



REPUBLIC OF UGANDA

MINISTRY OF HEALTH

NATIONAL HEALTHCARE WASTE OPERATIONAL GUIDELINES

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ACRONYMS

DHO	District Health Office
HAIs	Healthcare Acquired Infections
HCW	Healthcare Waste
HCWM	Healthcare Waste Management
FEFO	First to Expire First Out
FIFO	First In First Out
IEC	Information Education and Communication
IPC	Infection Prevention and Control
NEMA	National Environment Management Authority
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
PPP	Public Private Partnership
SDG	Sustainable Development Goal
SOPs	Standard Operating Procedures
UHC	Universal Health Coverage
VHT	Village Health Team

GLOSSARY

Healthcare waste is defined as the total waste stream from all healthcare including both infectious and non-infectious waste materials. Non-infectious wastes are those that does not pose any particular biological, chemical and radioactive or physical hazard.

Incineration: Is a high-temperature dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and significantly reduces waste volume and weight.

Pathological waste: Human tissues, organs or fluids, body parts, fetuses, unused blood products and contaminated animal carcasses;

Sharps waste: Used or unused sharps, e.g. hypodermic, intravenous or other needles; auto-disable syringes; syringes with attached needles; infusion sets; scalpels; pipettes; knives; blades; broken glass;

Chemical waste: Solvents and reagents used for laboratory preparations, disinfectants, sterilants and heavy metals contained in medical devices (e.g. mercury in broken thermometers) and batteries;

Pharmaceutical and cytotoxic waste: Pharmaceuticals that are expired or no longer needed; items contaminated by, or containing, pharmaceuticals. Cytotoxic waste containing substances with genotoxic properties, e.g. waste containing cytostatic drugs (often used in cancer therapy); genotoxic chemicals;

Radioactive waste: Such as products contaminated by radionuclides including radioactive diagnostic material or radio therapeutic materials.

Waste handler: Refers to a person who engages in the processes of waste management including collection, storage, transportation, treatment and disposal.



Dr. Diana Atwine

FOREWORD

The Government of Uganda is committed to achieve the aspirations of Universal Health Coverage by delivering quality and equitable healthcare services for its citizens by 2030. A number of legal and institutional frameworks have been established to support health service delivery programs in line with Vision 2040, National Development Plan IV, Second National Health Policy and The Public Health Act (Cap 310) and other sectoral laws and regulations.

However, the unsatisfactory healthcare waste management practices such as poor segregation, inappropriate transportation and indiscriminate disposal continues to jeopardize the quality of healthcare service delivery, but also exposes the healthcare workers, patients, communities and the environment to infectious materials.

In a bid to improve the quality of health service delivery, the National Healthcare Waste management operational guidelines have been developed to operationalize the National HCWM strategy (2024/2025-2029/2030). These guidelines are important to address existing challenges in healthcare waste management during routine healthcare service delivery including the risks posed by emerging and re-emerging epidemics.

They are intended to offer detailed procedural guidance for effective healthcare waste management across the service chain for protection of public health and the environment.

Specific and simplified step-by-step procedural Standard Operating Procedures (SOPs) will be issued to operationalize these guidelines.

I therefore implore all sector players and stakeholders to ensure that healthcare waste management is prioritized at all levels of service delivery for a clean and healthy environment.

For God and my country.



Dr. Diana Atwine
PERMANENT SECRETARY



Dr. Charles Oloro

PREFACE

Uganda's healthcare system aims at ensuring quality and equitable service delivery for all people. It is therefore our commitment as the health sector to establish functional health infrastructure for provision of efficient and sustainable healthcare waste management services at all levels of the healthcare system across the value chain.

The National Healthcare Waste Management guidelines seek to operationalize targeted interventions enshrined in the current National Healthcare Waste Management Strategy (2025-2030). They offer guidance to all key players on the appropriate infrastructure to consider and best practices to undertake while strengthening and scaling up the quality of healthcare services.

Infrastructural enablers like waste collection trucks and incinerators have been deployed and installed in high-volume healthcare facilities across the country with support from Government of Uganda, the Global Fund, United States Agency for International Development (USAID) and the World Bank.

Additionally, the Ministry of Health has contracted service providers to support efficient and effective collection, transportation, treatment and disposal of healthcare waste across the country.

These guidelines therefore stipulate the recommended day-to-day best practices for effective healthcare waste management across the entire value chain.

Effective implementation of these guidelines will result in the reduction of the burden of Healthcare Associated Infections, the growing burden of Anti-Microbial Resistance, promotion of bio-security and bio-safety measures thus enhancing sustainable health outcomes.

I therefore implore all stakeholders to make reference to these guidelines as stewards of quality healthcare services provision in Uganda.

**Dr. Charles Oloro****DIRECTOR GENERAL HEALTH SERVICES**

ACKNOWLEDGEMENT



Dr. Herbert Nabaasa

The development of these guidelines has been a result of concerted efforts from multiple stakeholders including the line Ministries, Departments and Agencies, Local Governments, Private sector Operator, Civil Society, Professional bodies and Academia.

The Ministry of Health (MoH) also acknowledges the immense technical and financial contributions of the Government of Uganda and its Development Partners that enabled the development of these healthcare waste management operational guidelines.

In a special way, the Ministry of Health with gratitude appreciate the World Health Organization (WHO), United Nations Development Programme (UNDP), UNICEF and the Global Fund for the financial and technical support towards the development process.

We extend our appreciation to the Department of Environmental Health, Department of Pharmaceuticals and Natural Medicines and Department of Clinical Services for spearheading this process.

We are confident that these guidelines will enable the various practitioners as enshrined herein such as healthcare workers, waste management service providers among others to ensure delivery of quality healthcare services across the value chain.

A handwritten signature in black ink, appearing to read 'Dr. Nabaasa', with a stylized flourish at the end.

Dr. Herbert Nabaasa
Commissioner, Health Services-Environmental Health

EXECUTIVE SUMMARY

Over the years, Uganda has registered tremendous gains in improving its healthcare system. Critical investments in infrastructure, human resources for health, equipment among others have contributed to positive outcomes, making this system a center of excellence for many countries. This notwithstanding, some challenges resulting from increasing pressure of high population growth rates, high vulnerability to public health emergencies due to its geographical proximity to multiple epidemic belts, and a refugee influx, continue to jeopardize the country's gains on healthcare service delivery. All these continue to predispose the healthcare system to the risk of generating large volumes of highly infectious wastes.

This coupled with unsatisfactory management practices of healthcare wastes undermines strategic efforts which are aimed at achieving greater results. This poses health and safety risks to healthcare workers, patients, caretakers, communities and the environment. Therefore, effective management of healthcare waste will mitigate these shocks in Uganda's healthcare system.

There is therefore an urgent need to implement national and international healthcare waste management best practices so as to ensure public health safety and environmental protection.

In this regard, the Ministry of Health has provided guidance on various mechanisms enshrined in these National HCWM guidelines which must be undertaken within the healthcare system and its auxiliary structures to ensure responsiveness to the current and future public health challenges.

The guidelines have carefully considered evidence-based and technically sound infrastructure, processes and best practices as recommendations. Adequate reference has been made to supportive policies and strategies that are client-centred, a bedrock for Uganda's healthcare system.

These guidelines operationalize the National HCWM strategy (2024/2025-2029/2030). They will help to strengthen the capacity of the health system in ensuring delivery of safe and quality healthcare services.

Effective implementation of these guidelines shall contribute to the aspirations of achieving universal access to quality and affordable preventive, promotive, curative and palliative Healthcare to all people in Uganda.

Goal of the guidelines

To prevent and control health risks and hazards due to improper management of HCW in order to create a safe environment for healthcare workers and the community.

The National HCWM operational guidelines specifically seek to;

- Strengthen institutional capacity for the management of healthcare waste at all levels
- Detail acceptable standards for appropriate management of HCWM
- Provide key monitoring tools for HCWM at all levels to guide planning, implementation and performance review

Intended users

These guidelines are intended for a wide range of stakeholders in both public and private healthcare facilities including but not limited to Policy makers, facility managers, healthcare workers, waste handlers, waste handling service providers, health training and research Institutions, Pharmacies, Drug shops, clinics, alternative healthcare providers, veterinary clinics, home-based Healthcare and emergency settings.

1.0 INTRODUCTION TO HEALTHCARE WASTE

Healthcare waste (HCW) is defined as the total waste stream from all healthcare including both infectious and non-infectious waste materials. Non-infectious wastes are those that does not pose any particular biological, chemical and radioactive or physical hazard. Examples include office paper, food waste, plastics, glass among others. Infectious waste is that which is known or suspected to contain pathogens and poses a risk of disease transmission. These require special handling and disposal procedures to avoid negative health effects and adverse environmental effects.

Uganda's growing healthcare system and its capacity has exponentially led to a surge in the quantity of Healthcare Wastes (HCWs) generated majorly due to the rising burden of preventable diseases and recurrent public health outbreaks. This is coupled with unsatisfactory management practices ranging from poor segregation, inappropriate and inadequate storage facilities and indiscriminate disposal of hazardous HCWs. It continues to jeopardize the Country's gains on healthcare service delivery especially when healthcare workers, patients, communities and the environment remain at a risk of exposure to infectious materials.

Additionally, Uganda's high vulnerability to public health emergencies due to its geographical proximity to multiple epidemic belts like the Congo Basic hotspot, high population growth rates and a refugee influx, all predispose the health system to the unusual risk of generating large volumes of healthcare waste during the outbreaks. These contribute to high prevalence of injuries such as sharps-inflicted injuries, poisoning through toxic elements, wastewater and pharmaceutical products, water, soil and air pollution. These jeopardize the quality of healthcare service delivery.

A recent assessment across 4,272 HealthCare Facilities (HCFs) in 136 districts revealed that majority (76.6%) of the assessed facilities lacked efficient HCWM systems while only 23.4% had advanced HCWM systems (MoH, 2022).

These guidelines comprehensively detail the operational procedures for sustainable HCWM value chain as guided by the National HCWM strategy (2025-2030).

2.0 SITUATIONAL ANALYSIS

Uganda's healthcare system is expanding at an increasing rate and thus posing a threat to proper healthcare waste management processes. This is evidenced in the current unsatisfactory management practices ranging from poor segregation, storage, and indiscriminate disposal of hazardous waste across the country due to lack of an efficient Healthcare waste management (HCWM) system. These wastes end up mixed with biodegradable waste hence posing significant health risks to healthcare workers, patients, and the public, leading to the spread of infectious and other diseases including environmental pollution.

An assessment conducted on WASH in HCFs by Ministry of Health (2022) across 4,272 HCFs in 136 districts on HCWM services indicators found only 23.4% of HCFs with advanced, 56% with basic, 18% with limited and 3% with no service at all, respectively.

Across the demographic regions, West Nile, Acholi, Karamoja and Kampala regions had the highest number of HCFs with advanced level of access to HCWM estimated at 47.9%, 46.7%, 31% and 30% respectively. Bukedi, Bugishu and Busoga had the least number of HCFs with advanced HCWM estimated at 10%, 13.2% and 13.4% respectively.

Relatedly, across the districts, Lamwo (82.8%), Obongi (70.6%) and Koboko (69.2%) were ranked as leading with the highest number of HCFs with advanced access to HCWM services. Dokolo and Bulisa districts did not have any HCF with access to safe HCWM.

An assessment conducted by MoH (2025) with support from the World Health Organization (WHO) to establish the waste generated at the new regional incinerator sites (Gulu, Lira, Mbarara, Mukono and Fortportal) and the following representative data was generated.

