

REPUBLIC OF RWANDA



MINISTRY OF HEALTH

**NATIONAL GUIDELINES ON HEALTH CARE WASTE
MANAGEMENT**

www.moh.gov.rw

February, 2016

Foreword

As materials are used and disposed off regularly across all areas of the health sector, even the most efficient, effective Health care system creates waste. The guidelines found here have been developed to guide health service providers in managing waste generated from Health care activities. Such guidelines are crucial in sustaining efforts that are already employed in Health care waste management and injection safety.

The mismanagement of Health care waste poses a serious risk to the population, the environment, and the health care system itself. Medical waste can be hazardous if not disposed off correctly. Health personnel, waste handlers, and community members risk being seriously injured or infected if proper disposal methods are not used. Standards must be maintained no matter where Health care is provided, from the facility to the community level. Establishing and following a standard of practice for proper handling and disposal of Health care waste is an integral, ongoing aspect of the Health care delivery system.

These waste management guidelines will go a long way in mitigating risks of exposure and subsequent transmission of infections to health service providers, patients, and the communities being served. In addition, once the guidelines are effectively implemented, the environment will be protected against the undesirable resulting effects from using less than optimal methods of waste management and disposal.

The Ministry of Health takes this opportunity to renew its commitment to creating an enabling environment for the implementation of these guidelines in partnership with districts authorities, health facilities, development partners, the private sector, and other stakeholders. By maintaining these standards together, the risk of harm on human health and the environment condition can be reduced and the health care system will be allowed to continue to grow and thrive in a safe, sustainable setting.



Dr. Agnes BINAGWAHO
Minister of Health

Table of contents

Table of contents	3
List of Annexes	6
List of tables	7
List of figures	7
List of abbreviation	8
CHAPTER 1: INTRODUCTION	9
1.1 About these guidelines	9
1.2 Background	9
CHAPTER 2: HEALTH EFFECT OF HEALTH CARE WASTE	11
2.1 Hazard from health care waste	11
2.2 Risks caused by poor management of health care wastes	11
CHAPTER 3: CHARACTERIZATION OF HEALTH CARE WASTES	12
3.1. Source of Health Care waste	12
3.2. Categories of waste	12
3.2.1. Infectious waste	12
3.2.2. Pathological waste;	12
3.2.3. Sharps waste	13
3.2.4. Pharmaceutical waste	13
3.2.5. Radioactive waste	13
3.2.6. Chemical waste	13
3.2.7. Non-hazardous general waste	13
CHAPTER 4: LEGISLATIVE FRAMEWORK	14
4.1 Organic law N° 04/2005 of 08/04/2005 determining the modalities of protection, conservation and promotion of environment in Rwanda	14
4.2 Law N° 47/2012 of 14/01/2013 relating to the regulation and inspection of food and pharmaceutical products.	14
4.3 Environmental health policy	14
4.4 National Policy on Injection Safety, Prevention of Transmission of Nosocomial Infection and Health Care Waste Management;	14

CHAPTER 5: HEALTH CARE WASTE MANAGEMENT PLANNING	15
5.1 Preliminary Planning for Health Care Waste Management	15
5.2 Implementation of the waste management plan	15
5.3 Duties and responsibilities	16
5.3.1 Roles and Responsibilities for Head of Health Facilities	16
5.3.2 Roles and responsibilities for different levels	17
5.4 Management of health care waste from scattered small source	19
5.4.1 Marking of Waste	20
5.4.2 Dedicated vehicles	20
5.4.3 Storage	20
5.4.4 Employees knowledge of guidelines	20
CHAPTER 6: WASTE MINIMIZATION, RECYCLE AND REUSE	21
6.1 Minimization of waste	21
6.2 Waste Segregation and packaging.....	21
6.3 Safe reuse and recycling	23
CHAPTER 7: HANDLING, LABELING, CONTAINMENT, TRANSPORT AND STORAGE	25
7.2 Internal transportation	25
7.3 Waste labeling	25
7.4 Health Care Waste Tracking	25
7.5 Handling waste bags.....	26
7.6 Storage	26
7.6.1 Storage for waste	26
7.7 Spill Management	27
7.7.1 General spill management	27
7.7.2 Infectious waste spill kit.	27
7.7.3 Cytotoxic spill kit	27
7.7.4 Mercury spill kit	28
7.8 Collection	28
7.9 Transportation	29
7.10 On-site transport for collection purposes	30

7.11 Off-site transportation of waste	31
7.11.1 Regulation and control system	31
7.11.2 Routing	31
CHAPTER 8: TREATMENT AND DISPOSAL FOR HEALTH CARE WASTE	32
8.1 Treatment and disposal options	32
8.2 Waste disposal options	32
8.2.1 General disposal options	32
8.2.2 Inertization	33
8.2.3 Options of health care waste treatment and disposal as per level of care	34
CHAPTER 9: REQUIREMENT FOR OCCUPATIONAL HEALTH AND SAFETY PRACTICES	35
9.1 Occupational health and safety provisions	35
9.2 Employee responsibility	35
9.3 Personal Protective Equipment (PPE)	36
9.4 Hygiene Committee.....	37
9.5 Monitoring Hygiene Committee	37
9.5.1 Hygiene	37
9.6 Precautions for sharps, Blood and Body fluids exposure.....	38
9.7 Response to injury and exposure	38
CHAPTER 10: TRAINING	40
10.1 Technical Training and deployment	40
CHAPTER 11: COMMUNITY HEALTH CARE WASTE MANAGEMENT	41
11.1 Medical waste generated during Community Health Outreach	41
11.2 Sharps management.....	41
11.3 Waste transportation	41
CHAPTER 12: COLLECTIONS AND DISPOSAL OF WASTE WATER FROM HEALTH FACILITIES	42
12.1 Characteristics and hazards of waste water from health facilities	42
12.2 Waste water management.....	42
12.3 On-Site treatment or pre-treatment of waste water	42
12.4 Sludge treatment	43

12.5. Minimum safety requirements for sewerage treatment	43
12.6. Sanitation	44
12.7. Safe management of wastes from health facilities	44
ANNEXES:	45

List of Annexes

Annex 1 Sample sheet for assessment of waste generation	45
Annex 2 Color code for biomedical waste	46
Annex 3 International waste labeling symbols	47
Annex 4 Alternative labels for hazardous wastes	48
Annex 5 Health care waste tracking form sample 1	49
Annex 6 Health care waste tracking form sample 2	50
Annex 7 Waste treatment methods	51
Annex 8 Management of spillages	52
Annex 9 Recycling index	53
Annex 10 A sample tag for shipment	54
Annex 11 Facility Health care waste management plan	55

List of tables

Table 1 Responsibility at Central and District level	17
Table 2 Responsibility at Health Facility level	18
Table 3 Roles and responsibility of Community Health Worker	19
Table 4 Options of health care waste treatment and disposal as per level of care	34

List of figures

Figure 1 The waste management hierarchy	23
---	----

List of abbreviation

BCC	: Behavior Change Communication
DH	: District Hospital
EHO	: Environmental Health Officer
HBV	: Hepatitis B Virus
HC	: Health Center
HCW	: Health Care Waste
HCWM	: Health Care Waste Management
HCWMP	: Health Care Waste Management Plan
HF	: Health Facility
i/c	: In charge
IPC	: Infection Prevention Control
MGBs	: Mobile Garbage Bins
O i/c	: Officer in charge
PPE	: Personal protective Equipment
RURA	: Rwanda Utility Regulatory Agency
SOP	: Standard Operating Procedure
SOPs	: Standard Operating Procedures
WHO	: World Health Organization
HP	: Health Post
HIV/AIDS	: Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
Kg	: Kilograms

CHAPTER 1: INTRODUCTION

1.1 About these guidelines

These guidelines provide a minimum standard for safeguarding public health and the environment through efficient management of health care waste. All types of health care waste are considered in these guidelines and each health facility (HF) is responsible for managing its waste, from the point of generation to final disposal.

The guidelines provide a framework of waste management strategies outlined below:

- a) Hygiene and Infection Prevention Control committees for waste management, planning and auditing;
- b) Reduce, recycle and reuse
- c) Waste labeling and containment;
- d) Proper waste handling, segregation, storage and transport;
- e) Correct waste treatment and disposal

These guidelines are recommended to all stakeholders in the health sector and in particular all those involved in delivery of health care services in Rwanda.

Adoption of these guidelines should be accompanied by commitment of each HF through the establishment of Hygiene and IPC committees and development of a Health Care Waste Management Plan (HCWMP) that will assist HFs to manage its waste. The operations of these guidelines should be incorporated into the HF Action Plan.

1.2 Background

In Rwanda, efforts to improve health care waste management and injection safety are remarkable in public health facilities settings and in community.

Actually the Government of Rwanda has an **Organic Law** determining the modalities of protection, conservation and promotion of environment in Rwanda and other rules and regulations related. It is also signatory to a number of conventions, notably, the

Basel Convention, the Rotterdam Convention¹, the Montreal Protocol² and the Biodiversity Convention,³ that have some relevance to how HCW is managed.

