

## 11 HEALTHCARE WASTE MANAGEMENT

### 11.1 Introduction

Safe waste disposal helps to:

- prevent the spread of infection to healthcare workers who handle the waste, and to the local community;
- protect those who handle waste from accidental injury;
- prevent open piles of waste that can become breeding ground for flies, other insects and rats, which carry diseases;
- prevent build up of waste, which may pose fire hazards; and
- provide a pleasant atmosphere (uncollected waste causes foul smells, and is unsightly).

The key to effectively managing healthcare waste is segregation (separation) and identification. Segregation is the responsibility of the waste producer, and should take place as close as possible to where the waste is being generated. Healthcare waste should be categorised and placed into colour-coded bags or bins.

Two important points to remember with regards to waste disposal is that 1) open piles of waste are dangerous, and 2) hospital and health centre wastes should be disposed of in an area with a fence around it. All waste should be incinerated or buried.

### 11.2 Categories of healthcare waste

#### *11.2.1 General waste*

General waste includes wastes that do not carry harmful micro-organisms. Examples of general wastes include kitchen refuse, paper waste, boxes, bottles and plastic containers that store products used by the hospital or clinic.

#### *11.2.2 Infectious and/or clinical wastes*

**Solid and liquid infectious and/or clinical wastes** carry harmful micro-organisms and are likely to cause infection among patients, HCWs or people in the community. Infectious wastes may be solid wastes, liquid wastes or laboratory wastes. Examples include used dressings, gauze or other items contaminated with blood, pus, faeces, urine, blood or other body fluids; human tissue; body parts; paper specimen collection cups; pathology samples.

**Pathological waste** includes human materials removed during surgery, labour or delivery; autopsy; embalming; or biopsy, including body parts and tissues and foetuses; products of spontaneous or induced human abortions, regardless of the period of gestation, including body parts, tissues and foetuses, organs and bulk blood and body fluids. Pathological waste also includes laboratory specimens of blood and tissue after completion of laboratory examination.

**Sharps** include needles, lancets, hypodermic syringes with attached needles, scalper blades, razor blades, glass pipettes, broken glassware, intravenous spikes, and any other sharp object with the potential to penetrate intact skin.

### 11.2.3 Pharmaceutical and cytotoxic wastes

Pharmaceutical and cytotoxic wastes include expired, unused, split and contaminated pharmaceutical products, drugs and vaccines that are no longer required and need to be disposed of appropriately. This category of waste also includes discarded items used in the handling of pharmaceutical supplies such as bottles and boxes with residues, gloves and masks, connecting tubing and drug vials.

Cytotoxic drugs are also known as anti-neoplastic drugs or cancer chemotherapy drugs. These are highly hazardous wastes that have mutagenic, estrogenic or carcinogenic properties. Cytotoxic wastes include:

- Cytotoxic drugs (e.g. azathioprine, chlorambucil, cisplatin, 5-Fluouracil, cyclophamide, melphalan and methotrexate).
- Vomit, urine or feces from patients treated with cytotoxic drugs.
- Contaminated materials from cytotoxic drug preparation and administration such as syringes and needles, dressing packs and gauge vials.

#### General tips for safe waste disposal

- Use separate marked containers for clinical wastes.
- Use washable waste containers that are strong and will not rust (plastic is best). All waste containers should have lids.
- Do not use waste containers for any other purpose in the hospital or health centre.

### 11.3 Colour-coding or labelling containers

Colour-code or label containers for the following types of waste:

- **Sharps:** Dispose of in puncture-proof containers so they do not cause injury. These items can spread HIV and HBV. Sharps containers should be colour-coded red or yellow, or at a minimum, have an infectious sharps sticker placed on the container.
- **General:** Collect in separate containers for burning or for collection by the municipal authority for disposal at the landfill. General waste may be collected into black, white or clear coloured plastic bags.
- **Infectious/clinical/pathological:** Collect in separate containers for incineration. Heavy duty yellow or red plastic bags with an infectious logo on them.
- **Cytotoxic/pharmaceutical waste:** Collect in separate containers for incineration. Cytotoxic waste should be colour-coded purple.