TABLE 1. QUANTITIES OF WASTES GENERATED PER CATEGORY AND LEVEL OF FACILITY

Health Facility Level	HC III	HC IV	General. Hosp	RRH
Sharps	41	209	69	296
Infectious Waste	79	286	1,063	488
General Waste	0*	756	4,802	513
Waste Disposed of/Week	50	55	17	513

*** HC IIIs were unable to correctly estimate their volumes of general wastes**

Other Institutional challenges affecting proper HCWM identified during this assessment included the following;

- Lack of awareness and knowledge on HCWM.
- Lack of specific regulations of HCWM and poor enforcement of standards
- Insufficient HCW infrastructure in the health facilities.
- Inadequate supply of HCWM commodities.
- Insufficient monitoring and supervision on safe HCWM in the health facilities by the relevant authorities.
- Inadequate HCWM budget at health facilities to facilitate proper collection, transportation, treatment, and disposal of waste.

- Addressing these challenges requires concerted efforts from all stakeholders in ensuring proper planning, budgeting and adequate resource mobilization to effectively manage HCW generated at all levels of service delivery.

In Uganda's healthcare facilities, approximately 85% of the waste generated is non-hazardous, while the remaining 15% is categorized as hazardous. According to a study by the National Environment Management Authority (NEMA, 2014), the average quantity of waste generated in hospitals is estimated at 0.1 kg per bed per day, excluding pathological waste. At lower-level health facilities, the estimated daily waste generation is as follows: 1.5 kg per day for Health Centre IVs (HCIVs), 0.6 kg per day for Health Centre IIIs (HCIIIs), and 0.5 kg per day for Health Centre IIs (HCIIIs).

HCW is generated from various points of care at the different HCFs such as the emergency unit, wards, outpatient department (OPD), among others. The current practice of HCW segregation at generation points is inconsistent with the standards across the different levels of care. Higher level HCFs use contracted service providers to transport, treat and dispose of this waste, however, due to resource constraints, lower level HCFs often have been observed to use open pit burning as the final waste disposal mechanism for all HCW contrary to standards.

2.1 Existing infrastructure for HCWM

The Health Financing Strategy 2015/16 – 2024/25 provides a road map for health financing functions in the sector, however the sector remains underfinanced leading to inadequate human resources for health, health infrastructure development and lack of medicines, vaccines and other health supplies.

This notwithstanding, the Government of Uganda and its partners has significantly invested in healthcare service delivery at various levels. Relatedly, all public and private healthcare facilities are required to effectively plan and budget for healthcare waste as pre-requisite for quality healthcare service delivery.

In this regard, the Government has put in place deliberate initiatives to expand its investment in healthcare waste management. These include engagement with the private sector under the Public-private Partnership (PPP) arrangement where significant gains have been registered. For instance, with its partners like Global Fund equipment and establishment of infrastructure such as environmentally friendly incinerators and 10 specialized waste transportation trucks have been procured and installed in 05 regions of Uganda namely; Gulu, Kabarole, Lira, Mbarara and Mukono. Additionally, a number of private sector players have been engaged to support Government in the management of Healthcare waste across the country under the Public Private Partnership (PPP) arrangement.

A comprehensive revenue generation and financing model (pricing criteria, user fees, waste quantification thresholds, revenue collection and sharing modalities among others) is also being developed to ensure that both Government and the private operators sustainably run these facilities.

The Ministry has also issued circulars to all Local Governments necessitating them to adequately plan and budget for the management of healthcare wastes. This will help cushion the resource gap for effective HCWM at all levels.

2.2 The Current landscape of Healthcare Waste Management

This section highlights a profile of the current landscape for HCWM services in the country. Its characterized under the strengths, weaknesses, opportunities, and threats across the service delivery chain.

TABLE 2: SWOT Analysis of Healthcare Waste Management in Uganda

1. GENERATION AND SEGREGATION	
Strengths	Weaknesses
● Existance of protocols on the segregation of HCW ● Existance of a structure procurement mechanisms for supplies to support segregation (NMS and JMS) ● Presence of colour-coded bin and bin liners to ease segregation ● Availability of Information, Education andCommunication (IEC) materials on waste segregation ● Existance of Continuous Medical Education (CMEs) that promote enhanced skilling on appropriate HCWM	● Insufficient knowledge of different HCW management aspects e.g segregation protocols ● Poor segregation practices among healthcare workers and other waste handlers ● Inadequate implementation of existing policies, strategies and regulations ● Inadequate financing for HCWM at the HCFs levels ● Perenial insufficiency of supplies such as PPEs to support segregation of HWCs in most HCFs
Opportunities	Threats
● Existence the relevant stakeholders in the public and the private sector for example through the Coperate Social Responsibility (CSR) ● Presence of academia-driven innovative ideas and prototypes	● The exponential growth of the healthcare system with dispropotionate HCWM services ● Increasing disease burden and outbreaks which contribute to increased generation of HCWs beyond capacity
2. COLLECTION AND STORAGE	
Strengths	Weaknesses
● Availability of some appropriate collection and storage equipment ● Existance of temporal storage grounds at some HCFs ● Availability of personell to support collection and storage of HCWs	● Inadequate knowledge on appropriate collection, packaging and storage HCWs protocols ● Inadequate implementation of existing policies, strategies and regulations ● Inadequate financing for HCWM at the HCFs levels ● Poor collection, packaging and storage practices among healthcare workers and other waste handlers ● Insufficient PPE appropriate for usage among waste handlers during collection and storage ● Delays in the collection and disposal of accumulated stored HCWs
Opportunities	Threats
● There is growing interest in environmental conservation and climate change mitigation remedies ● Presence of academia-driven innovative ideas and prototypes	● Extreme weather conditions that affect the available waste collection and storage facilities ● Inadequate space allocations for temporary storage of HCWM especially in urban HCFs ● Inappropriately designed HCW storage facilities currently used by some HCFs

3. ONSITE AND OFFSITE TRANSPORTATION

Strengths	Weaknesses
• Availability of some equipment for onsite and offsite transportation of HCW • Presence of licenced private operators to support transportation of HCWs	• Inadequate knowledge on appropriate transportation HCWs protocols • Inadequate implementation of existing policies, strategies and regulations • Inadequate financing for HCWM at the HCFs levels • Poor transportation practices among healthcare workers and other waste handlers • Insufficient PPE appropriate for usage among waste handlers during waste transportation • Inadequate maintenance and servicing options for the available transport equipment
Opportunities	Threats
• Existence of some public and private transportation equipments for HCWs • Continuous engagements towards increasing capacity of the transportation systems in both the public and private sector	• Extreme weather conditions that affect the transport processes for HCWs • Poor accessibility to some HCFs especially those allocated in difficult geographical terrain areas.

4. TREATMENT AND FINAL DISPOSAL

Strengths	Weaknesses
• Existence of some infrastructure for treatment and disposal of HCW • Existence of compliance systems to guide reduction of pharmaceutical waste like expired drugs	• Inadequate knowledge on appropriate treatment and disposal protocols • Inadequate implementation of existing policies, strategies and regulations • Inadequate financing for HCWM at the HCFs levels • Insufficient PPE appropriate for usage among waste handlers during waste treatment and disposal • Inadequate skilled human resources to support appropriate treatment and disposal processes • Poor maintenance practices of the established HCW treatment and disposal facilities by the responsible oversight personell

3.0 CATEGORIES OF HCW

3.1 Introduction

Healthcare waste (HCW) refers to all forms of waste generated as a result of activities carried out in the delivery of healthcare services. This waste is generated from a variety of sources, including healthcare establishments such as hospitals, health centres, clinics, private mortuaries, research centres, medical laboratories, veterinary clinics, pharmacies and drug shops. It also includes such wastes from communities (households, schools and other institutions, lodges and hotels), among others.

Healthcare waste is broadly classified into two main categories: **hazardous** and **non-hazardous (general)** waste.

- **Non-Hazardous (General) Waste** refers to waste materials that do not pose any immediate risk to human health or the environment and this accounts for approximately 75–85% of the total waste generated by healthcare facilities. This category includes: Paper, cardboard, and packaging materials, non-contaminated plastics and glass, Food leftovers from hospital kitchens, office waste and administrative materials
- **Hazardous healthcare waste** refers to waste that poses a significant risk to human health or the environment due to its dangerous properties. It's further divided into infectious, sharps, pharmaceutical, radioactive, cytotoxic and chemical waste.

Table 3: Categories of Waste

Waste categories	Descriptions and examples
HAZARDOUS WASTE	
Infectious waste	This is waste known or suspected to contain pathogens and pose a risk of disease transmission. This includes • Pathological Waste → Amputations and other body tissues resulting from surgical operations → Autopsy (post-mortem) → Child delivery organs or fluids → Body parts → Foetuses • waste and wastewater contaminated with blood and other body fluids • laboratory cultures, microbiological stocks, ; unused blood products, excreta • other materials that have been in contact with patients infected with infectious diseases in isolation wards e.g. Ebola, TB • Used gloves • Sanitary pads, used diapers and used condoms
Pharmaceutical waste	These entail pharmaceuticals that are expired or no longer needed; and items contaminated by, or containing, pharmaceuticals. This includes • Bottles/boxes of expired or unwanted medications • Vaccine waste • Leftover samples

Waste categories	Descriptions and examples
HAZARDOUS WASTE	
Chemical waste	Waste containing purified chemical substances that are toxic, corrosive, flammable, reactive, and/or explosive. This includes • Unwanted disinfectants, • Solvents, • Film developer, • Laboratory reagents, • Waste with high content of heavy metals, e.g., batteries, broken thermometers and blood pressure gauges.
Cytotoxic waste (genotoxic or teratogenic)	Cytotoxic waste containing substances with genotoxic properties. This includes • waste containing cytostatic drugs (often used in cancer) • genotoxic chemicals.
Sharps	• Used or unused sharps, e.g. hypodermic, intravenous or other needles; auto-disable syringes; syringes with attached needles; infusion sets; • scalpels • pipettes • blades • broken glass
Radioactive waste	Waste containing radioactive substances • unused liquids from radiotherapy or laboratory research • contaminated glassware, packages or absorbent paper • urine and excreta from patients treated or tested with unsealed radionuclides.
Non- hazardous waste	This waste does not pose any immediate risk to human health or the environment and this accounts for approximately 75-85% of the total waste generated by healthcare facilities. • Paper, cardboard, and packaging materials, non-contaminated plastics and glass • Food leftovers from hospital kitchens • Office waste and administrative materials

4.0 PROCEDURES FOR APPROPRIATE HCW MANAGEMENT

This chapter outlines guidance for generation, segregation, temporary storage, transportation, treatment while maintaining segregation up to final disposal.

4.1 HCW MINIMISATION

This entails reducing the amount and toxicity of hazardous waste generated. Minimisation is the first and best way to reduce waste. It may occur at procurement stage or at generation stage. Focus should be on purchase of environmentally friendly products.

The following considerations shall apply at procurement stage;

4.1.1 Green procurement

This focuses on the purchase of environmentally friendly products;

- Purchase of materials and supplies should put waste reduction into consideration
- Procuring officers should purchase medicines with longer shelf-life to reduce expiries
- Stakeholders should be engaged before procurement of commodities to ensure compatibility and usability of the items
- Avoiding purchase of commodities with banned materials such as mercury, ozone-depleting substances, lead based fluid, among others
- Purchasing commodities with eco-friendly packaging such as bio-degradable materials

Note: Health workers should be encouraged to change clinical practices such as the use of oral medication as an alternative to injections to reduce sharps waste in less adverse health conditions.