Despite to the above mentioned national and international legal frameworks, currently there are no national guidelines on health care waste management.

To ensure rationale management of medical waste, The Ministry of Health has taken all necessary measures to minimize the risks likely to result from improper medical waste management both in health facilities and in communities. In this regard, Health care waste management and injection safety have also been given due priority where training of health care providers has been conducted, national and district hospital incinerators purchased and plans to purchase additional ones are underway. Provision of personal protective equipment, auto disable syringes and needles, disinfectants and availing post exposure prophylaxis to victims of accidental occupational exposures (blood and amniotic fluid during labor and delivery) is being implemented. Safe storage of sharp waste, separation of waste according to their category at production site, waste transportation and destruction in a safe manner is extremely vital.

The primary purpose of these guidelines is to provide guidance to health professionals and waste handlers in proper **collection, segregation, transportation, treatment and final disposal of medical wastes** in a manner that does not endanger the lives of health care providers, supporting staff and community along the road where medical waste is transported.

1.3 Objective

The objectives of these guidelines are to maintain public health safety by:

- a) Minimizing health care waste generation and impacts to the environment.
- b) Setting standardized Health care waste management practices.
- c) Specifying roles and responsibilities within Health Facilities.

1 Rotterdam convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals Pesticides in International Trade; adopted 10 September 1998 in force on 24 February 2004)
2 Montreal Protocol on Substances that Deplete the Ozone Layer, 1 January 1998 (Revisions 1190 – 1999)
3 Convention on Biological Diversity (CBD) known as Biodiversity Convention, 29 December 1993.

CHAPTER 2: HEALTH EFFECT OF HEALTH CARE WASTE

Health Facilities produce waste during the diagnosis, treatment and carrying out of research. Annually these HF's produce large quantities of infectious, pathological, sharps, chemicals, pharmaceutical and radioactive wastes.

Home based care generates pharmaceutical, infectious and contaminated disposable materials such as treatment by Community Health Workers, home dialysis and used needles from insulin injection, or even illicit intravenous drug use.

2.1 Hazard from health care waste

All individuals exposed to hazardous health-care waste are potentially at risk, including those within health-care establishments that generate hazardous waste, and those outside these sources who either handle such waste or are exposed to it as a consequence of careless management. The main groups at risk are the following:

- a) Health care Providers and hospital maintenance personnel
- b) Patients in health-care facilities or receiving home care
- c) Visitors to health-care facilities
- d) Worker in support services allied to health care establishments, such cleaners, laundry staff and waste handlers including scavengers.

2.2 Risks caused by poor management of health care wastes

Poor management of HCW causes serious risk to personnel, waste handlers, patients, and the community. Sources of illness from infectious waste include injuries from used needles, reuse by other people, and diseases that may result from contact with this dangerous waste.

During handling of waste, health care personnel and waste handlers (within and outside the health facility) can come into contact with this waste if it has not been packaged safely. Needle stick injuries arising from improperly stored needles and syringes may occur. At landfills or waste dumps, waste recyclers or scavengers may come in contact with infectious waste if the waste has been disposed of without prior segregation and treatment.

The reuse of syringes by the general public represents a significant public health problem.

As opposed to direct contact with HCW, waste can also contaminate the environment, water, air, or land and therefore can indirectly impact on health.

CHAPTER 3: CHARACTERIZATION OF HEALTH CARE WASTES

3.1. Source of Health Care waste

Major sources of health-care waste are the following: Health Facilities (Referral, Provincial, District, HC, HPs), Community Health Workers, Emergency Medical Care, Long-term health-care establishments and Hospices, Transfusion centers, Military medical services, Prison hospitals or clinics, Related laboratories and research centers, Medical and Biomedical Laboratories, Biotechnology Laboratories and Institutions, Medical Research centers, Mortuary and Autopsy centres, Animal Research and Testing, Blood Banks and Blood Collection Services, Nursing Homes for the elderly.

3.2. Categories of waste

3.2.1. Infectious waste

Infectious waste is material suspected to contain pathogens (bacteria, viruses, parasites or fungi) in sufficient concentration or quantity to cause disease in susceptible hosts. This category includes:

- a) Waste contaminated with blood or other body fluids;
- b) Cultures and stocks of infectious agents from laboratory work;
- c) Waste from infected patients in isolation wards, surgery and autopsies (e.g excreta, tissue, and dressing from infected or surgical wounds, clothes soiled with human blood or other body fluid).

3.2.2. Pathological waste;

- a) Pathological waste could be considered a subcategory of infectious waste, but is often classified separately – especially when special methods of handling, treatment and disposal are used.
- b) Pathological waste consists of tissues, organs, body parts, blood, body fluids and other waste from surgery and autopsies on patients with infectious diseases;
- c) It also includes human fetuses and infected animal carcasses; Recognizable human or animal body parts are sometimes called anatomical waste.
- d) Pathological waste may include healthy body parts that have been removed during a medical procedure or produced during medical research.

3.2.3. Sharps waste

Sharps are items that could cause cuts or puncture wounds, including needles, hypodermic needles, scalpels and other blades, knives, infusion sets, saws, broken glass and pipettes.

Whether or not they are infected, such items are usually considered highly hazardous health-care waste.

3.2.4. Pharmaceutical waste

Pharmaceutical waste includes expired, unused, spilt and contaminated pharmaceutical products, this also includes drugs, vaccines and sera (serum) that are no longer required. The category also includes discarded items used in the handling of pharmaceuticals, such as bottles or boxes with residues and drugs vials.

3.2.5. Radioactive waste

Radioactive waste includes solids, liquid and gaseous material contaminated with radionuclide. It is produced as result of procedures such as *in vitro* analysis of body tissue and fluid, *in vivo* organ imaging and tumour localization, and various investigative and therapeutic practices.

3.2.6. Chemical waste

- a) **Hazardous chemical waste** consists of discarded solid, liquid and gaseous chemicals; for example, from diagnostic and experimental work and from cleaning and disinfecting procedures. In the context of protecting health, it is consider to be hazardous if it is corrosive (e.g. acids of pH <2 and bases of pH >12), flammable, reactive (explosive, water reactive, shock sensitive) and oxidizing.
- b) **Non-hazardous chemical** waste consists of chemicals with none of the above properties; for example, sugars, amino acids and certain organic and inorganic salts, which are widely used in transfusion liquids.

3.2.7. Non-hazardous general waste

Non-hazardous or general waste is waste that has not been in contact with infectious agents, hazardous chemicals or radioactive substances and does not pose a sharps hazard. It is generated from offices, kitchen, packaging material and from stores. It is similar to domestic waste.

CHAPTER 4: LEGISLATIVE FRAMEWORK

4.1 Organic law N° 04/2005 of 08/04/2005 determining the modalities of protection, conservation and promotion of environment in Rwanda

This organic law determines the modalities of protecting, conserving and promoting the environment in Rwanda: This Organic law aims at:

- a) Conserving the environment, people and their habitats; setting up fundamental principles related to protection of environment and any means that may degrade the environment with the intention of promoting the natural resources, to discourage any hazardous and destructive means;
- b) Promoting the social welfare of the population considering equal distribution of the existing wealth; considering the durability of the resources with an emphasis especially on equal rights on present and future generations;
- c) Guarantee to all Rwandans sustainable development which does not harm the environment and the social welfare of the population; setting up strategies of protecting and reducing negative effects on the environment and replacing the degraded environment.

4.2 Law N° 47/2012 of 14/01/2013 relating to the regulation and inspection of food and pharmaceutical products.

This Law relates to the regulation and inspection of food and pharmaceutical products;

4.3 Environmental health policy

The Environmental Health Policy aim is provision of adequate environmental health services to all Rwandans with their active participation to the reduction of infant, child and adult morbidity and mortality rates by reducing and eliminating health risks associated with environmental hazards, which are the direct causes and spread of diseases and conditions related to environmental health.

4.4 National Policy on Injection Safety, Prevention of Transmission of Nosocomial Infection and Health Care Waste Management;

The overall objective of this policy is to ensure no person is infected as a result of health-care she/he has received. It aims at putting in place mechanisms, systems and practices to prevent transmission of infection through injections and other medical procedures and ensuring that medical waste is disposed in a safe manner that does not have any risk to Health personnel, patients and the community.