### 11.4 Safe collection of general waste

General waste does not carry harmful micro-organisms. Examples of general waste are kitchen refuse, paper waste, boxes, bottles and plastic containers that store products used by the hospital or clinic. To prevent open piles and scattering of rubbish, bins must be placed in places where they are easily accessible. Signs on general waste containers should read: “**GENERAL WASTE — NO CONTAMINATED WASTE, NO SHARPS**”.

Procedures for disposing of general waste:

1. Collect waste in leak-proof bins.
2. Place bins at convenient locations so that they will be used.
3. Encourage patients to use the bins.
4. Provide separate containers for non-burnable waste such as bottles and cans.
5. Wear thick work gloves when handling and transporting waste. This will help to prevent injury.
6. Collect bins daily or more often if needed and carry to waste area for incineration or for collection by municipal authorities. A trolley or wheel-barrow may be used to help transport waste from the hospital to the incinerator.
7. Clean up all spills immediately with a broom and shovel, and wash the area with soap and water.
8. Wash all rubbish bins with soap and water daily.
9. Wash hands after handling rubbish bins.

### **11.5 Safe collection and disposal of infectious and/or clinical waste**

Infectious and/or clinical waste carries harmful micro-organisms and can cause infection among patients, HCWs or people in the community. Infectious and/or clinical waste is divided into four categories:

- Sharps.
- Solid clinical waste.
- Liquid clinical waste.
- Pathological waste.

Examples are used dressings, gauze or other items contaminated with blood, pus, faeces, urine, blood or body fluids; human tissue; body parts; paper specimen collection cups; pathology samples; needles; scalpel blades.

#### ***11.5.1 Sharps disposal***

Procedures for collecting and disposing of sharps:

1. Wear thick work gloves when transporting sharps containers to the incinerator to prevent injury.
2. Ensure that the sharps container lid is closed or sealed with tape before transporting it to the incinerator site.
3. Collect containers daily, or more often if needed, and carry to incinerator for burning.
4. Wash hands after handling sharps containers.

#### ***11.5.2 Solid clinical waste disposal***

Examples of solid clinical waste include used dressings, gauze or other items contaminated with blood, pus, faeces or other body fluids; human tissue; body parts; paper specimen collection cups. Proper disposal of solid clinical waste helps to prevent the spread of micro-organisms from contaminated waste to staff, patients and the community. Clinical solid waste should be burned or incinerated.

There should be a separate clinical waste bin with a lid. The bin should be lined with a plastic bag and should have no holes. Bins should be labelled “**CLINICAL WASTE, NO SHARPS**”

Procedures for disposing of solid clinic waste:

1. Place bins in places where they will be used
2. Wear thick gloves when handling and transporting wastes.
3. Collect bins daily, or more often if needed, and transport to incinerator for burning.
4. Clean up all spills immediately with a broom and shovel, and clean area with a neutral detergent.
5. Each day, wash waste bins with soap and water.
6. Wash hands after handling waste bins.

### ***11.5.3 Liquid clinical waste disposal***

Examples of liquid clinical waste include blood, urine, faeces, pus, sputum, spinal and peritoneal fluids, and pathology specimens. Proper disposal of liquid clinical waste helps to prevent the spread of micro-organisms from contaminated liquid waste to staff, patients and the community.

Procedures for the disposal of liquid clinical waste:

1. Wear thick work gloves when handling and transporting wastes.
2. Wear eye goggles to protect eyes from splashing
3. Carefully pour blood, urine or other body fluids directly into toilet, utility sink drain.  
**Avoid splashing.**
4. Rinse the sink or toilet carefully and thoroughly with water.
5. When stool or sputum is collected in paper specimen cups, treat as clinical solid waste.
6. Wash hands after handling liquid waste.

