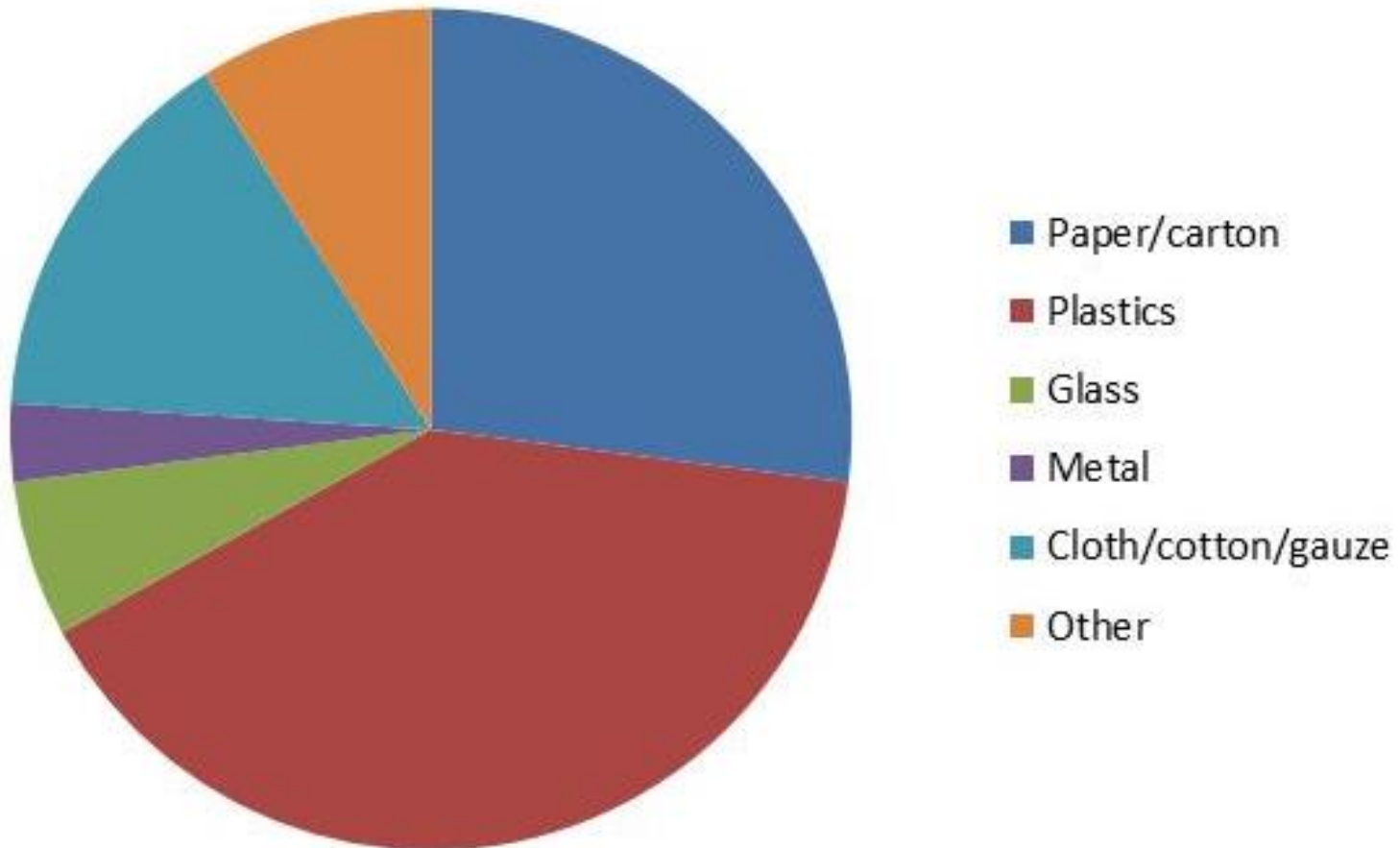
- Non-hazardous general wastes comparable to domestic waste (75-90% of healthcare waste in a health facility)
- Potentially hazardous waste or waste that is associated with some health risks (10-25% of healthcare waste in a health facility)