CHAPTER 5: HEALTH CARE WASTE MANAGEMENT PLANNING

5.1 Preliminary Planning for Health Care Waste Management

Planning for health care waste management involves:

- a) Setting the management objectives.
- b) Defining a strategy that will facilitate careful implementation of the necessary measures and the appropriate allocation of resources according to the identified priorities. A suitable, safe, and cost effective strategy will be concerned principally with transport, recycling, treatment and disposal options.
- c) Conducting surveys on waste generation shall provide baseline information on the quantities and classes of waste generated. A HF survey of Health care waste will provide a basis for identifying actions, taking into account conditions, needs, and possibilities. On the basis of waste generation surveys and recommendations, the waste management focal person (Environmental Health Officer) should provide estimates on the amount and type of waste generated to the Hygiene Committee/IPC.
- d) Setting the targets-for waste minimization, reuse, recycling, and cost reduction. A sample sheet for assessment of waste generation is provided in **Annex 1**.
- e) Proper management of health-care waste depends largely on good administration and organization
- f) Adequate legislation and financing is also required.
- g) Active participation by trained and informed staff is necessary.
- h) Each HF should have a contingency plan for emergency situations

5.2 Implementation of the waste management plan

The overall responsibility of implementation lies with the Head of the facility. It involves the following steps:

- a) A Gantt chart should be developed, showing management of wastes.
- b) Provision for future waste storage facilities should be made.
- c) The EHO should monitor the deployment of personnel to the posts with responsibility for waste management.
- d) The EHO in liaison with the Hygiene Committee/IPC should organize and supervise training programmes for all staff on HCWM.

- e) The Hygiene Committee/IPC should review the waste management plan annually and initiate changes necessary to upgrade.
- f) Design and implement Monitoring and Evaluation mechanisms for the plan.
- g) A report should be prepared and submitted to the relevant authorities as required (Monthly, Quarterly and Annual).

5.3 Duties and responsibilities

5.3.1 Roles and Responsibilities for Head of Health Facilities

The head of health facilities are responsible for the safe disposal of health-care waste generated in their establishments.

They should therefore, take all reasonable measures to:-

- a) Prevent health-care waste from causing environmental pollution or adverse effects on human health;
- b) Ensure that health-care waste is adequately segregated and safely packed, especially in the case of sharps which should be packed in puncture-proof containers;
- c) Ensure that bags or containers of health-care waste are handled only by those officially licensed to transport and/or dispose of such waste;
- d) Ensure that a transfer note describing the waste is handed to the recipient when waste is transferred;
- e) Check for proof that the driver of the collection vehicle is aware of the procedures governing transport of hazardous goods. Such proof shall include but not limited to an authorization letter or a certificate indicating form of training in transportation of health care waste.
- f) If on-site treatment is impossible or uneconomical, cooled storage facilities should be provided and there should be a regular collection by a contractor who has suitable incineration facilities.
- g) When an injection is carried out at a patient's home, the practitioner is responsible for disposing of syringes, needles, and all other items used including incontinence pads and swabs.
- h) The patient or the care giver shall be responsible for safe disposal of health care waste in case of home based treatment, for example in the case of diabetics.

- i) Ensure that ambulances are equipped with puncture-proof containers of appropriate size, mainly for infectious waste and sharps.
- j) Ensure that staff is trained in the safe handling of health-care waste.
- k) Ensure that any contractual arrangement for research by workers outside the establishment should include adequate provisions for the safe handling and disposal of waste.

5.3.2 Roles and responsibilities for different levels

Table 1 Responsibility at Central and District level

<i>Title</i>	<i>Responsibility</i>
Central level	<p>Put in place favorable policies and guidelines to ensure safe and appropriate waste management practices.</p> <p>Incorporate waste management commodities in existing essential medicines and supplies lists.</p> <p>Provide technical supportive supervision.</p> <p>Capacity building of HF staff on health care waste management.</p> <p>Mobilize resources.</p>
District level	<p>Build awareness on the risks of health care waste and the need for proper disposal</p> <p>Supervise the management/handling of health care waste at health facilities through management committees</p> <p>Advocate for increased allocation of district financial resources to support the management of health care waste at health facilities</p> <p>Promote the benefits of the public-private partnership model for providing best, affordable, and sustainable alternatives for managing health care waste.</p>

Table 2 Responsibility at Health Facility level

<i>Title</i>	<i>Responsibility</i>
Managerial Staff	<p>Obtain and be familiar with national waste management policies and guidelines.</p> <p>Enforce facility waste management plan (goal, budget, staff, roles, supervision, training, reporting, etc.).</p> <p>Monitor waste management practices</p> <p>Liaison with the waste management focal person (EHO)</p> <p>Ensure staff is trained on the proper procedures of HCWM.</p> <p>Budget for adequate supply of HCWM products and activities.</p> <p>Ensuring availability of health care waste management commodities</p> <p>Advocate for staff health and safety.</p>
Clinical Staff	<p>Follow waste management policies and procedures.</p> <p>Practice safe operating procedures and wear appropriate PPE.</p> <p>Follow color-coded waste segregation system.</p> <p>Notify Support Staff when HCW containers are $\frac{3}{4}$ full for collection and replacement.</p> <p>Notify Stores when HCW container stock is running low to ensure sound stock control.</p>
Support Staff	<p>Place appropriate HCW containers at designated locations.</p> <p>Know colour-coding system and use it correctly.</p> <p>Practice safe operating procedures and wear appropriate PPE.</p> <p>Collect correctly filled (no more than $\frac{3}{4}$) HCW containers.</p> <p>Ensure a clean and orderly environment at the facility.</p> <p>Record keeping—record number of filled HCW containers, identify supply needs, report stock outs.</p> <p>Ensure temporary storage of HCW in a dedicated and secure location.</p>
Technical Staff	<p>Follow waste management policies and procedures.</p> <p>Practice safe operating procedures and wear appropriate PPE.</p>

	<p>Ensure adequate supply of HCWM products.</p> <p>Follow colour-coded waste segregation system.</p> <p>Notify Support Staff when HCW containers are no more than ¾ full.</p>
Environmental Health Officer	<p>Obtain and be familiar with national and programme waste management policies and guidelines.</p> <p>Directly supervise collection, segregation, storage, transportation, treatment and disposal of health-care waste.</p> <p>Liaison with all department to raise the profile of health care waste management</p> <p>Enforce facility waste management plan (goal, budget, staff, roles, supervision, training, reporting, etc.).</p> <p>Identify training needs on health care waste management</p> <p>Organize and supervise staff training on safe waste management</p> <p>Conduct quality survey on quantity and type of waste generated and verify compliance with HCWM SOPs and National Guidelines.</p> <p>Monitoring injuries and infection incidences related to health care waste</p> <p>Record-keeping</p>

Table 3 Roles and responsibility of Community Health Worker

<i>Responsibility</i>
<p>Minimize waste generation;</p> <p>Conduct waste segregation;</p> <p>Ensure appropriate storage before final disposal of HCW;</p> <p>Return hazardous waste and the used sharps (in the safety box) to the health facility for treatment and disposal;</p> <p>Protect oneself and the community against potential health hazards;</p> <p>Conduct public awareness on the risk of health Care Waste.</p>

5.4 Management of health care waste from scattered small source

The management of health care waste from scattered small sources shall include but not limited to private medical practitioners, research facilities, nursing homes, home treatment, ambulance services and veterinary centers.

The options for safe collection, transportation and disposal of health-care waste from small sources, which do not treat their own waste, include the following:

- a) An authorized contractor should collect the waste for treatment and take it to a DH incinerator or other treatment facility;
- b) An authorized contractor collects and treats the waste at the treatment facility;
- c) The Local authority shall oversee the collection, treatment and final disposal of HCW to ensure adherence to set guidelines and SOPs.

5.4.1 Marking of Waste

- a) All waste should be clearly marked with self-adhesive indicating source and type of waste. Infectious, Pathological and Sharp waste should also be marked with the international biohazard symbol. Chemicals should also be marked with the appropriate international chemical hazard symbol. Radioactive waste must be labeled with the appropriate warning symbol as provided in **Annex 3**.
- b) Any contract for collection by a private registered health-care waste carrier should identify the disposal or treatment facility to be used.

5.4.2 Dedicated vehicles

- a) The carrier should, use dedicated vehicles for the collection and transportation of infectious waste.
- b) Collection and transportation of health-care waste from their source should be regular and according to schedule.

5.4.3 Storage

Any storage of waste before treatment or collection for off-site disposal should be in a secure location designated for the purpose.

5.4.4 Employees knowledge of guidelines

All employees should be made aware of these Guidelines, which contain details of the procedures to follow in case of a needle-stick injury or exposure to infected blood.

CHAPTER 6: WASTE MINIMIZATION, RECYCLE AND REUSE

6.1 Minimization of waste

The preferred management solution is quite simply not to produce the waste, by avoiding wasteful ways of working. To achieve lasting waste reduction (or minimization), the focus should be on working with medical staff to change clinical practices to ones that use less materials. Although waste minimization is most commonly applied at the point of its generation, health-care managers can also take measures to reduce the production of waste through adapting their purchasing and stock control strategies.

6.2 Waste Segregation and packaging

Waste segregation is separation of wastes according to types and categories.