4.1.2 Good inventory management practices

- The manufacture and expiry date of all supplies and products should be checked at the time of delivery
 - Issuing and use of supplies should follow FIFO (First In First Out) and FEFO (First to Expire First Out) principles.
 - Redistribution should be done to avert expiries
 - Practice good commodities storage to minimise damage
 - Do not receive damaged commodities during delivery from suppliers
-
- ▶ Encourage the reuse and recycling of non-infectious waste including paper, cardboard, and other packaging materials
 - ▶ Taking back containers which can be reused for refilling including gas cylinders
 - ▶ Encouraging effective commodities and supplies use by staff to minimise wastage

The figure below shows the different interventions that are used for waste minimisation.

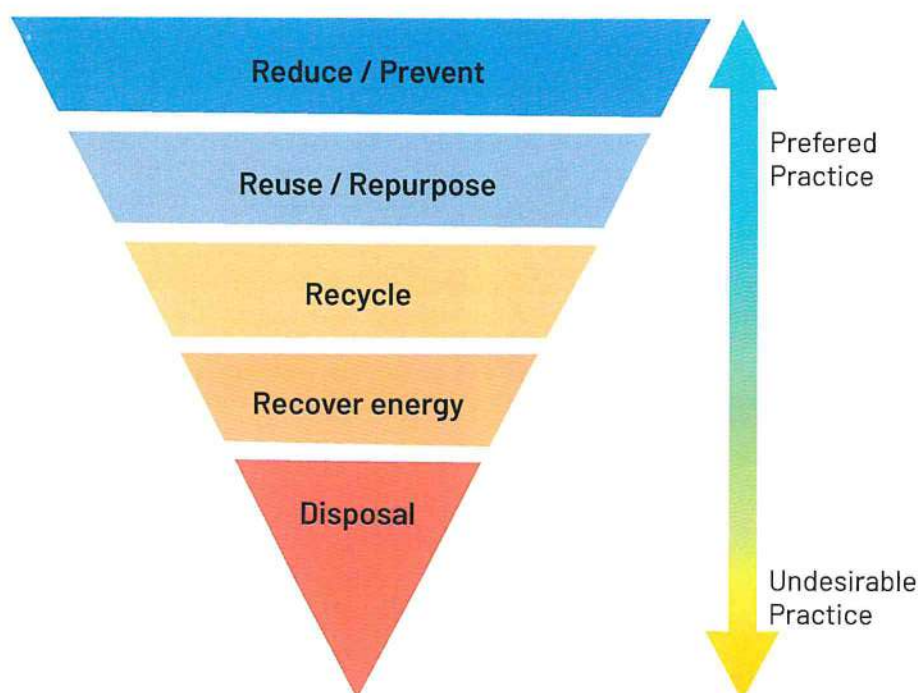


Figure 1. Waste Minimization Hierarchy

4.2 HCW SEGREGATION

This is the process of separating wastes at the point of generation into specific color-coded containers based on category and risk level. This is essential for safe handling, transportation, treatment and disposal hence protecting the healthcare workers, waste handlers, patients, caregivers and the community.

Waste is generated at service points where there is an interface between the healthcare worker, patient and the caretaker.

The primary generator of HCW in health facilities is the health worker resulting from processes he/she undertakes while interacting with the patient. Therefore, it's imperative that he/she follows through the entire segregation process in adherence to the principle of *"the generator pays principle"*

Segregation of waste must therefore be initiated at every point of generation with consideration to the segregation categorization.

If categorization of a waste item is uncertain, as a precaution it should be placed into a container used for infectious waste bin.

- ▶ Health education talks should be conducted routinely for patients and care-givers on proper segregation of HCW.
- ▶ Caregivers and patients should be guided to place waste including used sanitary pads and diapers in the infectious waste bin (red bin)
- ▶ The appropriate waste receptacle (bags, bins, sharps boxes) should be provided in waste-producing areas to facilitate efficient waste segregation

- Posters/ charts showing the type of waste that should be disposed of in each container should be placed near the bins (e.g. on the walls as appropriate) to guide and reinforce safe and hygienic practices.

The nine categories of HCW shall be segregated and colour-coded as follows:

Table 4. Recommended Segregation Scheme for Healthcare Waste

Segregation category	Colour	Type of Container
Non-infectious waste	Black	Bio-hazard bag or bin with liner
Sharp waste	Yellow/White	Safety box
Anatomical/Pathological waste and placenta	Red	Bio-hazard bag or bin with liner
Infectious waste	Red	Bio-hazard bag or bin with liner
Wastes with high contents of heavy metals	Red	Secure container
Effluents	Red	Flask or container
Pharmaceutical and cytotoxic waste	Brown	Bio-hazard bag or bin with line
Radioactive waste	CAUTION RADIOACTIVE MATERIAL	Waste bins shielded with lead (Pb) (with radioactive symbol)

NOTE:

1. There has been a shift to consider highly infectious waste and infectious waste into one collection stream since they are treated and disposed of using the same method.
2. The red bins shall hence force be used to contain this waste as Infectious Waste
3. The Yellow colour-coding will now represent containment of sharps which can either be stored in the yellow safety box or white safety box.



Figure 2. HCW Segregation & Packaging illustration

Table 5. Waste Segregation Colour Coding

	Non-infectious wastes bin Black for general wastes like packaging materials, paper, leftover food, plaster of Paris (POP), needle wrappings
	Safety box Yellow/White for sharps such as surgical blades, needles, broken glass
	Hazardous waste bin Red for infectious wastes like pathological, anatomical waste, or effluent and heavy metals
	Hazardous waste bin Brown filled pharmaceutical and cytotoxic waste or heavy metals. Include the effluents

4.2.1 Placement of colour coded bins

- Colour coded bins should be placed near each other to facilitate segregation
- Sharps containers should be placed within arm's reach of the health worker to prevent needle stick injuries
- Infectious waste containers should only be placed at service points where infectious waste is generated
- Pharmaceutical, radiological and cytotoxic bin should only be used in places where such waste is generated. This includes pharmacies, medical stores and reconstitution rooms for cytotoxic waste.
- Trolleys used for ward rounds should have the infectious, non-infectious waste containers and a safety box.
- Placement of waste bins at each service point should follow the order of infectious (red bin); sharps (yellow/white box); pharmaceutical (brown bin) and general (black).

NOTE:

1. For settings where cytotoxic waste and waste containing heavy metals like mercury is generated should provide for secure containers of strong material to avoid leakage.
1. For radioactive waste, waste bins shielded with lead (Pb) should be provided. The contained waste should be safely stored.

4.2.2 Don'ts for segregation

- Do not place waste in the wrong bins. Take time and clearly read/ distinguish the appropriate colour coding for each waste before placement.
- In the event that waste has been wrongly placed, the waste handlers should never sort that waste. But rather report that incident to the immediate supervisor for immediate corrective measure to minimize risks such as needle prick injuries, exposure to harmful pathogens that may eventually occur.

4.2.3 Segregation of healthcare waste in the community

Segregation of HCW at community level will follow the same guidelines as mentioned above. For Community Health Workers such as VHTs implementing activities that require adherence to waste segregation, red bins and safety boxes should be provided.

- For expired drugs, Community Health Workers (CHWs) should be supported by the supervising healthcare facilities with appropriate containers and liners for collection from communities and storage at the healthcare facility.

4.2.4 Guidance for Home-based care settings

- For home-based care, where sharps are generated, a secure puncture proof container should be provided for their containment.
- Where infectious waste is generated, the appropriate colour coded bins and liners should be provided for safe containment.
- Residual and expired drugs should as well be packaged in secure containers and kept away from children awaiting collection by the attendant healthcare facility.
- All waste from this setting should be handed over to the CHW or Healthcare worker at the next appointment for proper storage, treatment and disposal.
- The officer in charge of Environmental Health (Health Inspector/ Assistant) shall continuously supervise adherence to the above segregation practices

4.2.5 Guidance for Outreach activities

- Organisers of outreaches should adequately plan for waste generated during such activities including colour coded bins with matching liners as appropriate and safety boxes.
- Planning should also be done for transportation of waste back to the healthcare facility for proper storage, treatment and disposal.

4.2.5 Healthcare waste Packaging

The following guidelines should be followed during packaging.

- Infectious wastes should be safely and tightly contained from the point of generation to the point of treatment where it is rendered non-infectious.
- The packaging should be appropriate for the type of waste involved (refer to segregation section).
- All waste bins should have tightly fitting covers for containment of waste and should be pedal-operated
- Sharps (sharp items, or items with sharp corners) should be placed in safety boxes of impervious, rigid, puncture-resistant nature.
- Safety boxes should properly be assembled according to the chronology of the folding parts to ensure waste is securely contained.
- Safety boxes should be filled to the three-quarter mark and safely sealed off to avoid spillage of the content.
- Liquid infectious waste should be placed in capped or tightly stoppered bottles or flasks and large quantities may be placed in containment tanks.
- Solid or semisolid waste should be placed in durable, tear resistant plastic bags.

The following precautions should further be undertaken during packaging of waste;

- Plastic liners should be filled up to three-quarters to allow space for securely tying the liner at collection.
- Do not load bin liners beyond their weight or volume capacity.
- Keep bin liners away from contact with sharp objects.
- Consider double-bagging to ensure tear-resistance.

Some waste treatment techniques require special packaging these include;

- Combustible containers for incineration
- Low-density plastics for steam sterilization that allow steam penetration and evacuation of air.
- Equipment from safe male circumcision activities should be packaged in puncture proof containers for disposal.

4.3 WASTE STORAGE

The following guidance should be followed for waste storage:

- In each unit where HCW is generated, an adequate place shall be dedicated for storing HCW bags, bins, or containers. This space should be locked and inaccessible to the general public.
- In all HFs, separate central storage facilities shall be provided for hazardous HCW, except radioactive waste that shall be stored separately. It shall clearly be mentioned that the facility stores hazardous HCW.
- Healthcare facilities below level three should store no materials other than yellow bag (infectious) waste.
- Highly infectious waste and anatomical waste (except heavy metals and effluent waste) should be disposed of immediately (no later than end of shift). No waste shall be stored for more than two days before being treated or disposed of.
- Properly-treated waste can be stored for a maximum of one week. In cases of outbreaks, additional guidelines for highly infectious waste should be adhered to.

4.3.1 Additional considerations for the central storage facility

- The designated central storage facility shall be located within the HF premises close to the treatment unit but away from food storage or food preparation areas.
- The designated central storage facility should be large enough to contain all the hazardous HCW produced by the healthcare facility during one week, with spare capacity to cope with any maintenance or breakdown of the treatment facility.
- The designated central storage facility shall be totally enclosed and secured from unauthorized access.
- The designated central storage facility shall be inaccessible to animals, insects, birds and free from direct sunlight.
- The designated central storage facility shall be easy to clean and disinfect and shall have an impermeable hard-standing floor / base, good water supply, drainage and ventilation.
- The facility should be readily accessible to the waste collection vehicles.

4.3.2 Detailed considerations for storage of wastes

The following procedures are recommended:

- All highly infectious waste (red bags) from isolation wards should be disposed of immediately.
- Infectious waste should be stored for a minimum of two days if not treated and one week if treated.
- The waste should be packaged securely enough to ensure containment of the waste and to prevent penetration by rodents and vermin.
- The universal biological hazard symbol should be posted on the storage area door and waste containers
- In case of camp settings where huge numbers of the community need to be served over a limited number of days, usually at temporarily settings such as schools, open fields, market places, and churches, lockable colour-coded waste bins with matching liners should be made available for temporary storage of waste as it accumulates.