### ***11.5.4 Laboratory waste disposal***

Examples of laboratory waste include used culture plates, specimen containers and specimens. The proper disposal of laboratory waste helps to prevent the spread of micro-organisms from microbiology laboratory waste and other specimens to staff, patients and the community.

An autoclave or pressure cooker is used to sterilise laboratory waste before disposal into a separate plastic bin with a yellow or red plastic bin liner labelled (in black) “**BIOHAZARD WASTE**”.

Procedures for disposing of laboratory waste:

1. Autoclave all petri dishes and test tubes that have been used to grow micro-organisms *before* incineration.
2. After sterilising, discard disposable petri dishes and test tubes into a bin marked “**CLINICAL WASTE**”.
3. After sterilising, remove the culture media from reusable petri dishes and test tubes and discard into a “**CLINICAL WASTE**” bin.
4. Wash and dry reusable petri dishes and test tubes.
5. Collect “**CLINICAL WASTE**” bins daily, or more often if needed.
6. Each day, wash bins with soap and water.
7. Wash hands after handling bins.

## **11.6 Handling healthcare waste bags**

Procedures for handling healthcare waste bags:

1. Check that waste storage bags and containers are effectively sealed. Bags should be picked up by the neck only. They should be placed down in such a way that they can again be picked up by the neck for further handling. Waste bags should be manually handled as little as possible.

2. Bags should not be held against the body nor should collection staff attempt to carry too many bags at a time.
3. Avoid letting the bag come into contact with the body when being carried. A needle stick is the most likely hazard to endanger the person collecting the waste bag. Hypodermic needles that are not properly segregated into correct sharps containers can cause this type of injury.
4. Sharps have been known to pierce the sides and bottom of polypropylene containers. These containers should be picked up and carried by the handle provided. The other hand should not be used to support the bottom of the container.
5. Avoid puncturing or damaging waste bags, and do not throw or drop them.
6. Ensure that infectious wastes are not mixed, and that bags are stored in designated storage areas.
7. Protective clothing should be worn during all waste handling operations.
8. Transport all waste bags directly to the designated central storage for disposal.
9. Bags of hazardous healthcare waste and of general waste should not be mixed at anytime, but should be segregated throughout handling; hazardous waste should be placed only in specific storage areas. If hazardous waste is accidentally placed in general waste, the entire quantity of waste must be treated as hazardous.

## **11.7 Scavenging**

Steps must be taken to ensure that scavenging does not take place at the hospital waste storage sites as this could be detrimental to the individual's health. The waste storage shed or area must be kept locked at all times when not attended, and care should be taken to ensure that only properly prepared and non-hazardous waste is disposed of through the municipal garbage disposal system.

## **11.8 Methods of solid waste disposal**

### ***11.8.1 Incineration or burning***

Incineration is a process of burning wastes at very high temperatures. Incineration requires special equipment and a fuel source such as diesel or gas. Incineration is the best way to destroy contaminated wastes. The advantages of incineration and burning are that micro-organisms are destroyed by the heat, and large amounts of wastes that require considerable space are reduced to ashes.

The hospital incinerator should be housed in a locked enclosure and only used by trained operators. The incinerator must be operated in accordance with the manufacturer's instructions. Incineration equipment must be kept in good working condition and be serviced on a regular basis in accordance with the manufacturer's instructions.