- a) Segregation should;
 - i. Always be the responsibility of the waste producer,
 - ii. Take place as close as possible to where the waste is generated, and
 - iii. Be maintained in storage areas, during transportation, treatment and disposal.
- b) The most appropriate way of identifying the categories of health-care waste is by **separating** the waste into colour-coded plastic bags or containers. The recommended colour-coding scheme is provided in **Annex 2**.
- c) In addition to the colour coding of waste containers, the following practices are recommended:
 - i. General (non-infectious) health-care waste can join the stream of domestic refuse for disposal if none can be salvaged.
 - ii. Sharps should all be collected together, regardless of whether or not they are contaminated.
- d) Sharps containers should be;
 - i. Puncture-proof (usually made of cardboard or high-density plastic) and fitted with covers.

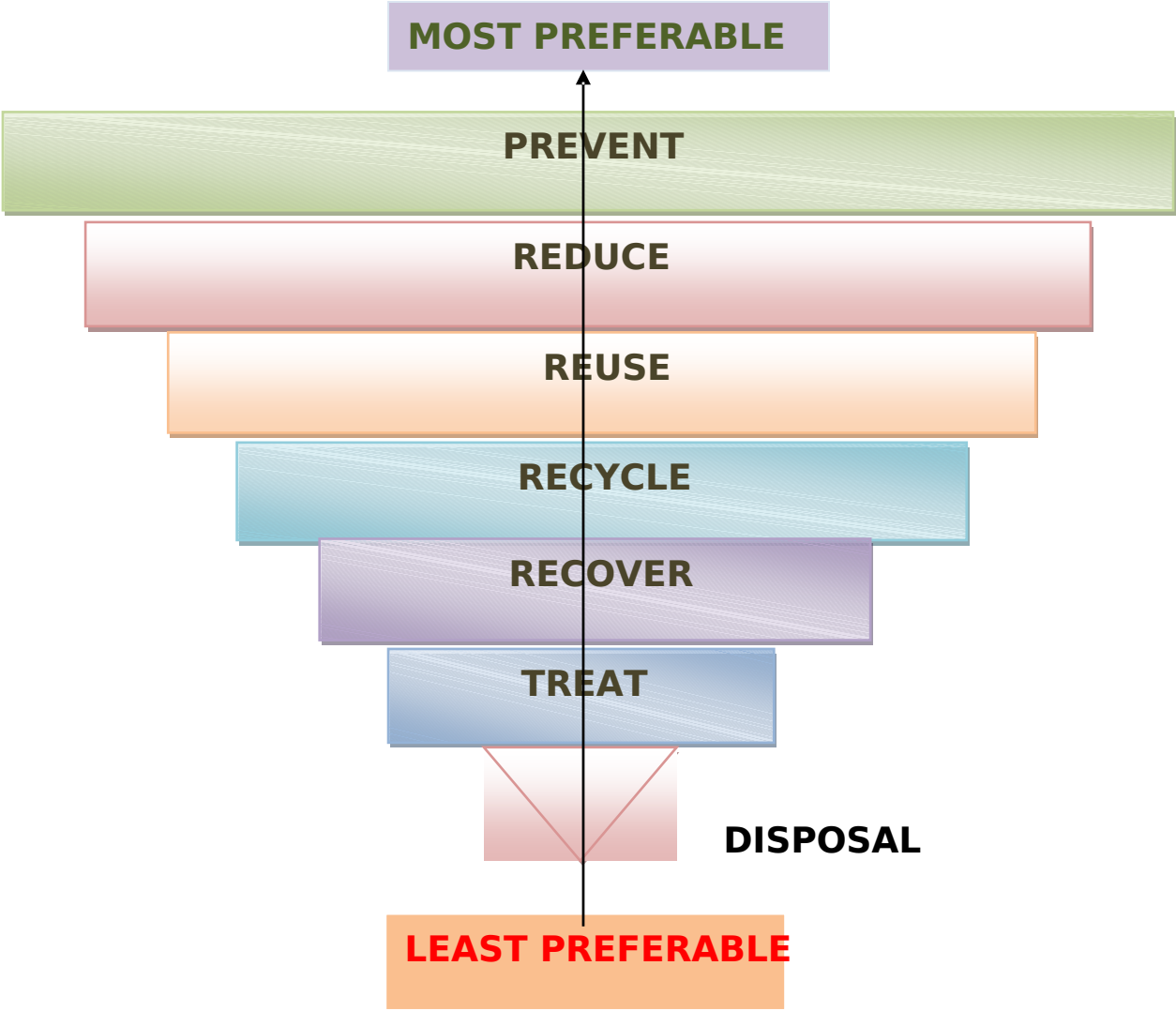
- ii. Be rigid and impermeable so that they safely retain not only the sharps but also any residual liquids from syringes.
 - iii. To discourage abuse, containers should be tamper-proof (difficult to open or break) and needles and syringes should be rendered unusable.
- e) Liner bags used should be;
- i. Highly resistant to puncturing and tearing with exceptional strength and stretch properties.
 - ii. They should be of a gauge not less than 150 microns.
 - iii. Where bins are unavailable or too costly, containers made of dense cardboard are recommended:
 - iv. Bags and containers for infectious waste should be marked with the international infectious substance symbol **(Refer to annex 3)**.
- f) Highly infectious waste should, whenever possible,
- i. Be sterilized immediately by autoclaving.
 - ii. It needs to be packaged in bags that are compatible with the proposed treatment process. Red bags suitable for autoclaving are recommended.
- g) Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
- h) Cytotoxic waste, most of which is produced in major hospital or research facilities, should be collected in strong, leak-proof containers clearly labeled “Cytotoxic wastes”.
- i) Small amounts of chemical or pharmaceutical waste may be;
- i. Collected together with infectious waste.
 - ii. Large quantities of obsolete or expired pharmaceuticals stored in hospital wards or departments should be returned to the pharmacy for disposal.
 - iii. Other pharmaceutical waste generated, such as spilled or contaminated drugs or packaging containing drug residues should not be returned because of the risk of contaminating the pharmacy; it should be deposited in the correct container at the point of generation.
 - iv. Large quantities of chemical waste should be packed in chemical resistant containers.

6.3 Safe reuse and recycling

Medical and other equipment used in a health-care establishment may be reused provided that it is designed for the purpose and will withstand the sterilization process.

- a) Proper disinfection and sterilization can ensure the safe use of invasive and non-invasive medical devices. The choice of disinfectant, concentration, and exposure time is based on the risk for infection associated with use of the equipment and other factors discussed in this guideline
- b) Reusable items may include certain sharps, such as scalpels, syringes, glass bottles and containers, etc. After use, these should be collected separately from non-reusable items, carefully washed and may then be sterilized by either thermal or chemical sterilization.
- c) Plastic syringes and catheters should not be thermally or chemically sterilized; they should be discarded.
- d) Other non infectious wastes such as paper, glass, polythene, food remains should be recycled and reused.
- e) Other types of wastes not mentioned here are not recommended for recycling or re-use.

Figure 1 The waste management hierarchy



CHAPTER 7: HANDLING, LABELING, CONTAINMENT, TRANSPORT AND STORAGE

This section explains the importance of streamlining the process of waste collection, handling and transport to ensure compliance with occupational health and safety and environmental control requirements.

7.1 Organization

Each HF must have a dedicated staff/company of waste handlers.

Waste handlers must be trained and equipped to undertake the handling, internal transportation, spillmanagement, blood, body fluid exposure management and storage requirements of the HF.

7.2 Internal transportation

All HF should conduct a review to optimize the waste collection process, reduce handling and transportation, and to promote safe work practices.

Transportation routes should avoid where possible food preparation and heavily used areas.

7.3 Waste labeling

All waste liner bags and waste containers are to be color coded (**Annex 2**) and inscribed with hazard marks or stickers and identified in accordance with international waste labeling symbols as provided in **Annex 3**.

7.4 Health Care Waste Tracking

Tracking of HCW is necessary to enable both the regulatory bodies and all other stakeholders' to follow the movement of waste from generation to safe final disposal. Tracking helps to rapidly identify the source of waste, facilitates segregation, provides feedback, assists in providing data for education purposes, decision making facilitates auditing and may be used to allocate resources for HCWM.

The use of tracking forms is therefore necessary and would enable both the regulatory bodies and all concerned to follow the movement of waste from generation to safe final disposal. Samples of waste tracking forms are provided in **Annex 4**.

All liner bags /containers of waste must be clearly marked to identify the HF, unit (e.g. Maternity Ward) and date of collection.

The illegal dumping of Health care waste by unscrupulous waste collectors/generators poses a great risk to public health. Tracking the movement of waste from the points of generation through transportation to the final disposal point would guard against the malpractice of illegal dumping (**see Annex 4**).

7.5 Handling waste bags

- a) Sharps must always be placed in injection safety boxes and never be placed in waste bags.
- b) Waste must be contained in colour coded and well labeled plastic bags
- c) General waste should be contained in well labeled black bags.
- d) Waste bags must not be over filled (approx 2/3 of capacity).
- e) The volume of a waste bag should not exceed 55 liters.
- f) Excess air should be excluded without compaction, prior to closure using a bag tie at the point of waste generation.
- g) All bags should be held away from the body by the closed top of the bag, and placed directly into a mobile garbage bin or trolley.
- h) Where waste bags are sealed and stored pending collection, they should be in a secure place with restricted access.
- i) There should be a Waste collection schedule.