General Characteristics of Healthcare Waste

- ▶ Typical breakdown of material constituents in healthcare waste (excluding food)





General Characteristics of Healthcare Waste

- ▶ 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 of healthcare waste:
 - About 100 - 200 kg per cubic meter



Categories of Healthcare Waste

- ▶ Sharps waste
- ▶ Infectious waste
 - Laboratory cultures and waste
- ▶ Pathological waste
- ▶ Pharmaceutical or cytotoxic waste
- ▶ Chemical waste
- ▶ Radioactive waste
- ▶ Non-hazardous/general waste



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			EXAMPL ES
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





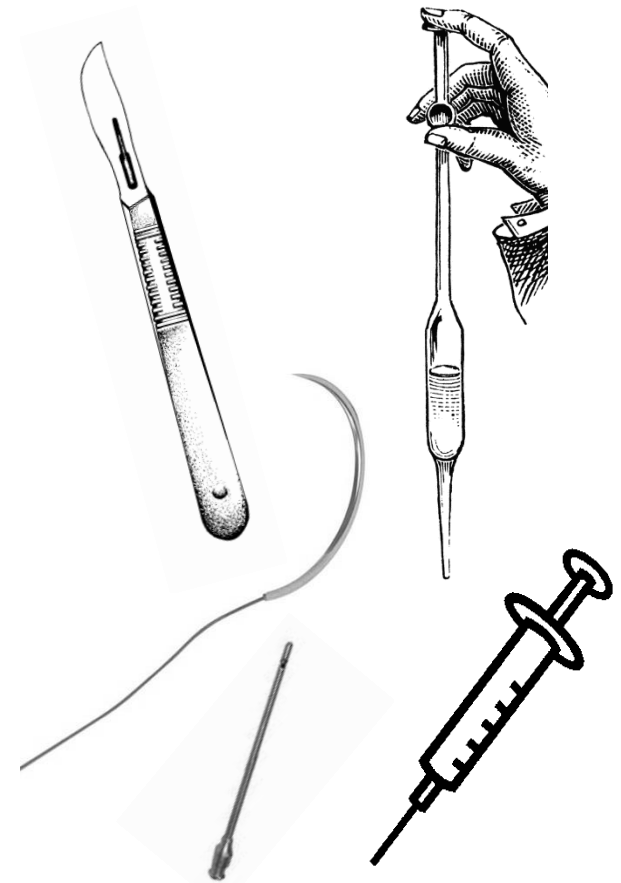
Isolation Ward Waste

- 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 <ul style="list-style-type: none">• 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

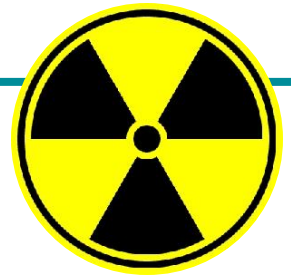


Pharmaceutical Wastes

- 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



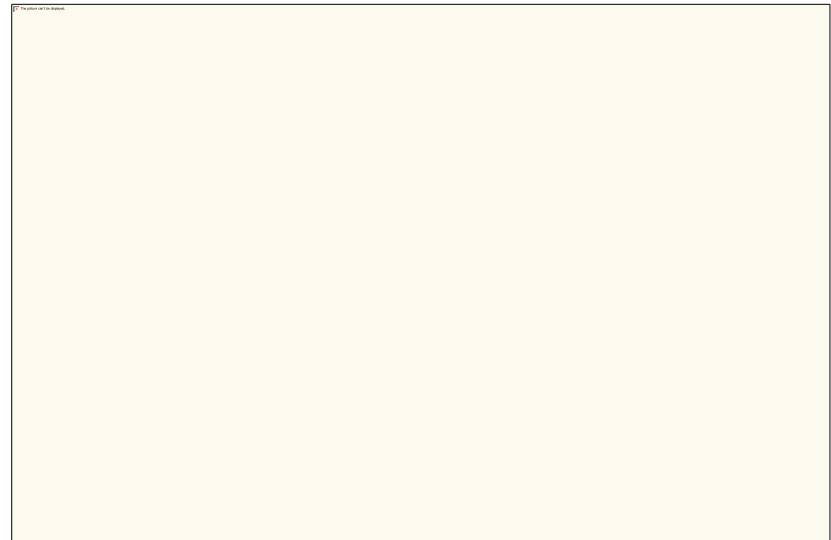
General Wastes

- **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.