4.4 SPECIAL STORAGE CONSIDERATIONS FOR SELECTED CATEGORIES OF WASTE

4.4.1 Storage of infectious waste

- Clearly label the storage site/facility with a biohazard sign as indicated in Table 3.
- Floors and walls should be sealed or tiled to allow easy disinfection. If present, the storage room should be connected to a special sewage system for infectious hospital wastewater.
- Compacting of untreated infectious waste or waste with a high content of blood or other body fluids destined for offsite disposal (for which there is a risk of spilling) shall not be permitted.
- Sharps contained in closed, leak-proof, puncture-proof containers can be stored without special treatment.
- Other infectious waste should be kept cool or refrigerated at a temperature preferably no higher than 3°C to 8°C as an alternative to waste treatment if stored for more than a week.
- Unless a refrigerated storage room is available, storage times for infectious waste (i.e., the time gap between generation and treatment/ disposal) should not exceed 48 hours during the cool season and 24 hours during the hot season.

4.4.2 Storage of pathological waste

- Pathological waste and the growth of pathogens it may contain are considered biologically active waste, and gas formation during storage should be expected.
- To minimize these possibilities, the storage places should have the same conditions as those for infectious and sharps waste.
- In some cultures, body parts should be passed to the family for ritual procedures or are buried in designated places.
- Body parts should be placed in sealed bags to reduce infection risks before release to the public.

4.4.3 Storage of pharmaceutical waste

- Pharmaceutical waste should be segregated from other wastes and the appropriate regulations by the responsible entity like National Medical Stores (NMS) should be followed for final disposal.
- Pharmaceutical wastes can be hazardous or non-hazardous, and liquid or solid, and each should be handled differently as guided by the responsible entity.

- Pharmaceutical waste with non-hazardous characteristics that can be stored in a non-hazardous storage area: Such waste includes;
 - ▶ Ampoules with non-hazardous content (e.g. vitamins)
 - ▶ Fluids with non-hazardous contents, such as vitamins, salts (sodium chloride), and amino salts
 - ▶ Solids or semi-solids, such as tablets, capsules, granules, powders for injection, mixtures, creams, lotions, gels, and suppositories
 - ▶ Aerosol cans, including propellant-driven sprays and inhalers.

4.4.4 Storage of chemical waste

- Characteristics like inflammability, corrosiveness, explosiveness of the different chemicals to be stored and disposed of must be considered.
- The storage place should be an enclosed and secured area and separated from other waste storage areas.
- When storing liquid chemicals, the storage should be equipped with a liquid- and chemical-proof sump.
- If no sump is present, catch-containers to collect leaked liquids should be placed under the storage containers.
- Spillage kits, protective equipment, and first aid equipment (e.g. eye showers) should be available in the central storage area.
- The storage area itself should have adequate lighting and good ventilation to prevent the accumulation of toxic fumes.
- Separate storage zones should be clearly labelled according to their hazard class to prevent dangerous chemical reactions.
- If more than one hazard class is defined for a specific waste, use the most hazardous classification.
- The hazardous classification shall include; Explosive waste, Corrosive acid waste, Corrosive alkali waste (bases), Toxic waste, Flammable waste, Oxidative waste, Halogenated solvents (containing chlorine, bromine, iodine, or fluorine).

4.4.5 Non-halogenated solvents

- Liquid and solid waste should be stored separately.
- The packaging used to store and transport chemical wastes offsite should also be labelled. This label should have the following information: hazard symbol(s), waste classification, date, and point of generation (if applicable).
- The storage area for explosive or highly flammable materials must be suitably ventilated above and below, with a bonded floor and constructed of materials suitable to withstand explosion or leakage.

4.4.6 Storage of radioactive waste

- Radioactive waste should be stored in containers that prevent dispersion of radiation, and stored behind lead shielding.
- Waste that is to be stored during radioactive decay should be labelled with the type of radionuclide, date, period of time before full decay, and details of required storage conditions.
- A minimum storage time of 10 half-life times for radioisotopes in wastes with a half-life of less than 90 days is the recommended practice.
- Infectious radioactive waste should be decontaminated before disposal.

- Sharp objects such as needles, Pasteur pipettes, and broken glass should be placed into a sharps container.
- Liquids associated with solid materials, such as assay tube contents, should be decanted or removed by decay time.
- All radioactive labelling should be removed on any items to be disposed of (once minimum storage time is complete and the waste is safe for disposal).

4.5 HCW COLLECTION (ON-SITE TRANSPORTATION)

4.5.1 Collection within the healthcare facility

- Collection times should be scheduled as appropriate to the quantity and quality of waste produced in each area within the healthcare facility.
 - As a minimum, waste should be collected from service points daily
 - For very busy service areas, collection of waste should be done more than once to match the rate of generation
- General waste should not be collected at the same time. Infectious waste should be collected first and then non-infectious waste last.
- Do not use the same trolley for collecting both infectious and non-infectious waste.
- Waste liners and sharps containers should be filled to no more than three quarters full. Once this level is reached, they should be sealed ready for collection.
- Plastic liners should never be stapled but may be tied or sealed with a plastic tag or tie.
- Replacement liners or containers should be available at each service area so that full ones can immediately be replaced.
- Waste liners and containers should be labelled with the date, type of waste and point of generation to allow them to be tracked through to disposal.
- Weight of waste collected should be routinely recorded in a waste tracking log.

The table below presents the summary of the recommended collection schedule for Healthcare waste.

Table 6. Collection schedule for Healthcare wastes

Waste categories	Collection Frequency
Infectious waste	When three-quarters filled or at least once a day
Sharp waste	When filled to the line or three-quarters filled
Pathological waste	When three-quarters filled or at least once a day
Chemical & pharmaceutical waste	On demand
Radioactive waste	On demand
Non-infectious waste	When three-quarters filled or at least once a day

4.5.2 HCW Collection at Community Level

- Community support structure should also follow the above guidance depending on the type of waste generated.
- Infectious waste collected should be taken to the supervising health facility by the CHW or attached health worker.
- Waste may also be collected by a licenced waste handler for disposal at a licenced site/facility.
- The officer in charge of Environmental Health shall supervise this waste collection process.

4.5.3 For Outreach activities

- Sufficient numbers of waste containers with appropriate liners should be prepared for the day
- Safety boxes should be placed into clearly marked waste bags and hermetically closed when $\frac{3}{4}$ full to avoid any leakage during transportation
- Waste segregation protocols should be followed as highlighted earlier on
- All waste generated should be collected and transported back to the supervising health facility. Appropriate packaging, transportation, storage, treatment and disposal protocols should be ensured.
- Empty vials should be put into clearly marked waste containers with appropriate liners to avoid leakage
- Care should be taken to ensure that waste containers are securely locked to prevent spillage during transportation.

4.6 ON-SITE STORAGE

The following guidelines should be adhered to in regard to waste storage at HCF:

- In each healthcare unit, a central area or facility shall be dedicated for storing HCW.
- The designated central storage facility shall be located within the HCF premises close to the waste treatment unit.
- The central store should be away from food storage or food preparation areas.
- The designated central storage facility should;
 - ▶ Be large enough to contain all the hazardous HCW produced by the healthcare facility for at least a week
 - ▶ Consideration should be made for spare capacity to cope with any maintenance or breakdown of the treatment facility.
 - ▶ Be totally enclosed and secured from unauthorized access
 - ▶ Be inaccessible to animals and birds.
 - ▶ Have an impermeable hard-standing base, good water supply, drainage for easy cleaning and disinfection.
 - ▶ Have adequate ventilation
 - ▶ Maintained clean and dry
- In all HCFs, separate central storage facilities shall be provided for hazardous HCW, except radioactive waste which shall be stored separately.
- The facility shall be clearly labelled "**Hazardous HCW storage**".

- A separate storage facility for non-infectious waste should be provided.
- Anatomical waste such as amputated limbs and extracted teeth, should be disposed of immediately into the placenta pit.
- No waste shall be stored for more than two days before being treated or disposed of.
 - ▶ In exceptional circumstances, appropriately packaged waste can be stored up to a maximum of one week.

Additional guidelines for infectious waste as stated in other National guidelines should be adhered to during disease outbreaks and emergencies.

Please Note:

1. All infectious waste (red bags) from isolation wards should be disposed of immediately.
2. Infectious waste should be stored for a minimum of 2 days if not treated & 1 week if treated.
3. Waste should be packaged securely enough to ensure containment & to prevent penetration by rodents and vermin.
4. Limited access to the storage area is recommended.
5. The universal biological hazard symbol should be posted on the storage area door, and waste containers.
6. Containers for bio-hazardous material should be a distinctive red colour

4.6.1 Storage of healthcare waste at community level

- A suitable area (secure, out of reach of children, away from other routine household activities, etc.) should be set aside for storage of infectious waste within the home.
- Siting of this area should be guided by the Officer in-charge of Environmental Health (Health Inspector/ Assistant).

4.6.2 Minimum Standards for Internal Handling

Once segregated and stored, waste needs to be transported from the point of generation to a central storage area within the HCF. This is known as internal handling.

- In larger healthcare facilities, a dedicated trolley must be used for internal waste transport.
 - ▶ The trolley must be designed so that any spills are contained.
- Healthcare waste must not be transported where clean linen and/or food are transported.
- All waste handlers must be provided with and use appropriate PPE including face masks, overalls, heavy-duty aprons and boots, heavy-duty gloves, and goggles.
- Interim storage areas at ward/department level should be secure and located away from public areas.
- Interim storage areas should be sufficient in size to allow for waste segregation to avoid waste of different classifications being stored together.
- Each healthcare waste-generating setting must implement a scheduled waste collection program specifying the responsible persons for collection and supervision.

4.7 ON-SITE TRANSPORTATION

- The on-site transport of waste should take place during off-peak times whenever possible.
- Designated on-site transport routes should be used to;

- ▶ Reduce exposure of staff and patients to infectious pathogens that may spill from waste being transported,
- ▶ Minimise the passage of hazardous waste through patient care and other clean areas.
- ▶ Depending on the design of the healthcare facility, the internal transport of waste should use separate floors, stairways or elevators as far as possible.
- ▶ Regular transport routes and collection times should be fixed and reliable.
- Hazardous and non-hazardous waste should always be transported separately.
- Staff aiding transporting waste should wear adequate personal protective equipment like gloves, strong and closed shoes, overalls and masks.
- Dedicated transportation vessels like trolleys, wheeled containers or carts should be used.
- These transportation vessels should meet the following specifications:
 - ▶ Easy to load and unload,
 - ▶ No sharp edges that could damage waste liners or containers during loading and unloading,
 - ▶ Easy to clean and disinfect and if enclosed, fitted with a drainage hole and plug,
 - ▶ Lined with impervious and durable materials,
 - ▶ Marked with **"fill limit"** indicators, to prevent toppling as a result of over-filling leading to possible breakage and/or spillage,
 - ▶ Be labelled and dedicated to a particular waste type,
 - ▶ Easy to push and pull,
 - ▶ Be properly maintained and replaced when necessary
- The waste segregation categorization should be maintained during on-site transportation.
- Infectious waste can be transported together with used sharps waste.
- The on-site transportation vessels should be cleaned and disinfected daily.
- Hazardous waste should never be transported by hand due to the risk of accident or injury from infectious material or incorrectly disposed sharps that may protrude from a container.
- Spare transport vessels should be available in case of breakdowns and maintenance.