7.6 Storage

7.6.1 Storage for waste

- a) A storage location for health-care waste should be designated inside the HF.
- b) Unless a refrigerated storage room is available, storage times for Health care waste (i.e. the delay between production and treatment) should not exceed the following:
 - i. 48 hours during the cool season
 - ii. 24 hours during the hot season
- c) **Cytotoxic waste** should be stored separately from other health-care waste in a designated secure location.

- d) **Radioactive waste** should be stored in containers that prevent dispersion, behind lead shielding. Waste that is to be stored during radioactive decay should be labeled with the type of radionuclide, the date, and details of required storage conditions.

7.7 Spill Management

7.7.1 General spill management

HF should manage waste spills as they occur in the facility.

- a) In the case of gross spills, containment is the principal role.
- b) It is essential that personnel involved in spill management receive education and training in emergency procedures and handling requirements.
- c) Spill kits should be readily available throughout the hospital with their location known by all staff.
- d) Spill kits that have been used should be disposed of with the type of waste that has been cleaned up, e.g. used cytotoxic spill kits should be disposed of with cytotoxic waste.
- e) All spillage should be documented per department and per facility.

7.7.2 Infectious waste spill kit.

Infectious waste spill kit should contain at least:

- a) Broom, a pan and scraper, mop and mop bucket
- b) A large (10 liter) reusable plastic container or bucket with fitted lid, containing;
- c) 2 infectious waste bags for the disposal of clinical waste;
- d) Disinfectant containing (1%) 10,000 ppm available chlorine or equivalent;
- e) Rubber gloves suitable for cleaning
- f) Detergent, sponges / disposable cloths
- g) Personal protective equipment including eye protection, an apron or long
- h) Sleeve impervious gown, a face mask, heavy duty gloves.
- i) Incident report form
- j) Waste spill sign.

7.7.3 Cytotoxic spill kit

Cytotoxic spill kit should contain at least:

- a) Mop and mop bucket, a pan and scraper.
- b) A large (10 litre) reusable plastic container or bucket with fitted lid, containing;

- c) 2 cytotoxic waste bags for the disposal of cytotoxic waste
- d) 2 hooded overalls, shoe covers, long heavy duty gloves, latex gloves, a face
- e) Mask and eye protection
- f) Absorbent toweling / absorbent spill mat
- g) Incident report form
- h) Waste spill sign

7.7.4 Mercury spill kit

Mercury spill kit should contain at least:

- a) 2 unbreakable lidded containers
- b) Spill sign
- c) Pasteur pipette, eye dropper
- d) Sodium thiosulphate
- e) Face mask
- f) Dust pan and brush
- g) Sulfur powder
- h) Incident report form.

7.8 Collection

- a) Wastes should not be allowed to accumulate at the point of production. For this reason a routine programme for their collection should be established as part of the health-care waste management plan.
- b) Nursing and other clinical staff should ensure that waste bags are tightly closed or sealed when they are about three-quarters full.
- c) Light-gauge bags can be closed by tying the neck, but heavier-gauge bags probably require a plastic sealing tag of the self-locking type.
- d) Bags should *not* be closed by stapling.
- e) Sealed sharps containers should be placed in a labelled, yellow infectious health-care waste bag before removal from the hospital ward or department.
- f) The following recommendations should be followed by the waste handlers:
 - i. Waste should be collected daily (or as frequently as required) and transported to the designated central storage site.

- ii. No bags should be removed unless they are labeled with their point of production (hospital and ward or department) and contents.
- iii. The bags or containers should be replaced immediately with new ones of the same type.
- iv. A supply of fresh collection bags or containers should be readily available at all locations where waste is produced.
- v. The person in charge should ensure that adequate supplies (3 months) are available and that procurement is timely to ensure the facility does not run out of waste collection bags.

7.9 Transportation

- a) All transporters of biomedical waste must be appointed by the Ministry of Health or Manager of the health facility and must obtain a transportation license from RURA.
- b) The transporter shall collect waste from the designated area of operations or storage areas and shall deliver such waste to the designated storage site, disposal site or plant.
- c) The Ministry or Manager of a HF shall ensure that:
 - i. The collection and transportation of such waste is conducted in such a manner that will not cause scattering, escaping and/or flowing out of the waste;
 - ii. The vehicles and equipment for the transportation of waste are in such a state that shall not cause the scattering of, escaping of, or flowing out of the waste or emitting of noxious smells from the waste;
 - iii. The vehicles for transportation and other means of conveyance of waste shall follow the scheduled routes approved by RURA from the point of collection to the disposal site or plant; and
 - iv. During the transportation of waste, the transporter should possess at all times a duly filled tracking document and shall produce the same on demand to any law enforcement officer.
- d) Biomedical waste shall be:
 - i. Transported in a specially designed vehicle or other means of conveyance so as to prevent scattering, escaping, flowing, spillage or leakage of the waste.

- ii. It is recommended that the vehicle is closely lockable, covered, labeled, leak proof and corrosionproof preferably internally lined with aluminium or stainless steel.
- iii. Any vehicle used for transportation of waste or any other means of conveyance shall be appropriately labeled.

7.10 On-site transport for collection purposes

- a) Mobile garbage bins (MGBS) and trolleys should be used when transporting waste to decrease spills, minimize collector contact with waste and minimize manual handling.
- b) Loads contained in MGBs and trolleys should be less than 55kgs.
- c) All bins must be colour coded and marked as specified in **Annex 2**.
- d) Health-care waste should be transported within the hospital or other facility by means of wheeled trolleys or containers that are not used for any other purpose and meet the following specifications:
 - i. Easy to load and unload;
 - ii. No sharp edges that could damage waste bags or containers during loading and unloading;
 - iii. Easy to clean.
- e) Trolleys and MGBs must be dedicated singularly for collecting waste and must be made of rigid material, lidded, lockable (if used for storage), leak proof and washable.
- f) These MGBs and trolleys should be labelled according to the type of wastes contained, cleaned regularly and must never be overfilled.
- g) Waste collection rounds should be performed as often as necessary to minimize housekeeping hazards.
- h) When cleaning trolleys and MGBs:
 - i. Rinse with cold water then wash with warm water and a neutral detergent.
 - ii. Trolleys and MGBs should then be drained to sewer and left to dry.
 - iii. Clean trolleys and bins should be stored separately to soiled containers.
 - iv. Appropriate personal protective equipment should be worn when cleaning MGBs.
 - v. Waste water may only be diverted to the sewer.
- i) The vehicles should be cleaned and disinfected daily with an appropriate disinfectant (Glutaraldehyde or Peracetic acid).

- j) All waste-bag seals should be in place and intact at the end of transportation.
- k) Use of wheelbarrows is not recommended for transportation.

7.11 Off-site transportation of waste

7.11.1 Regulation and control system

- a) The health-care waste producer is responsible for safe packaging and adequate labeling of waste to be transported off-site and for authorization of its destination.
- b) The tracking form (**Annex 5 or 6**) has to be signed at the point of destination and shall be kept as records by the health facility as proof of proper disposal of waste.
- c) The signed tracking form will be submitted as part of records in the reports.
- d) Packaging and labeling of waste should comply with the Ministry of Health HCWM Guidelines and with international agreements (such as the Basel Convention) if wastes are shipped abroad for treatment and disposal.
- e) The control strategy for health-care waste should have the following components:
 - i. A consignment note (**Annex 6**) should accompany the waste from its place of production to the site of final disposal. On completion of the journey, the transporter should complete the part of the consignment note especially reserved for him and return it to the waste producer.
 - ii. The transporting organization should be registered with RURA.
 - iii. Handling and disposal facilities other than the DH should hold a permit, issued by RURA, allowing the facilities to handle and dispose of health-care waste.

7.11.2 Routing

- a) Health-care waste should be transported by the quickest possible route, which should be planned before the journey begins.
- b) After departure from the waste production point, every effort should be made to avoid further handling.
- c) If handling cannot be avoided, it should be pre-arranged and take place in adequately designed and authorized premises by the Waste Management focal person.
- d) Handling requirements can be specified in the contract established between the waste producer and the carrier.

CHAPTER 8: TREATMENT AND DISPOSAL FOR HEALTH CARE WASTE

8.1 Treatment and disposal options

- a) Health care waste should be treated prior to disposal so as to ensure protection from potential hazards posed by these wastes.
- b) To be effective, treatment must reduce or eliminate the risk present in the waste so that it no longer poses a hazard to persons who may be exposed to it.
- c) The common method of treatment is: incineration; steam sterilization, chemical disinfection, autoclaving and microwave irradiation.
- d) Other methods that can be used include encapsulation and inertization, shredding, macerations and grinding.
- e) However treatment methods should be chosen according to the type of waste and these guidelines.
- f) In-case of infectious and sharp wastes, all the treatment methods are applicable (**Annex 7**).