Sources of Healthcare Waste (I)

- ▶ Hospitals
- ▶ Clinics
- ▶ Laboratories
- ▶ Research activities
- ▶ Nursing homes
- ▶ Acupuncturist
- ▶ Paramedic and ambulance services
- ▶ Animal research
- ▶ Blood banks





Sources of Healthcare Wastes (II)

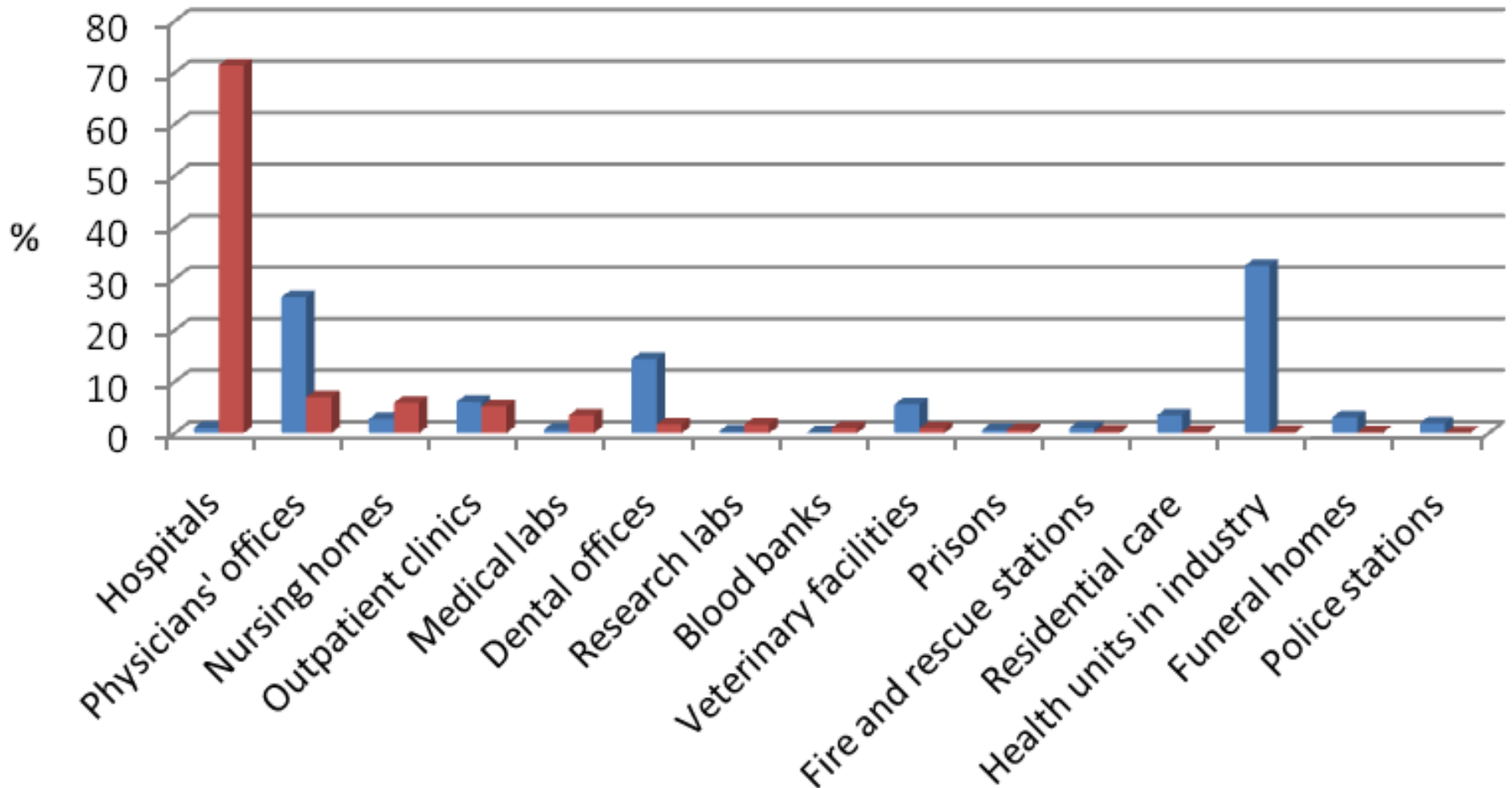
- ▶ Physicians' offices
- ▶ Dental clinics
- ▶ Chiropractors
- ▶ Psychiatric hospitals
- ▶ Cosmetic piercing and tattooing
- ▶ Institutions for disabled persons
- ▶ Funeral services
- ▶ Home healthcare