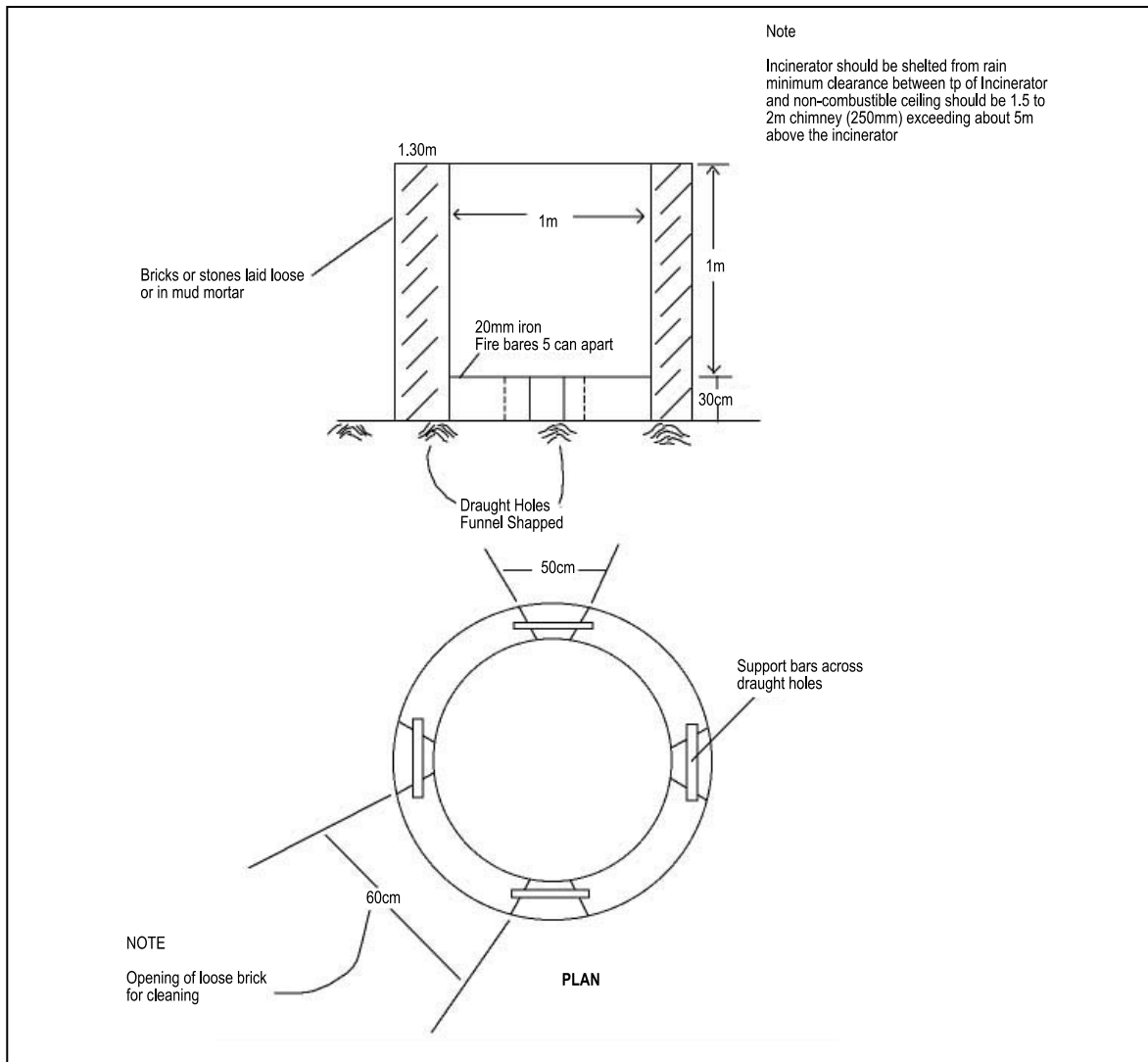
## **11.9 Building and using a simple stove for burning wastes**

In situations where incineration equipment is not available, burning can be done in a simple, large stove. Open burning is dangerous; therefore, all waste should be burned or incinerated in special stoves located in enclosed (properly fenced) areas.

Below are basic guidelines for building and using a simple stove for burning waste.