8.2 Waste disposal options

8.2.1 General disposal options

- a) After disinfection or incineration, infectious health care waste becomes non-risk waste and may be finally disposed of in landfill sites. The commonly used disposal method in Rwanda is land disposal which include District disposal sites, protected ash and waste pits.
- b) However, certain types of Health care waste, such as anatomical waste, will still have an offensive visual impact and this is culturally unacceptable in Rwanda. Such wastes should therefore be buried and use of placenta pits.
- c) Other methods may include the return of the wastes to the supplier/manufacture.
- d) Aerosol containers may be collected with general health care waste once they are completely empty, provided that the waste is not destined for incineration. Contractors for recycling the cans can be called upon.

- e) All radioactive waste (e.g. swabs, syringes for diagnostic or therapeutic use) may be collected in yellow bags or containers for infectious waste if these are destined for incineration.
- f) Appropriate containers or bag holders should be placed in all locations where particular categories of waste may be generated.
- g) Instructions on waste separation and identification should be posted at each waste **generation** and **collection** point to remind staff of the procedures.
- h) **Containers should be removed when they are three-quarters full.**
- i) Staff should never attempt to correct errors of segregation by removing items from a bag or container after disposal or by placing one bag inside another bag of a different colour.
- j) If general and hazardous wastes are accidentally mixed, the mixture should be treated as hazardous Health care waste.

8.2.2 Inertization

Inertization

- a) The process of “inertization” involves mixing waste with cement and other substances before disposal in order to minimize the risk of toxic substances contained in the waste migrating into surface water or groundwater.
- b) It is especially suitable, for pharmaceuticals and for incineration ashes with a high metal content (in this case the process is also called “stabilization”).
- c) For the inertization of pharmaceutical waste, the packaging should be removed, the pharmaceuticals ground, and a mixture of water, lime, and cement added.
- d) A homogeneous mass is formed and cubes or pellets are produced on site and then can be transported to a suitable storage site.
- e) Alternatively, the homogeneous mixture can be transported in liquid state to a landfill and poured into District waste.
- f) The following are typical proportions for the mixture:
 - i. 65% pharmaceutical waste;
 - ii. 15% lime;
 - iii. 15% cement;
 - iv. 5% water.

The process is reasonably inexpensive and can be performed using relatively unsophisticated equipment.

- g) Other than personnel, the main requirements are a grinder or road roller to crush the Pharmaceuticals, a concrete mixer, and supplies of cement, lime, and water.
- h) The main way to achieve this is to sort the Health care waste into the various categories to minimize the need for expensive or complicated disposal methods.

8.2.3 Options of health care waste treatment and disposal as per level of care

Table 4 Options of health care waste treatment and disposal as per level of care

Facility level Type of waste	CHWs/Health Post	Health Center	District Hospital	Provincial Hospital	Referral Hospital
Sharps	Transfer to HC	Incineration with DeMont Fort/ Transfer to DH	Incineration	Incineration	Incineration
Infectious	Transfer to HC	Incineration and deep burial	Incineration/deep burial	Incineration/deep burial	Incineration/deep burial
Highly infectious	Transfer to HC	Deep burial	Incineration	Incineration	Incineration
Pharmaceutical	Transfer to HC	Return to DH	Incineration, return to source or manufacturer	Incineration, return to source or manufacturer	Incineration, return to source or manufacturer

CHAPTER 9: REQUIREMENT FOR OCCUPATIONAL HEALTH AND SAFETY PRACTICES

Each Health Facility is responsible for providing a safe, healthy workplace and safe systems of work for all. The management of waste presents a number of potential hazards to employees requiring the appropriate measure of risk identification, risk assessment, and risk control.

Health care workers have an obligation to follow instructions regarding safe work practices. This section explains their responsibilities and obligations.

9.1 Occupational health and safety provisions

- a) Health care waste management plans should include provision for the continuous monitoring of workers' health and safety to ensure that correct handling during segregation, storage, collection, transportation, treatment and disposal procedures of waste are being followed.
- b) Essential occupational health and safety measures include the following:
 - i. Training of workers on infection transmission.
 - ii. Provision of personal protective equipment;
 - iii. Establishment of an effective occupational health programme that includes immunization, post-exposure prophylactic treatment, and medical surveillance.
- c) Training in health and safety should ensure that workers know of and understand the potential risks associated with health-care waste, the value of immunization against viral hepatitis B among other diseases, and the importance of consistent use of personal protection equipment.

9.2 Employee responsibility

- a) Health facility management is responsible to provide appropriate information, education, training and ensuring that safe systems of work are developed and maintained.
- b) Key among the responsibilities is to provide information on hepatitis B vaccination among other required vaccinations and a register of vaccinated personnel maintained.
- c) Official Rwanda language translations should be provided to workers where necessary.
- d) Standard Operating procedures should:

- i. Specify accepted waste management practices, waste segregation procedures and approved waste handling procedures;
- ii. Detail appropriate steps required for waste generators, and handlers;
- iii. Specify personal protective equipment required for waste handling tasks;
- iv. Detail spill management strategies and designate trained personnel for spill management onsite;
- v. Identify first aid resources and needle stick injury treatment protocol; and
- vi. Specify how to operate the information, education, training and safe working systems

9.3 Personal Protective Equipment (PPE)

- a) Hygiene Committee/IPC should assess risks and recommend suitable PPE for the nature and degree of the hazard HF staff are likely to be exposed to.
- b) PPE must be worn when required.
- c) Waste collectors are under obligation to wear appropriate PPE. The risk of spills or splash exposures necessitates the wearing of face and eye protection. Protection of the legs is also required.
- d) Carrying of HCW bags is to be minimized and where it cannot be avoided, the waste collector should wear protective garments and apron to minimize the risk of injury.
- e) Protective garments should be worn whenever collecting waste, even if the process involves wheeling a securely covered waste trolley to the holding area.
- f) The type of protective clothing used will depend on the risk associated with the health-care waste, but the following should be made available to all personnel who collect or handle health-care waste:
 - i. Helmets, with or without visors-depending on the operation.
 - ii. Face masks-depending on operation.
 - iii. Eye protectors (safety goggles)-depending on operation.
 - iv. Overalls (coveralls)-obligatory.
 - v. Industrial aprons-obligatory.
 - vi. Leg protectors and/or industrial boots-obligatory.
 - vii. Disposable gloves (medical staff) or heavy-duty gloves (waste workers) - obligatory.

- g) Operators of manually loaded incinerators should wear protective face visors and helmets.
- h) During ash and slag removal and other operations that create dust, dust masks should be provided for operators.
- i) Employees should comply with health care waste management guidelines and SOPs given on correct use of safety and protective equipment for the protection of their own health and safety and the health and safety of others.

9.4 Hygiene Committee

- a) The hygiene committee has responsibilities to review:
 - i. Monitor and Evaluate provision and installation of facilities and protective equipment;
 - ii. Work practices;
 - iii. Incidents and accidents;
 - iv. Provision and status of information, education and training;
 - v. Relevant records;

9.5 Monitoring Hygiene Committee

- b) Incident and accident reporting and recording is an essential management information system for identifying causative factors of injuries relating to waste handling.
- c) Incident and accident reporting and recording should facilitate costing of associated financial loss and enable management to make injury prevention investment decisions based upon accurate data.
- d) Waste treatment, operating and disposal costs should be reviewed periodically to evaluate any fluctuations.

9.5.1 Hygiene

- a) Regular washing and maintenance of equipment used to contain and transport waste should be done by providing hand-washing facilities (with warm running water and soap) for employees.
- b) It is important for health care facilities to promote regular hygiene procedures that comply with the National HCWM Guidelines and SOPs. This is of particular importance at storage and incineration facilities.

- c) It may be useful also to designate specific areas for equipment maintenance in hygienic workplaces that are properly equipped with emergency shower rooms and drainage to sewers or septic tanks.
- d) Emergency shower rooms should be provided in all health care facilities.

9.6 Precautions for sharps, Blood and Body fluids exposure

Precautions must be implemented to protect against exposure to sharps, blood and body fluids.

These precautions include:

- a) Providing a purposely designed sharps container as close as practicable to the point of generation of the sharps;
- b) Providing appropriate PPE for potential blood and body substance exposures;
- c) Conducting compliance checks to confirm that people wear protective clothing;
- d) Investigating all incidents to identify causes of exposures
- e) Take remedial action to eliminate risks;
- f) Hygiene Committee must review incident reports and confirm appropriate action taken;
- g) Train staff in first aid and injury management procedures for sharps injury and body substance exposure;
- h) Reinforce the need for staff to report all incidents and injuries;
- i) Analyze statistics to identify any risk exposure trends for necessary interventions.

9.7 Response to injury and exposure

All personnel who handle health care waste should be trained to deal with injuries and exposures.