Which Institutions Generate the Most Healthcare Waste?

■ % of the total number of facilities ■ % of the total annual healthcare waste generated





Waste from different places

Department	Sharps	Infectious and pathological waste	Chemical, pharmaceutical and cytotoxic waste	Non-hazardous or general waste
Medical ward	Hypodermic needles, intravenous set needles; broken vials and ampoules	Dressings, bandages, gauze, and cotton contaminated with blood or body fluids; gloves and masks contaminated with blood or body fluids	Broken thermometers and blood pressure gauges; split medicines; spent disinfectants	Packaging, food scraps, paper, flowers, empty saline bottles, non-bloody diapers; non-bloody IV tubing and bags
Operating theatre	Needles, IV sets, scalpels, blades, saws	Blood and other body fluids; suction canisters; gowns, gloves, masks, gauze, and other waste contaminated with blood and body fluids; tissues, organs, foetuses, body parts	Spent disinfectants	Packaging, uncontaminated gowns, gloves, masks, hats and shoe covers
Laboratory	Needles; broken glass, Petri dishes, slides and cover slips; broken pipettes	Blood and body fluids; microbiological cultures and stocks; tissue; infected animal carcasses; tubes and containers contaminated with blood or body fluid	Fixatives; formalin; xylene, toluene, methanol, methylene chloride, and other solvents; broken lab thermometers	Packaging; paper, plastic containers
Pharmacy store	Broken bottles, broken thermometers		Expired drugs, Spilled drugs Empty containers	Packaging; paper, empty containers
Radiology			Silver; fixing and developing solutions; acetic acid; glutaraldehyde	Packaging, paper
Chemotherapy	Needles and syringes		Bulk chemotherapeutic waste; vials, gloves and other material contaminated with cytotoxic agents; contaminated excreta and urine. IV sets containing chemotherapy drugs are cytotoxic waste	Packaging, paper



Waste from different places

Department	Sharps	Infectious and pathological waste	Chemical, pharmaceutical and cytotoxic waste	Non-hazardous or general waste
Vaccination campaigns	Needles and syringes		Bulk vaccine waste; vials, gloves	Packaging
Cleaning Services	Broken glass		Disinfectants (glutaraldehyde, phenols, etc.), cleaners, spilled mercury, pesticides	Packaging, flowers, newspapers, magazines, cardboard, plastic and glass containers, yard waste
Engineering			Cleaning solvents, oils, lubricants, thinners, asbestos, broken mercury devices, batteries	Packaging, construction or demolition waste, wood, metal
Food services				Food scraps; plastic, metal and glass containers; packaging
Other sources:				
Physicians' offices	Needles and syringes, broken ampoules and vials	Cotton, gauze, dressing, gloves, masks and other materials contaminated with blood or other body fluids	Broken thermometers and blood pressure gauges; expired drugs; spent disinfectants	Packaging, office paper, newspapers, magazines, uncontaminated gloves and masks
Dental offices	Needles and syringes, broken ampoules	Cotton, gauze, gloves, masks and other materials contaminated with blood	Dental amalgam; spent disinfectants	Packaging, office paper, newspapers, magazines, uncontaminated gloves and masks
Home health care	Lancets and insulin injection needles	Bandages and other material contaminated with blood or other body fluids	Broken thermometers	Domestic waste