NOTE:

Collection should start from the most hygienically sensitive medical areas (e.g. intensive care, dialysis, theatres) and follow a fixed route around other medical areas to interim storage locations.

4.8 OFF-SITE TRANSPORT, TREATMENT AND DISPOSAL

4.8.1 Off-Site Transport

The following guidance shall be followed during off-site transportation of HCW:

- Vehicles used for off-site transportation of waste must be licensed by the relevant authorities.
- The licence for transportation of waste should be maintained on the vehicle at all times.
- All waste transported on the vehicle must have an accompanying waste manifest/ transfer note
- Waste manifests should be kept on file for accountability
- Vehicles must not be used for any other purpose apart from transportation of healthcare waste

- Operators shall not transport any other commodities together with HCW
- Must be cleaned and disinfected after offloading waste
- Should follow a specified routing plan to the treatment and disposal site
- The transport vehicle loaded with waste should only be parked at designated secure parking points along the way to the disposal facility.
- Transportation of waste should follow a specified schedule
- Waste categorisation should be maintained during transportation
- Vehicles should have adequate supplies of plastic bags, Personal Protective Equipment, cleaning materials/ tools and disinfectants to support cleaning and disinfection in case of any spills.

4.8.1.2 Minimum requirements for off-site transportation vehicles

- Be fitted with a refrigeration system to keep waste at low temperatures to inhibit the proliferation of infectious agents
- Waste transportation vehicles should be properly labelled with "HAZARDOUS WASTE", the biohazard symbol and other relevant warning messages such as "Danger" and "Unauthorised persons keep away".
- Be built of an enclosed, leak-proof body
- Be secured with a lock system to secure the loaded waste
- Have clear signage visible at a distance of 100 metres, including hazard symbols and emergency contacts (as guided by the licensing bodies)
- Have spill kits for infection containment.
- Have movable ramps for ensuring safe access to the vehicle steps for loading the waste.
- Have storage bins, containment and holding bins (for larger vehicles)
- Drivers and operators of transporting vehicles should be trained on risks, regulations, safe handling methods, labelling, documentation and emergency procedures, consignment systems,
- Be appropriately sized according to the volumes of waste generated at a Healthcare facility

NOTE:

A licensed waste service provider shall collect waste from designated areas of operation and deliver such waste to designated treatment and disposal sites at all times.

4.8.2 TREATMENT

- All waste should be treated on site where a high temperature dual chamber incinerator (**800°C – 1000°C for the primary chamber and 1100°C** for the secondary chamber) is available.
- In the absence of onsite technologies, off-site transportation to a central treatment facility (meeting the above temperature specifications) should be considered.
- Where applicable, non-burn technologies such as HCW autoclave and microwave should be prioritised

NOTE:

1. All personnel handling waste should be trained and equipped with appropriate Personal Protective Equipment (PPE) such as scrubs, gumboots, heavy-duty gloves, disposable coveralls, heavy-duty aprons, nose masks and goggles.
2. All service points shall be labelled with appropriate signage and Information Education and Communication (IEC) messages in relevant language for appropriate risk communication.

4.8.2.1 Healthcare Waste treatment options

4.8.2.1.1 Treatment of non-infectious waste

Non-hazardous waste should be repurposed, recycled or disposed of in a municipal landfill.

- Composting is recommended for biodegradable wastes including; food waste, vegetation waste. For composition in a healthcare setting, a suitable location should be selected for the purpose.
- Food wastes and other biodegradable wastes should be collected separately for composting and re-use.
- Recyclable waste such as plastics, metal, paper among others should be securely packaged for subsequent recycling or disposal in a sanitary landfill.
- Landfilling: Make reference to the NEMA Landfill guidelines <https://www.nema.go.ug/en/wp-content/uploads/2025/01/Guidelines-for-the-Management-of-Landfills-in-Uganda-December-2020-PDF.pdf>

4.8.2.1.2 Treatment of infectious and sharp waste

- Decontamination by autoclaving and then disposed as general non-hazardous waste on a landfill.
- Incineration in a high temperature incinerator- the ash is disposed in a hazardous waste landfill or an ash pit.

NOTE:

Hazardous healthcare waste should never be transported to a normal municipal landfill without pre-treatment which decontaminate and eliminate the risk of the waste.

4.8.2.1.3 Alternative non-incineration treatment (steam-based technologies) for infectious waste

- Steam-based treatment technologies can be used to disinfect/sterilize infectious waste, and sharp waste.
- They subject such waste to moist heat and steam for a defined period of time, depending on the size of the load and the content.
- The combined action of saturated steam and heat kills microorganisms.
- For full decontamination of the infectious material, the process must be validated and regular biological, chemical and physical testing done.
- Steam treatment technologies should be operated under reliable and stable electricity connection (220 V/380 V).
- Some of such technologies require water of specific quality and/or specific bags or containers. Offensive odours can be generated if there is a large amount of organic matter in the waste.
- The location of the treatment and/or ventilation options should be considered.
- Shredders and mixers can be used to improve the rate of heat transfer and expose more surface area of waste for treatment.

1. Autoclaving

- The most common type of steam treatment to decontaminate waste at temperature of 121°C to 134°C.

2. Microwave

- Microwaving technology heats the water contained in the waste by microwave energy.
- Some microwave-based devices include transformation systems like blending or shredding.
- Waste is exposed to steam and heated to 100°C by microwave generators.

4.8.2.1.4 Decay of low radioactive waste

- Low-level radioactive waste should be stored for decay in compliance with national regulations including NEMA and the Atomic Energy Council.
- It should be placed in containers that prevent dispersion of radiation and stored behind lead shielding.
- Waste that is to be stored during radioactive decay should be labelled with the type of radionuclide, date, period of time before full decay and details of required storage conditions.
- After decay the waste can be disposed as non-hazardous general waste.
- The treatment and disposal of radioactive waste depends on the level of radioactivity
- Low level radioactive waste and wastewater can be decayed and then disposed as general non-hazardous waste.
- Other radioactive waste needs special safe disposal as guided by the relevant authority including NEMA and Atomic Energy Council.

4.8.2.1.5 Treatment and disposal of Chemical waste

- Dilute waste based on the risk assessment of the substance and dispose in the sewage system
- Treat in a central high-temperature incinerator
- Stabilise and landfill

4.8.2.1.6 Expired or unused pharmaceuticals

Different treatment and disposal options are available. However, the waste should be:

- Taken back by suppliers (National Medical Stores or Joint Medical Stores) for centralized treatment and disposal
- Taken back by the manufacturers or other supplying agencies
- Treated in central high-temperature fit-for-purpose incinerator with a pollution reduction system.
- Ash from incineration should be disposed of in sites designed for hazardous wastes, e.g. designated cells at engineered landfills, encapsulated and placed in specialised monofil sites or disposed in an ash pit.

4.9 DISPOSAL OF HCW

- Pathological waste from activities such as safe male circumcision, amputations, placentas should be disposed of in the placenta pit
- Blood bank waste (waste blood bags) treatment and disposal
- Waste blood may be treated by incineration, autoclaving, chemical disinfection, stabilisation and then landfilling

5.0 HCWM DURING PUBLIC HEALTH EMERGENCIES

This guidance applies to waste generated from healthcare operations involving suspected or confirmed notifiable diseases in settings such as, treatment and testing, isolation centres, and quarantine sites.

5.1 Treatment centre

- This is a specially designated autonomous inpatient facility either within or outside the HCF equipped and staffed to handle outbreaks, epidemics and other serious public health threats.
- A treatment centre has its own general services (latrine, showers, kitchen, laundry, mortuary and temporary storage area) stocks and resources (medical and logistics, water and electricity) operating twenty-four (24) hours a day.

5.2 Testing Centre

- Is a health facility that offers diagnostic testing services combined with counselling, ensuring informed consent, confidentiality, and proper linkage to care.
 - ▶ Isolation centre
 - ▶ Quarantine site

5.3 Segregation

- All waste generated under care of suspected or confirmed notifiable disease patients are considered infectious and they should be put into the "red" bin.
- Within the clinical area, the waste bins should be placed in a suitable designated area within each room
- Waste bins in the clinical areas should be pedal-operated.
- Waste bins in the doffing areas should be large capacity (recommended 240 litres) and bins left open to minimise contact.
- Sharps waste should be put placed in an impervious puncture-proof safety box
- A safety box should be placed at each service care point for prompt disposal of sharps
- Vials and ampules should be put in a separate infectious "red" bin as these are incinerated at higher temperatures.

5.4 Collection and packaging

- Collection of waste at a minimum should be done daily from all service points.
- Bins liners should be three-quarters full to allow proper tying during collection.
- Where generation rates are higher, more frequent collection should be done.
- Collection times should be scheduled preferably at off-peak hours
- All packaging should be labelled with the biohazard symbol

5.5 On-site Transportation

- Vessels such as trolleys, large size bins should be used for transportation of waste to the central store
- These vessels should be cleaned and disinfected after emptying.

5.6 Storage (Waste management area)

- A dedicated store of adequate capacity should be provided for waste generated
- The waste management area should be double-fenced to isolate it from other facilities
- Should be secured to avoid patients, other users or animals from accessing it.
- The waste store should be climate-proofed (protected from rain, high temperatures) and of an impermeable surface to avoid leakage to the environment.
- Provision should be made for drainage in the store to allow cleaning
- All waste bins should be cleaned and disinfected and turned over to dry at the disinfection site within the waste management area. The store should be regularly cleaned after emptying waste for on-site treatment or off-site transportation.

5.7 Off-site transportation

- Frequency of off-site transportation should match the generation rates.
- As a minimum, waste should be transported to the incinerator site daily to avoid nuisances.
- The minimum requirements for vehicles as mentioned earlier should apply to off-site transportation of waste during public health emergencies.
- Pathological waste from activities such as safe male circumcision, amputations, placentas should be disposed of in the placenta pit
- Blood bank waste (waste blood bags) may be treated by incineration, autoclaving, chemical disinfection, stabilisation and then landfilling in appropriate sanitary facilities

6.0 CROSS-BORDER TRANSPORTATION OF HEALTHCARE WASTES

The above guidelines on off-site transportation apply to cross border transport of HCW. In addition;

- All cross-border transportation vehicles must be licenced by the relevant authorities of the country of origin, each country to be traversed and the country of destination.
- The wastes must be accompanied with a waste manifest/ transfer form
- Hazardous waste (HCW) shall not be transported on water except for waste generated on islands or from operations/outreaches on water bodies
- Additional guidance should be sought from licencing and regulatory authorities like the National Environment Management Authority (NEMA) Act cap 181 and the Ministry of Health.

7.0 MANAGEMENT OF WASTE FROM OTHER HEALTHCARE WASTE GENERATING SETTINGS

7.1 Veterinary clinics and laboratories

- Services offered in veterinary clinics and laboratories generate both infectious and non-infectious wastes. Management of such wastes should follow the clear guidance as stipulated for appropriate segregation, collection, transportation, treatment and disposal in the relevant section above.
- Public veterinary clinics and laboratories should ensure close collaboration with the public healthcare facilities within their catchment for utilization of regional HCWM services.
- Private veterinary clinics and laboratories should utilise the services of licenced private HCWM operators within the areas of catchment.