The programme should include the following elements:

- a) Immediate first-aid measures, such as cleansing of wounds and skin, and irrigation (splashing) of eyes with clean water;
 - i. An immediate report of the incident to a designated responsible person;
 - ii. Retention, if possible, of the item involved in the incident;
 - iii. Details of its source for identification of possible infection;
 - iv. Additional medical attention in an accident and emergency
 - v. Alerting occupational health committee, as soon as possible;

- vi. Medical surveillance;
 - vii. Blood or other tests if indicated;
 - viii. Recording of the incident;
 - ix. Investigation of the incident; identification and implementation of remedial action.
- b) Waste handlers are particularly at risk from the waste. In all stages they require:-
- i. PPE
 - ii. Hold waste containers at the handle or at the top of liner bag
 - iii. Avoid any waste falling on the floor during collection and transportation
 - iv. Non-complying waste (in terms of segregation) should not be sorted by hand
 - v. Waste storage/chamber should be well ventilated and compartmentalized.
 - vi. Cloak rooms for changing and showering
 - vii. Waste handlers should also receive post exposure prophylaxis for HIV/AIDS

CHAPTER 10: TRAINING

10.1 Technical Training and deployment

- a) Only technically trained and certified persons shall be deployed in health care waste management. Managers should facilitate education and training in the following levels
 - i. Health Facility Managers training
 - ii. Operational training
 - iii. Waste handlers training (generators, handlers, collectors, transporters)
 - iv. Public awareness and behaviour change communication (BCC).
- b) The Ministry of Health should develop and update training manuals to facilitate this process.
- c) Continuous training on HCWM should be organized to address the performance gaps.

CHAPTER 11: COMMUNITY HEALTH CARE WASTE MANAGEMENT

Community Health is a range of services based on community health outreach and other services provided by Community Health Workers.

11.1 Medical waste generated during Community Health Outreach

- a) It is vital that the health facility management ensures clinical wastes are returned to the health facility for appropriate disposal.
- b) Waste must be transported in a designated vehicle supplied with a spill kit.

11.2 Sharps management

Safety boxes should be supplied at all sites that generate sharps

11.3 Waste transportation

The following points should be observed:

- a) Lids shall be securely fitted to the containers to ensure that the wastes are prevented from spilling;
- b) Containers should be thoroughly cleansed and disinfected before re-use;
- c) Containers used for the transportation of clinical wastes shall be clearly marked;
- d) During transportation, containers holding the wastes shall be securely held inside the vehicle to prevent movement of the containers and spillage of wastes; and
- e) The transporter shall ensure that vehicles being used for the transportation of clinical wastes shall be securely locked when left unattended.

CHAPTER 12: COLLECTIONS AND DISPOSAL OF WASTE WATER FROM HEALTH FACILITIES

12.1 Characteristics and hazards of waste water from health facilities

- a) Wastewater from health facilities contains a high content of enteric pathogens, including bacteria, viruses, and helminths, which are easily transmitted through water.
- b) Contaminated wastewater is produced by wards treating patients with enteric diseases and is a particular problem during outbreaks of diarrhoeal disease.
- c) It may also contain various potentially hazardous components, such as microbiological pathogens, hazardous chemicals, pharmaceuticals and radioactive materials which are discussed below:-
 - i. Small amounts of chemicals from cleaning and disinfection operations are regularly discharged into sewers.
 - ii. Small quantities of pharmaceuticals are usually discharged to the sewers from hospital pharmacies and from the various wards.
 - iii. Radioactive isotopes should be discharged into holding tanks by oncology departments
 - iv. The toxic effects of any chemical pollutants contained in wastewater on the active bacteria of the sewage purification process may give rise to additional hazards.

12.2 Waste water management

- a) The basic principle underlying effective wastewater management is a strict limit on the discharge of hazardous liquids to sewers.
- b) Where water use is commonly high, sewage is usually diluted.
- c) For effluents treated in treatment plants, no significant health risks should be expected, even without further specific treatment of these effluents.

12.3 On-Site treatment or pre-treatment of waste water

- a) Health Facility should have their own sewage treatment plants e.g. septic tanks.
- b) Efficient on-site treatment of sewage should include the following operations:

- i. *Primary treatment*
 - ii. *Secondary biological purification.* Most helminths will settle in the sludge resulting from secondary purification, together with 90-95% of bacteria and a significant percentage of viruses; the secondary effluent will thus be almost free of helminths, but will still include infective concentrations of bacteria and viruses.
 - iii. *Tertiary treatment.* The secondary effluent will probably contain at least 20 mg/litre suspended organic matter, which is too high for efficient chlorine disinfection. It should therefore be subjected to a tertiary treatment, such as lagooning. If no space is available for creating a lagoon, rapid sand filtration may be substituted to produce a tertiary effluent with a much reduced content of suspended organic matter (<10mg/litre).
 - iv. *Chlorine disinfection.* To achieve pathogen concentrations comparable to those found in natural waters, the tertiary effluent will be subjected to chlorine disinfection to the breakpoint. This may be done with chlorine dioxide (which is the most efficient), sodium hypochlorite, or chlorine gas, chlorine powder.
 - v. Another option is *ultraviolet light disinfection.*
- c) Disinfection of the effluents is particularly important if they are discharged into maritime waters (Rivers, Lakes...)

12.4 Sludge treatment

- a) The sludge from the sewage treatment plant requires anaerobic digestion to ensure thermal elimination of most pathogens.
- b) Alternatively, it may be dried in natural drying beds and then incinerated together with solid infectious health-care waste.

12.5. Minimum safety requirements for sewerage treatment

For health facilities that are unable to afford any sewage treatment, the following measures should be implemented to minimize health risks:

- a) No chemicals or pharmaceuticals should be discharged into the sewer.

- b) Sludge from hospital cesspools should be dehydrated on natural drying beds and disinfected chemically (e.g. with sodium hypochlorite, chlorine gas, or preferably chlorine dioxide).
- c) Sewage should never be used for agricultural or aquaculture purposes.
- d) Hospital sewage should not be discharged into natural water bodies that are used to irrigate fruit or vegetable crops, to produce drinking water, or for recreational purposes.

12.6. Sanitation

Human excreta are the principal vehicle for the transmission and spread of a wide range of communicable diseases, and excreta from hospital patients may be expected to contain far higher concentrations of pathogens, and therefore to be far more infectious, than excreta from households.

- a) In most HF's, human sanitation is often by pit latrines. Excreta collected from patients are usually disposed of via the same route, creating a risk of infection to other people.
- b) Sufficient toilets should be available; the recommended minimum is one toilet per 20 users for inpatient medical areas, and at least four toilets per outpatient location (one each for male and female staff, one for female patients, one for male patients) (WHO, 2008).

12.7. Safe management of wastes from health facilities

A health facility should ideally be connected to a sewerage system.

- a) Where there are no sewerage systems, technically sound on-site sanitation such as the simple pit latrine, ventilated pit latrine, and pour-flush latrine, and the more advanced septic tank with soak-away should be provided.
- b) In temporary field hospitals during outbreaks of communicable diseases, other options such as chemical toilets may also be considered.
- c) In addition, convenient washing facilities (with warm water and soap available) should be available for patients, personnel, and visitors in order to limit the spread of infectious diseases within the Health Facility.




ANNEXES:

Annex 1 Sample sheet for assessment of waste generation

Name of the health facility:Week:Date:..... Month.....

Waste collection point: department/location	Waste category (specify)	Quantity of waste generated per day (weight and volume)													
		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
		Kg	litre	Kg	litre	Kg	litre	Kg	litre	Kg	litre	Kg	litre	Kg	litre

Annex 2 Color code for biomedical waste

NO	TYPE OF WASTE	COLOUR OF CONTAINER AND MARKINGS	TYPE OF CONTAINER
1	Infectious	Yellow with biohazard sign 	Strong leak proof-plastic bag with biohazard symbol
2	Pathological/anatomical	Red with biohazard sign \ 	
3	Sharps	Yellow - (marked sharps)	
4	Chemicals	Brown (marked chemicals)	
5	Pharmaceutical	Brown	
6	General waste/Noninfectious/non hazardous(Non-clinical)		
7	Radioactive waste	Symbol for radioactive waste 	
8	Genotoxic/ Cytotoxicwaste	Purple	
9	e-Waste	Refer to e-waste guidelines	

SOURCE: WHO COLOUR CODE,

Annex 3 International waste labeling symbols

 <p>potentially explosive waste</p>	 <p>Radioactive waste</p>	 <p>Potentially corrosive waste</p>
 <p>Label for infectious waste</p>	 <p>Waste containing flammable material</p>	 <p>Label for waste containing oxidizing chemicals</p>
 <p>Waste containing toxic materials</p>	 <p>Highly infectious/sharps waste</p>	

Annex 4 Alternative labels for hazardous wastes

**HAZARDOUS WASTE
CYTOSTATIC**

Institution/Hospital: -----

Department/ward: -----

Signature of i/c. -----

Signature of O i/c -----

**HAZARDOUS WASTE
“SHARPS: INFECTIOUS”**

Institution/Hospital: -----

Department/ward: -----

Signature of i/c. -----

Signature of O i/c -----

**HAZARDOUS WASTE
BIOLOGICAL**

Institution/Hospital: -----

Department/ward: -----

Signature of i/c. -----

-

Signature of O i/c -----

-

**HAZARDOUS WASTE
CHEMICALS**

Institution/Hospital: -----

Department/ward: -----

Signature of i/c. -----

Signature of O i/c -----

**HAZARDOUS WASTE
INFECTIOUS**

Institution/Hospital: -----

Department/ward: -----

Signature of i/c. -----

-

Signature of O i/c -----

-

**HAZARDOUS WASTE
PHARMACEUTICAL**

Institution/Hospital: -----

Department/ward: -----

Signature of i/c. -----

Signature of O i/c -----

Annex 5 Health care waste tracking form sample 1

HEALTH CARE WASTE TRACKING FORM

Date of shipment **DD/MM/YYYY**

Source (Name of HF/Hospital/Clinic).....