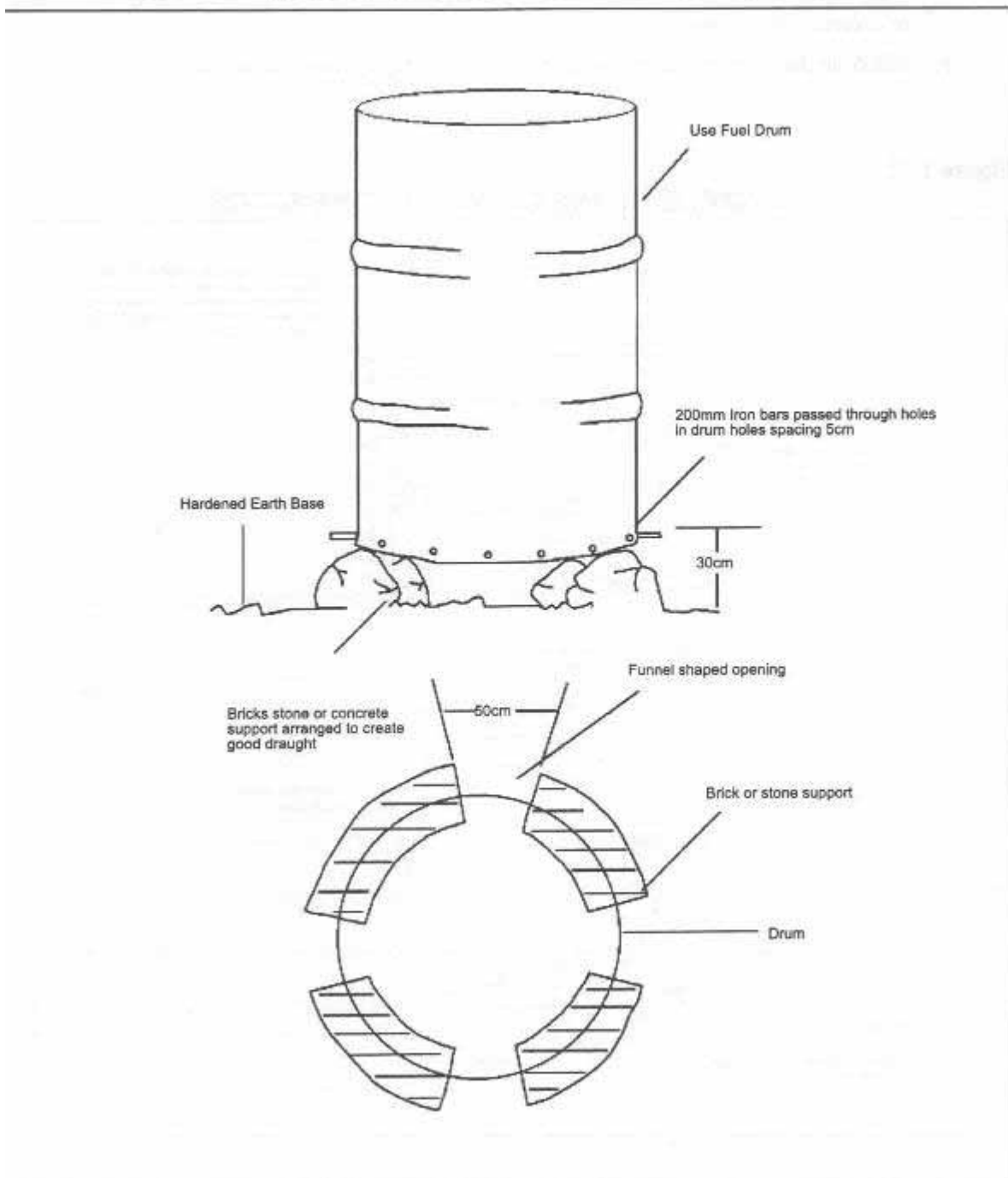
1. Select a site downwind from the healthcare facility.
2. Build a simple stove using local materials (mud or stone), or a used oil drum.
3. Place the stove on hardened earth or a concrete base.
4. Make sure the stove has:
  - Sufficient air inlets underneath to burn well,
  - Loosely placed metal bars to hold wastes and allow ashes to fall below,
  - Enough space to add waste at the top and to remove ashes from below,
  - Long enough chimney to allow for good draught and removal of smoke.
5. Burn all burnable waste, such as paper and cardboard, as well as dressings and other contaminated wastes.
6. If the waste is wet, add kerosene so that a hot fire burns all the waste. Store waste for incineration in covered rubbish bins.
7. Ash from the stove or incinerator can be treated as non-contaminated waste. Note, however, that sharps, even after incineration, may be dangerous and should be buried (see below).