7.2 Research and training laboratories

- Research and training laboratories often generated infectious wastes during their operations and thus their effective management is a critical aspect.
- Therefore, the laboratory management and personnel in charge should adhere to the waste management guidance provided in all the sections above.

7.3 Hospitality and recreation centres

- These settings including lodging houses, hotels, bars and nightclubs often generate infectious waste such as used condoms.
- The appropriate color coded bins with matching liners as guided in section above should be provided. These shall be supervised by the officer in charge of Environmental Health.
- Care should be taken not to collect these wastes together with domestic wastes.

7.4 Traditional and complementary medicine

- All sites where traditional and complementary medicine is practiced, shall abide by the laid-out guidance for healthcare settings (segregation, packaging, collection, storage, transportation, treatment and disposal).
- Examples of such settings include those where these services; acupuncture, homeopathy, naturopathy, oriental/Chinese medicine, chiropractic or osteopathic medicine, massage, body movement therapies, dietary supplements, herbal medicine, electromagnetic therapy are offered.

8.0 ON-SITE HEALTHCARE TREATMENT AND DISPOSAL

The following considerations should be made while siting a HCW treatment facility:

- Must be located away from the food preparation areas, patient rooms, laboratories, hospital function/operation rooms or any public access areas. This is important to avoid nuisances such as odour, noise, the unsightliness of waste handling operations.
- Safe waste transfer routes must be provided from the storage area to the treatment facility
- The site should be in a secured area for limited access to unauthorized personnel including animals and birds.
- Consider the proximity of the treatment facility to the temporary or central storage area
- Be strategically placed so as not to cause traffic problems in the entry and exit of vehicles
- Consider the volume of waste generated by the HCF when it comes to the size of the treatment facility
- Be protected from rain, strong winds, floods, etc.
- Have elevated, concrete finish flooring and with waterproofing, adequately sloped for easy cleaning
- Have a good drainage system and connected to a Wastewater Treatment Plant (WWTP).
- Have continuous water supply for cleaning purposes.
- Have adequate ventilation and lighting
- Have adequate cleaning implements (e.g., hose with spray nozzle, scrubber with long handle, disinfectant, protective clothing, waste bags or bins) and fire-fighting equipment/devices located conveniently close to the storage area.
- Have space allowances needed by workers to manoeuvre safely around the treatment facility.
- Have floors, walls, and ceilings that are maintained clean at all times.
- Have a warning sign posted in a strategic place: **"CAUTION: TREATMENT AREA: UNAUTHORISED PERSONS KEEP OUT"**.

8.1 Operators' cloakroom

Should be provided for safe keeping of the operators' clothes away from the contaminated area.

- Should be provided with a first aid kit
- Appropriate space or shelves for storage of PPE
- Emergency contacts should be displayed on site in the waste management area
- Warning signs should be displayed

The following table presents a summary of the different treatment and disposal options for each waste category.

Table 7. Overview of treatment and disposal options for different waste categories

Waste Categories	Treatment Options				Disposal Options			
	Recycling	Incineration	Alternative treatment (autoclave)	Decay	Landfill for Hazardous waste	Landfill for Non-hazardous waste	Disposal Pit	Deep geological disposal
Non-infectious waste	X	X				X		
Infectious Waste		X	X		X			
Sharps Waste		X	X		X			
Anatomical Waste		X					X	
Pharmaceutical waste		X (High temperature)			X			X
Chemical waste		X (High temperature)						X
Low level Radioactive waste				X				X

9.0 HEALTHCARE WASTE DISPOSAL OPTIONS

9.1 Landfilling

- a) These should provide geological isolation of wastes from the environment.
- b) Appropriate engineering preparations should be conducted before the site is ready to accept wastes.
- c) Trained staff should be present on site ensure daily organized operations for treatment and disposal of waste.
- d) No contamination of soil and of surface water and groundwater, or any form of pollution, smells, and direct contact with the public should be registered.
- e) Access to the site, designated working areas and arranged for waste delivery should be controlled
- f) The site should be divided into manageable phases of operation, each appropriately prepared before landfilling starts in each phase.
- g) Adequate sealing of the base and sides of the site should be ensured to minimize the movement of wastewater (leachate) off the site
- h) Adequate mechanisms for leachate collection and where necessary treatment systems to reduce the pollution potential before discharging off site must be provided.
- i) Organized deposit of wastes in small working areas, which allow waste to be spread, compacted and covered daily should be provided.
- j) Surface waste drainage trenches around site boundaries must be provided.
- k) Placement of final cover to minimize rainwater infiltration

9.1.2 Disposal Pits for pathological waste (Placenta Pits)

9.1.2.1 Recommendations on the use the Placenta pit

- a) Only anatomical pathological healthcare waste should be buried.
- b) As the waste decomposes, 2 years should be allowed to pass before reopening.
- c) The pit should be closed off with a concrete slab to reduce the risks of attracting vectors such as flies, mosquitoes and rodents.
- d) It is essential that the organic waste be covered with the lid immediately after disposal to avoid attracting insects and rodents.
- e) In the very early stages of an emergency, the slab can still be made of wood, but it has to be replaced rapidly by a concrete model.
- f) Only use the pit to dispose of pathological and biodegradable organic waste.
- g) Do not use the pit for soft waste (e.g. bandages), sharps or toxic waste.
- h) Do not treat the waste with chemical disinfectants such as chlorine before disposal. These chemicals destroy the microorganisms that are important for biological decomposition
- i) Dispose of organics in the pit as soon as they arrive.
- j) Keep the cover over the hole at all times except when putting waste into the pit.

- k) Clean and disinfect the slab regularly. Non-persistent disinfectants such as hydrogen peroxide are recommended.
- l) Do not add disinfectants to the pit.
- m) Ash, charcoal or lime may also be added to reduce odors without adversely affecting decomposition.
- n) Lime has a high pH (about 11) so will kill a lot of pathogens, but beware that it may also kill bacteria needed for rapid and complete decomposition.
- o) When the level of the waste reaches 0.5 m from the surface, the pit should be closed down.
- p) Mark it permanently to explain the contents and the closure date.
- q) Record the location for future reference.
- r) It should be possible to reuse the pit after enough time has elapsed.
- s) The rate of decomposition depends on several factors, including the microbial and chemical conditions, temperature and humidity.
- t) If it is necessary to remove material from an old pit: Leave at least 2 years after the closure of the pit to maximise the elimination of pathogens and their eggs or cysts;
- u) If possible, test the material to be sure it is not infectious;
- v) Provide workers with PPE (mask, goggles, boots, gloves, overalls);
- w) Limit the use of any extracted material as a fertilizer; do not use for food growing or outside the hospital premises.

9.1.3 Placenta pits, their volumes and number of placentas for disposal

Table 8. Number of placentas per day that can be put in pits of different volumes

Diameter (m)	Radius (m)	Area (m ²)	Total Depth (m)	Usable depth (m)	Volume (m ³)	No. of placenta per year	Deliveries per day
1	0.5	0.8	1.5	1	0.8	786	2
1	0.5	0.8	2.5	2	1.6	1571	4
1	0.5	0.8	3.5	3	2.4	2357	6
1	0.5	0.8	4.5	4	3.1	3142	9
1	0.5	0.8	5.5	5	3.9	3928	11

- This table is based on a one-meter diameter pit and ignores the leaching of liquid.
- As a rule of thumb, two pits each with capacity for one year should be adequate for any facility.

Adapted from Doc 575: Technical Specifications: Placenta Pit – Médecins Sans Frontières,

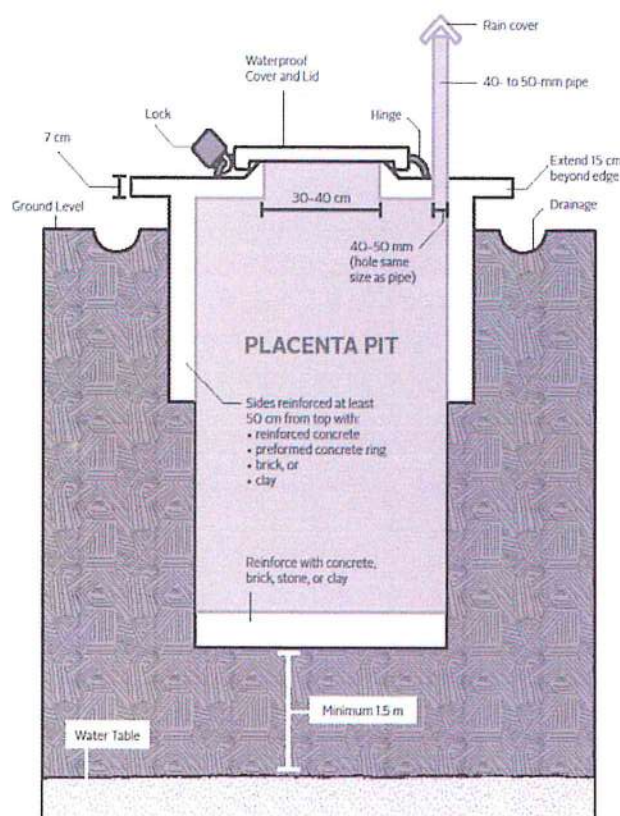


Figure 8.5: Placenta Pit

(Source: Médecins Sans Frontières)

9.2. Incineration

9.2.1 Basic facts about incineration

- Incineration is a high-temperature and dry oxidation process.
- It reduces organic and combustible waste to inorganic, incombustible matter and results in a significant reduction of waste volume and weight.
- High-heat thermal processes take place at temperatures from about 850°C to more than 1000°C.
- Chemical and physical breakdown of organic material through the processes of combustion, pyrolysis or gasification are involved.
- Combustion by-products and residual ash are often released into the atmosphere.
- The combustion of Healthcare waste produces mainly gaseous emissions, including steam, carbon dioxide, nitrogen oxides, a range of volatile substances (e.g. metals, halogenic acids, products of incomplete combustion) and particulate matter, plus solid residues in the form of ashes.
- Gases are ventilated through the incinerator stacks, and the residue or ash is disposed of in a sanitary landfill or an ash-pit.
- Properly designed, maintained, and operated incinerators are effective in killing organisms present in infectious waste.

9.2.2 Guidance for Incineration

- Incineration should be used for safe and effective disposal of pathological wastes such as tissues and body parts.
- Incineration should be used to render contaminated sharps unusable.
- Variations in waste composition, the waste feed rate, and the combustion temperature should be considered to maintain efficiency of incinerating infectious wastes.
- Infectious wastes containing drugs should be disposed of in an incinerator that provides high temperatures and enough time for the complete destruction of these compounds.
- The incinerator's effectiveness in treating/destroying chemical wastes should be documented/assessed before use, if applicable.
- Persons involved in Incineration must wear protective clothing and should be trained in handling techniques to minimize personal exposure to hazards from infectious wastes.

9.2.3 Prohibited materials

The following materials shall not be burned or incinerated due to the toxic emissions they produce:

- ▶ Radioactive waste
- ▶ Pressurized glass containers
- ▶ Wastes containing mercury (e.g. batteries, sphygmomanometers, thermometers); Cadmium and other heavy metals
- ▶ Halogenated materials (Poly Vinyl Chlorinated-PVC plastics)
- ▶ Chemical wastes (such as reactive, aldehydes)
- ▶ Photographic and x-ray materials
- ▶ Aerosol cans or sealed vials.

9.2.4 Community safety

All incinerators or burning areas must be:

- ▶ Fenced to prevent access by the community or animals.
- ▶ They should be located away from households and crops.