Physical address

Generation Point:

Postal address:

Tel : 07.....

Email:

TRANSPORTER:

NAME

Physical address

Postal address

Tel:0000000

Email.....

Annex 6 Health care waste tracking form sample 2

[Name, Address and telephone number of]	Registration number from regulatory agency
	Originator's reference
CONSIGNMENT NOTE FOR THE CARRIAGE AND DISPOSAL OF HAZARDOUS WASTE	
A. Producer's Certificate	(1) The material described in B below is to be collected from (location).....and taken to (location)..... Name.....Signed..... On behalf of Designation..... AddressTel. no..... DateTime of collection.....
B. Description of the waste	(1) General description and physical nature of waste..... (2) Relevant chemical and biological components and maximum concentrations (3) Quantity of waste and size, type and number of containers..... (4) Process (es) from which waste originated.....
C. Carriers Collection Certificate	I certify that I collected the consignment of waste and the information given in A (1) and(2) and B (1) and (3) is correct, subject to any amendment listed in this space I collected this consignment on..... at.....Time Signed Name Date On behalf of Vehicle reg. No. AddressTel. No.
D. Producer's Collection Certificate	I certify that the information given in B and C is correct and the carrier was advised of appropriate precautionary measures. SignedName Date..... Tel. no.
E. Disposer's Certificate	I certify that Waste Disposal License No....., issued by [name of issuing body], authorizes the treatment/disposal at this facility of the waste described in B (and as amended where necessary at C) Name and address of facility..... This waste was delivered in vehicle[reg. No.] at Time [date] and the carrier gave his name as on behalf ofProper instructions were given that the waste should be taken to Signed Name Position Dateon behalf of
F. For use by Producer/Carrier/Dispose	

Annex 7 Waste treatment methods

Infectious Wastes	Treatment method
Cultures and stock	Steam sterilization/microwave
Contaminated bedding/patient care waste	Steam sterilization or Incineration
Contaminated small equipment	Steam sterilization or Incineration
Contaminated large equipment	Formaldehyde decontamination
Biological Waste	Steam sterilization or Incineration/ microwave
Contaminated laboratory waste	Steam sterilization/ microwave
Dialysis unit waste	Steam sterilization
Pathological waste	
Anatomical wastes	Steam sterilization or Incineration/Grinding
Surgery waste	Steam sterilization or Incineration
Human blood and blood products	Steam sterilization or Incineration
Contaminated animal carcasses	Incineration
Autopsy waste	Incineration
Sharps	
Contaminated and unused sharps	Steam sterilization and Incineration/grinding
Pharmaceutical Wastes	
Pharmaceutical waste	See separate Pharmaceutical waste guidelines, microwave
Anti-neoplastic drug waste	Incineration
Low level Radioactive waste	Consult Radiation protection board

Annex 8 Management of spillages

(Example of General Procedure for Dealing with Spillages')

1. **Evacuate** the contaminated area.
2. **Decontaminate** the eyes and skin of exposed personnel immediately.
3. **Inform** the designated person (usually the Waste Management Officer), who should coordinate the necessary actions.
4. Determine the **nature** of the spill.
5. **Evacuate** all the people not involved in cleaning up if the spillage involves a particularly hazardous substance.
6. Provide **first aid** and medical care to injured individuals.
7. **Secure** the area to prevent exposure of additional individuals.
8. Provide adequate **protective clothing** to personnel involved in cleaning-up.
9. **Limit** the spread of the spill.
10. **Neutralize or disinfect** the spilled or contaminated material if indicated.
11. **Collect** all spilled and contaminated material. [**Sharps should never be picked up by hand**; brushes and pans or other suitable tools should be used.] Spilled material and disposable contaminated items used for cleaning should be placed in the appropriate waste bags or containers.
12. **Decontaminate or disinfect** the area, wiping up with absorbent cloth. The cloth (or other absorbent material) should never be turned during this process, because this will spread the contamination. The decontamination should be carried out by working from the least to the most contaminated part, with a change of cloth at each stage. Dry cloths should be used in the case of liquid spillage; for spillages of solids, cloth impregnated with water (acidic, basic, or neutral as appropriate) should be used.
13. **Rinse** the area, and wipe dry with absorbent cloth.
14. Decontaminate or disinfect any tools that were used.
15. Remove protective clothing and decontaminate or disinfect it if necessary.
16. **Seek medical attention** if exposure to hazardous material has occurred during the operation.

Annex 9 Recycling index

Uncontaminated Paper and Cardboard		
Category	Action	Outcome
Cardboard	Flatten & Bundle Cartons	Recycled
Confidential documents	Shred	Recycled Paper
Office Paper	Separate & Bundle	Recycled Paper
Metals		
Aluminium	Contact a scrap merchant	Reprocessed Cans
Dental Amalgam	Contact a silver recovery Contractor	Recovered Silver
Mercury	Contact a recovery Contractor	Recovered Mercury
Scrap Steel.	Contact a scrap merchant	Reprocessed Steel
Silver X-Ray Films and Processors	Contact a silver recovery Contractor	Recovered Silver
Glass		
Bottles & Jars Clear, Brown and Green	Separate , re-use and contact a Recycler	Reused item or reprocessed glass
Broken glass	Separate, store in rigid containers and contact a recycler	Reprocessed glass
OILS		
Waste Oil	Separate and contact a recycler	Refined or used as fuels
Food remains/leftovers and Green Waste		
Food remains/leftovers	Separate from other types of waste into appropriate colour coded bins	-Garden Compost -Pig swill
Plastics		
High and low Density Polyethylene	Return to Supplier	Reprocessed
PET Polyethylene Terephthalate Soft Drink Bottles	Separate and arrange collection	Recycled Bottles
PP Polypropylene Car Battery Casings	Separate and arrange collection	Reprocessed
PPVC Plasticised Polyvinyl Chloride Plastic Tubing	Separate and arrange collection	Reprocessed
PS Polystyrene Foam cups and Packaging	Separate and arrange collection	Reprocessed or reused
UPVC Unplasticised Polyvinyl Chloride	Separate and arrange collection	Reprocessed

Annex 10 A sample tag for shipment

HEALTH CARE WASTE	
GENERATOR	Date of shipment ____/____/____
NAME OF HEALTH FACILITY	_____
Physical address -	_____
Postal address -	_____ Tel: _____
TRANSPORTER:	
NAME -	_____
Physical address –	_____

Postal address -	_____ Tel: _____
HEALTH CARE WASTE	

Annex 11 Facility Health care waste management plan

Name of Facility:	Date:
--------------------------	--------------

Who is responsible overall for supervising HCWM at your facility? Attach supervision structure organogram of your facility
Who is responsible for performing waste disposal for each area of your facility? Attach job descriptions for all cadres of staff at your facility.

Outline Current HCWM Status at Facility

Define type and amounts of waste generated.	
Type	Amount (per week)
Non-infectious waste	
Infectious waste	
Highly infectious waste	
Highly infectious waste	
List number of staff and their designations at your facility	
Designation	Number

Outline HCWM practices used currently.

Concept	Current Practice
<i>Is waste classified and segregated into different coloured waste bins? Describe how.</i>	
<i>How are sharps (needles) disposed? How are safety boxes used?</i>	
<i>Are full safety boxes recorded? Where are they stored? How are they transported to their final disposal location?</i>	
<i>Where are different categories of waste disposed? Describe the disposal process</i>	

Outline Ideal Practices: Establishing Standards

Concept	Current Practice
Segregating waste (different types, corresponding colours of waste liners)	
Prioritising sharps (use of safety boxes or needle removers, if applicable)	
Recording, handling and transport of safety boxes	
Final waste disposal for each category of waste (including sharps barrel, if applicable)	
Hepatitis B and tetanus toxoid immunization for all cadres of staff	

List Improvements Needed

Define type and amounts of waste generated.

Item	Date for Introduction	Total Cost	Responsible Party

What supplies needed for the next 6 months? (Protective clothing, cleaning supplies, waste bin, liners, safety boxes)

Supplies	Quantity	Total Cost

What training is needed at your facility for each cadre of staff ?

Cadre of Staff for	Training Topics	Date	completion