**Figure 11.1 Simple stone or mud incinerator**



Source: Adapted from Fiji Ministry of Health, Infection control manual for health facilities.

**Figure 11.2 Simple oil drum incinerator**



Source: Adapted from the Fiji Ministry of Health 2002, Infection control manual for health facilities.

## 11.10 Waste disposal by burying

When clinical and non-clinical wastes cannot be burned or incinerated, waste must be buried. Even if wastes are collected by a city collection system, it is good for healthcare administrators to make sure the waste is disposed of safely. When wastes are buried, certain requirements must be met so that children and animals cannot dig up the waste.

**Note:** Sharp objects may not be destroyed by burning and may later spread tetanus infection. Dispose of all sharp objects by putting them underground, even after burning.

Procedures for making and using an underground waste disposal site:

1. Select a site that:
  - is at least 50 meters (150 feet) away from any water source, to prevent contamination of the water supply.
  - has proper drainage, is located downhill from any wells, and is free of standing water.
  - is not in an area that floods.
2. Dig a pit 1 meter (3 feet) wide and 2 meters (6 feet) deep. The bottom of the pit should be 2 meters above the water table.
3. Fence in the site to keep animals and children away.
4. Wear heavy gloves when handling waste buckets.
5. Empty buckets of non-burnable waste into the pit every day.
6. Cover the waste with a thin layer of earth each day. The final cover should be 10 centimetres deep.

**Note:** General waste is the only waste that can be disposed of in a municipal garbage facility (i.e. landfill). It is illegal and dangerous to dispose of other wastes with municipal garbage.

**Table 11.1 Safe waste disposal**

	<b>Waste type</b>	<b>Waste bag colour</b>	<b>Disposal</b>
<b>General waste</b>	Kitchen refuse, paper waste, boxes, bottles, plastic containers	black	Local Level Govt Collection/ Incineration
<b>Sharps</b>	Needles, broken or disposal syringes, razors, lancets, scalpel blades	sharps container yellow or red	Incinerate, then bury
<b>Solid infectious and/or clinical waste</b>	Dressings, gauze, or other items contaminated with blood, pus, faeces or other body fluids; human tissue; body parts; paper specimen collection cups	yellow or red	Incinerate
<b>Liquid and clinical waste</b>	Blood, urine, faeces, pus, sputum, spinal and peritoneal fluids, pathology specimens	no bags	Drain fluids into toilet or utility sink; or place in contaminated waste bin, and incinerate
<b>Laboratory waste</b>	Used culture plates, specimen containers, specimens	yellow or red	Sterilise, place in contaminated

			waste bins, and incinerate
<b>Cytotoxic waste</b>	Cancer treatment drugs and used consumables	purple	Incinerate
<b>Pharmaceutical waste</b>	Tablets, mixtures and injectables	yellow	Incinerate

### 11.11 Garbage storage and disposal

Garbage should be removed at least twice daily and no garbage should be left in kitchen areas overnight. Not only are many common pests capable of transmitting infection, but the sight of insects and pests within the hospital environment can be very disturbing to patients, staff and visitors alike. It is, therefore, a basic requirement of the hospital cleaning programme that adequate attention be paid to preventive and protective measures designed to minimise this potential form of cross infection.

In general, six elements are essential in any effective programme for the control of pests in a hospital.

- Thorough, constant cleaning of all potential areas of infestation.
- Regular, careful inspections for evidence of pests.
- Storage of waste and garbage in water-tight containers.
- Thorough cleaning of all garbage containers after use.
- Daily removal of all stray garbage not placed in correct receptacles.
- Proper storage of all goods and supplies likely to attract pests.