9.2.5 Maintenance and repair

- All incinerators should be inspected and maintained by a qualified person on a regular basis.
- All incineration equipment requires regular service and preventative maintenance.
- Unscheduled maintenance is also required in the event of failures.
- A service schedule should be established
- A well-trained and qualified technician should regularly visit incineration sites to inspect and service the equipment.
- During site visits, task performed and consumables or spare parts used should be recorded.
- Consumables should also be stocked as part of a routine service program.
- Operator logs should be maintained and kept up to date.
- Information recorded in operator logs should include waste deposited and source, waste destroyed, fuel consumed, equipment defects, and service and maintenance history.

- Construction of incinerators should be done using detailed engineering plans and materials to minimize flaws that may lead to incomplete destruction of waste and premature failures of the incinerator.

9.2.6 Guidance on Installation of incinerators

Special considerations should be made for;

- ▶ Site preparation,
- ▶ Equipment installation
- ▶ Commissioning
- ▶ Service and operating instructions provided by the manufacturer
- ▶ Assured manufacturer support, metal works (fuel tank, filter and supply lines, electrical power supply, etc.)
- ▶ Civil works (foundations, pits, water supply and run off for rinsing reusable recipients).
- ▶ Security and the safety of the installation need.

Additional information can be accessed from the incinerator guidebook, *A practical guide for selecting, purchasing, installing, operating, and maintaining small-scale incinerators in low-resource settings, Version 1, March 2010*

9.2.7 Protective enclosure of the Incinerator

- Incinerators should be installed in a protective enclosure or suitably ventilated building to prevent access by unauthorized persons and to protect the incineration equipment.

9.2.8 Protective enclosure or building

This should ensure that:

- ▶ The incinerator and other materials stored inside are protected from rain and UV radiation from direct sunlight.
- ▶ The incinerator is well ventilated and the stack emissions are clear of the building or enclosure so that the operator is not exposed to fumes when the incinerator is in use.
- ▶ The enclosure is robust and corrosion resistant, and its design-life is at least equivalent to the expected life of the incinerator.
- ▶ The enclosure or building can be securely locked against unauthorized entry.
- ▶ There is space within the enclosure to store the operator's protective clothing, tools, and equipment required to operate the system.
- ▶ There should also be sufficient space to conveniently store waste to be destroyed, as well as load and operate the incinerator.
- ▶ There is provision for an emergency exit should there be a fire or other emergency at the facility.
- ▶ There is storage space for solid fuels or a storage reservoir for fuel. This is best located within the incinerator enclosure to ensure adequate security.
- ▶ The enclosure has a provision for waste to be deposited without allowing the waste handler, to enter the enclosure or building.

9.2.9 Operational requirements of the Incinerator-Ash Pit

- The ash pit should have sufficient capacity to store ash for a period of at least 5 years.

Essential features of an ash pit include:

- ▶ The pit should be positioned above any shallow aquifer.
- ▶ The pit should be positioned to prevent risk of flooding.
- ▶ The pit should be constructed of concrete, concrete blocks, or brick, with a water-resistant floor to ensure the pit will not collapse.
- ▶ The pit should have a provision to deposit ash or other authorized wastes (i.e., needle containers), without a risk to the waste handler.
- ▶ There should be provisional access to the pit for purposes of levelling or removal of accumulated waste and subsequent transfer to a municipal landfill.
- ▶ The pit should be protected from access by unauthorized persons.
- ▶ The pit should be in the immediate proximity of the incinerator to ensure convenient transfer of ash.



Figure 3: STRUCTURE OF AN INCINERATOR

PICTURE OF A HIGH THERMAL INCINERATOR, (Source: Ministry of Health)



9.2.9.1 Fuel storage

- All incinerators require fuel either to preheat (in the case of auto-combustion Incinerators) or to assist throughout the incineration process (in the case of fuel-assisted incinerators).
- Safe and secure storage of incinerator fuel is imperative.
- There should be adequate space to safely store dry solid fuel (wood, coconut husks, charcoal, etc.) sufficient for at least one week of operation of the incinerator at auto-combustion sites.
- A storage reservoir, fuel filter, and shutoff tap or valve should be positioned within the enclosure or building to ensure the fuel supply is not exposed to excessive heat from the incinerator.
- It should be mounted at an appropriate level to ensure a gravity supply of fuel and deter access by unauthorized persons.
- Any storage reservoir should be large enough to store fuel for 3 times the period between normal waste deliveries.

9.2.9.2 Water supply

- The incinerator should have a reliable, constant and adequate water supply to support the cleaning processes.
- Access to piped water supply system is recommended with a back-up such as a motorized water system, rain water harvesting among others.

9.2.9.3 Glass disposal

- Glass wastes should not be incinerated.
- Glass vials deposited in incinerators tend to clog grates and causes explosions when unopened.
- A glass crusher with a provision for crushed glass (to be heated and sterilized) should be the considered option.
- Provide space within the enclosure or building for equipment to crush glass syringes and vials.
- 9.2.9.4 Operational guidance

For safe and optimal performance, the incinerator should be operated correctly for minimal emissions and effective waste treatment.

- i. Ensure that incinerator operators are adequately trained to ensure the following key steps;
- ii. Wear personal protective equipment - helmet, goggles, respirator, overcoat/overalls, heavy-duty gloves, apron, and boots.
- iii. Ensure fuel is available for operating the incinerator and that the waste to be incinerated is dry.
- iv. Record the number of safety boxes and bags to be burned.
- v. Clean the incinerator.
- vi. Remove the ash and deposit it safely in the ash pit.
- vii. Place the grate/tray back in the incinerator.
- viii. Preheat the incinerator.
- ix. Place firewood or other material in the incinerator.
- x. Light the wood or other material.
- xi. After 5 minutes of a steady burn, add more wood.

- xii. Continue this process every 5 minutes for 20 minutes total (4 cycles).
- xiii. Load and burn the waste.
- xiv. Load 1 safety box every 8–10 minutes.
- xv. Alternate loading bags of waste with loading safety boxes.
- xvi. If the temperature drops, load combustible material such as paper.
- xvii. If you see smoke the temperature is too low
- xviii. If the temperature gets too high, add a bag of waste.
- xix. If you see fire in the chimney the temperature is too high.
- xx. Burn down the waste.
- xxi. Load the last safety box.
- xxii. Wait 10 minutes and add firewood to maintain the fire and ensure the waste is completely burned. This may take up to 30 minutes.
- xxiii. When the waste is completely burned, allow the fire to die out.
- xxiv. Do not leave the incinerator until the fire has burned down to embers

PLEASE NOTE:

- Keep the primary chamber as full as possible.
- Very wet loads should be separated with drier material
- In extreme cases supplement wet loads by an extra increment of diesel/kerosene.
- Let one box burn almost completely before adding the next.
- The time can be gauged by noting when the smoke level decreases.
- If the flame appears to be burning less fiercely, poke out any blockage in the transfer flue between the two chambers.
- The operator must wear protective equipment like a face mask/eye protection at all times.

Note:

1. When the loading door is opened, combustible gases may come into contact with air and burn suddenly and fiercely.
2. When the loading door is closed suddenly more burning gases may come through the air holes-the operator should load from the side.

10.0 MANAGEMENT OF WASTEWATER FROM HEALTHCARE FACILITIES

- Healthcare wastewater is any water that has been adversely affected in quality during the provision of healthcare services.
- It is mainly liquid waste, containing some solids produced by humans (staff and patients) or during Healthcare-related processes, including cooking, cleaning and laundry.

10.1 Categories of Healthcare wastewater

- **Blackwater** (sewage) is heavily polluted wastewater that contains high concentrations of faecal matter and urine;
- **Greywater** (silage) contains more dilute residues from washing, bathing, laboratory processes, laundry and technical processes such as cooling water or the rinsing of X-ray films;
- **Storm water** is technically not a wastewater itself, but represents the rainfall collected on hospital roofs, grounds, yards and paved surfaces.

This may be lost to drains and watercourses and as groundwater recharge, or used for irrigating hospital grounds, toilet flushing and other general washing purposes.

10.2 Sources of healthcare wastewater

These include; Administration, Wards, Kitchen, Laundry, Operating rooms and ICU, Laboratories, Radiology, Haemodialysis, Dental departments, Toilets, Engineering and maintenance department, Runoff from paved areas

10.3 Hazards of wastewater from Healthcare Facilities

- Wastewater from Healthcare facilities must be considered to be potentially infectious and precautions must be taken.
- Depending on the service level and tasks of the Healthcare facility, the wastewater might contain:
 - Chemicals including;
 - ▶ Anaesthetics
 - ▶ Disinfectants (formaldehyde, glutaraldehyde)
 - ▶ Chemicals from laboratory activities
 - ▶ Photochemical solutions (hydroquinone), and
 - ▶ X-ray contrast media containing absorbable organohalogen compounds (AOX)
 - Mercury from dental amalgams or laboratory chemicals;
 - Excessive nutrients and nitrates;
 - Pharmaceuticals, including antibiotics
 - Radioactive wastes
 - Infectious agents, including bacteria, viruses and parasites.

NOTE:

Where sewers of Healthcare facilities are not watertight, a significant part of the wastewater may leak into the groundwater.

10.4 Health and environmental implications of improper management of healthcare wastewater

- Leaked pharmaceuticals in water may act as endocrine disruptors;
- Leaked antibiotics could result in antibiotic-resistant pathogens;
- Leaked Mercury and heavy metals could cause poisoning;
- Water-borne disease outbreaks in communities like Campylobacteriosis, cholera, Hepatitis A and E, schistosomiasis, and typhoid fever;
- Numerous vector-borne diseases (e.g. malaria and filariasis) by providing breeding places for the vectors, and favours the spread of parasites (e.g. roundworms or *Ascaris lumbricoides*).
- Excessive nutrients leakage can cause biological degradation in groundwater, lakes and rivers by using up oxygen (eutrophication) resulting in algal blooms and biotoxins;

10.5 Collection of Liquid Healthcare Waste

- Segregation, minimization and safe storage of hazardous materials are just as important for liquid wastes as they are for solid wastes.

10.6 Recommended collection method

- "Central system" of sewage pipes bringing wastewater from throughout the facility to a central underground location for treatment or disposal;

10.7 Recommended set-up for management of wastewater from healthcare facilities

- Construction of two separate collection systems
- Sewerage system for wastewater (sanitary sewers)
- Storm water system for rainwater (storm water sewers), which can be used for gardens, toilet flushing or washing of paved areas
- Manholes to allow access for maintenance every 50 meters or less
- Watertight sewerage pipes and manholes
- Pre-treatment to reduce or eliminate contaminants in non-domestic wastewater, or in altering its nature before discharging it into the sewer.

10.8 Pre-treatment of Liquid Healthcare Waste

- A strict limit on the discharge of hazardous liquids to sewers is the basic principle of effective wastewater management.
- Chemical and pharmaceutical wastes like photographic chemicals, aldehydes, colorants and antibiotics should not be discharged directly into the sewer drains.

10.9 Recommended pre-treatment methods of hazardous liquids from healthcare facilities

Table 9. Pre-treatment of liquid healthcare waste

Department from which Wastewater is generated	Recommended pre-treatment method
Dental department	- Install pre-encapsulated amalgam separators in sinks, especially by patient treatment chairs. - Ensure safe storage of waste generated.
Radiotherapy department	- Ensure proper collection of radioactive wastewaters (e.g. urine of patients from the thyroid treatment), - Adequately store collected waste for decay in a secured die-away basin until background concentrations have decreased, - After the required storage time, properly disposed of the wastewater in the sewer system.
Kitchen	- Install a grease trap to remove grease, oil and other floating materials from kitchen wastewater. - Remove the trap and collected grease every 2–4 weeks.
Medical laboratory	- Use Acid-base neutralization, filtration and sedimentation, or autoclaving - Or waste water should be collected separately, mixed with an absorbent (e.g., saw dust), and immobilized or encapsulated (Minimum approach)
Outbreaks/Emergencies (Faeces, vomit or urine)	- Decontaminate with lime milk (hydrated calcium oxide or calcium hydroxide): - Use a ratio of 1:2 for stool and vomit with lime for 6 hours minimum; Ratio of 1:1 for urine with lime for 2 hours' minimum - Or should be thermally treated (e.g. in a waste treatment autoclave) and then discharged via the drain (Minimum approach)
Blood	- Blood can be discharged in the sewer (using PPE to protect from blood splatter) if a risk assessment shows that the organic loading does not require pre-treatment. - Otherwise, blood can be pre-treated by a thermal method or disposed directly into a septic tank if safety measures are used. Note: 5% hypochlorite is not effective for high organic loads like blood
Note: Chemicals such as syrups, vitamins, or eye drops, small quantities of blood and rinsing liquids from surgical theaters can be discharged in the sewer system without pre-treatment	

10.9.1 Onsite Wastewater Treatment

- Large Healthcare facilities that are not connected to any municipal treatment plant, may operate their own wastewater-treatment works.
- These treatment works should produce a treated effluent that is suitable for reuse or discharge back into the environment, usually surface watercourses.
- Wastewater treatment involves three stages; Primary, Secondary and Tertiary. Refer to;

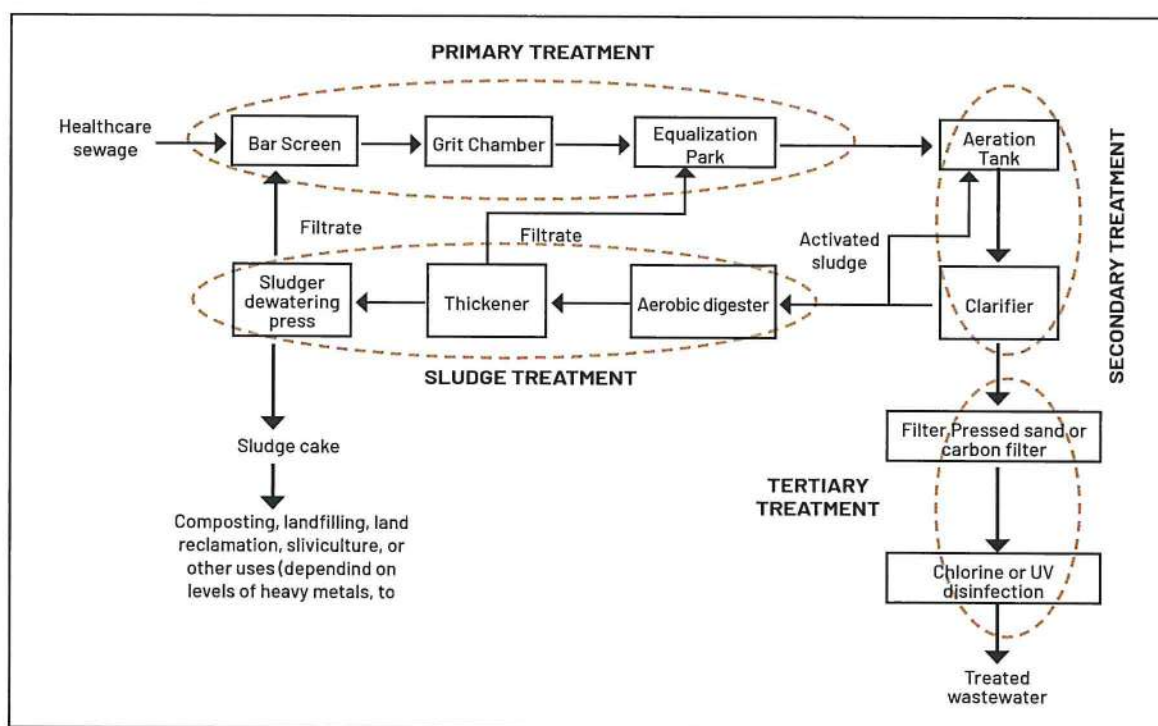


Figure . Illustration of On-site Wastewater Treatment for a Referral Hospital

10.9.2 Disposal of sludge

Onsite treatment of hospital sewage produces a sludge that contains high concentrations of helminths and other pathogens, and should be treated before disposal.

The recommended treatment options include:

- 1) **Anaerobic digestion** (a bacterial process that is carried out in the absence of oxygen and is mainly used for large-scale plants).
- 2) **Aerobic digestion** (a bacterial process that is carried out in the presence of oxygen and is mainly used for large-scale plants).
- 3) **Composting** (Sludge is mixed with a carbon source such as sawdust, straw or wood chips. In the presence of oxygen, bacteria digest the sludge and the carbon source, and create heat that will pasteurize the sludge).
- 4) **Reed beds** (Here sludge is applied on a horizontal system – flow reed bed.

One part of the water is absorbed by the reeds, which then transpire moisture into the air; the other part is returned to the wastewater treatment plant through a drainage layer in the bottom of the reed bed.

10.9.3 Decentralized septic tank system

- This is the minimum treatment method for wastewater.
- It is a watertight receptacle for the separation of solid and liquid components of wastewater and for the digestion of organic matter in an anaerobic environment.
- A septic tank also takes on the functions of storing solids and allowing clarified liquid to outflow for further treatment or discharge.
- The capacity of the septic tank should be equivalent to a total of two days' wastewater flow. If a two-chamber system is used, the first chamber should be two thirds of the total capacity.
- Access holes, inspection ports and ventilation should be installed in every chamber.
- Solid matter (sludge, scum) from septic tanks must be removed when the chambers are half filled with sludge.
- If the level of solid matter cannot be controlled, it should ideally be removed once every two years.

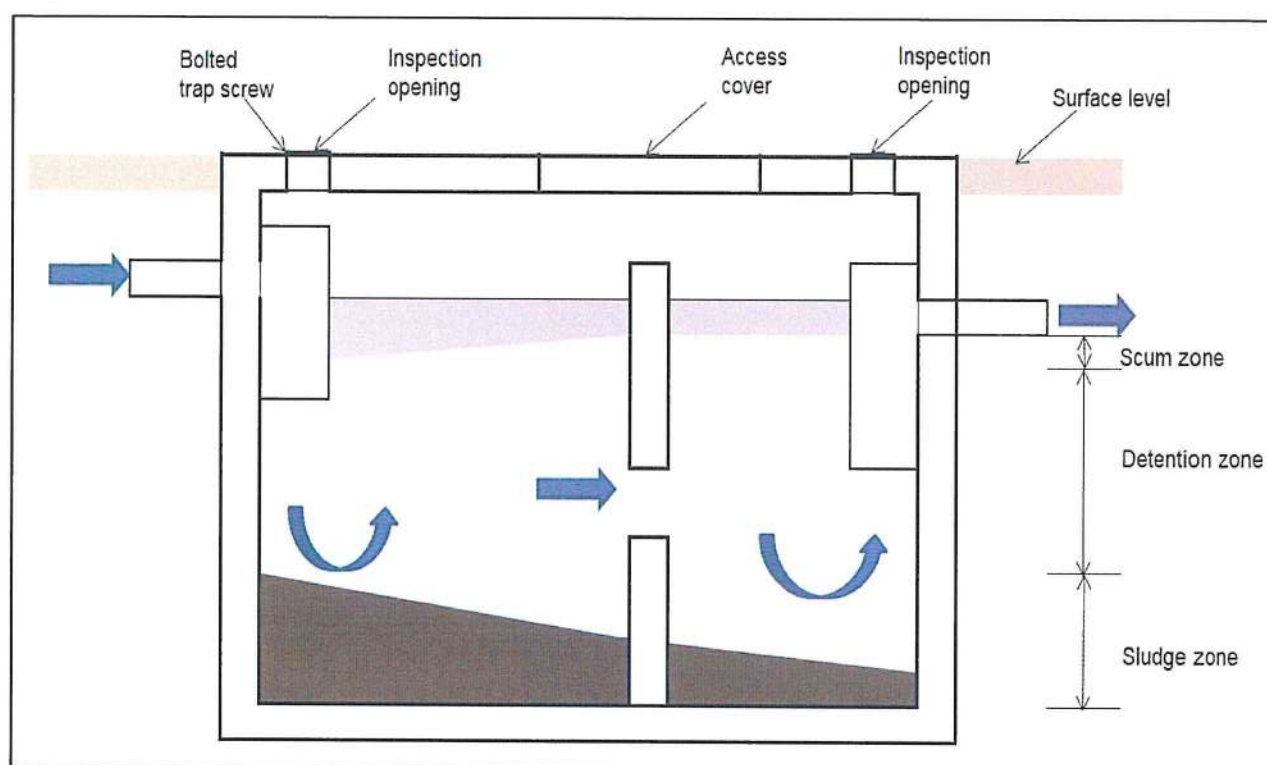


Figure 4:Decentralized septic tank system

Figure . Illustration of a two Chamber Septic Tank (Source: Safe management of wastes from Healthcare activities –WHO Second Edition)

10.9.4 Soakaway pits and leach fields

- A soakaway pit should have one or more tanks, with the total volume equal to the wastewater-treatment plant.
- Effluents from the treatment plant should be collected and allowed to infiltrate into the ground.
- The pit may be filled with stones, broken bricks or similar material or may be lined with open-jointed masonry.
- The top 0.5 m of the pit should be lined solidly, to provide firm support for a reinforced concrete cover and sealed with cement mortar to prevent the infiltration of rainwater.
- Planting trees adjacent to or over a soakaway can improve liquid removal through transpiration and increased soil permeability.
- The size of the soak pit depends on the volume of liquid to be disposed of and the type of soil in which the pit is excavated.
- Soak pits are commonly between 2 and 5m deep and 1 to 2.5 m in diameter.
- When larger amounts of wastewater need to be infiltrated (e.g. referral hospitals), a leach field is often a better solution.
- Leach fields consist of gravel-filled underground trenches, called leach lines, which allow the liquid effluent from the wastewater treatment to permeate into the ground.
- Open-jointed (stoneware) or perforated (polyvinyl chloride) pipes carry the liquid effluent into the leach field.
- The leach trenches are usually 0.3–0.5 m wide and 0.6–1.0 m deep (from the top of the pipes). The trenches are laid with a 0.2–0.3% gradient of gravel (20–50 mm diameter), covered by a 0.3–0.5 m layer of soil.
- Soakaway pits and leach fields should be kept as far as practicable from shallow water wells and, where possible, they should be installed downstream of water abstraction sources to avoid ground water contamination.
- The distance between the bottom of the infiltration system and the groundwater table should be at least 1.5 m (more in coarse sands, gravels and fissured geological formations), and the system should be at least 30 m from any groundwater source (Harvey, 2002).

10.9.5 Lagooning system

- Where this system has been opted for, adequate attention must be given to facultative lagoons.
- Oxygen is supplied primarily by algae and for aerated lagoons, oxygen is supplied by mechanical surface aeration.
- Mechanical aeration requires comparatively high operational costs (electricity); therefore, it's better to prioritize facultative lagoons.

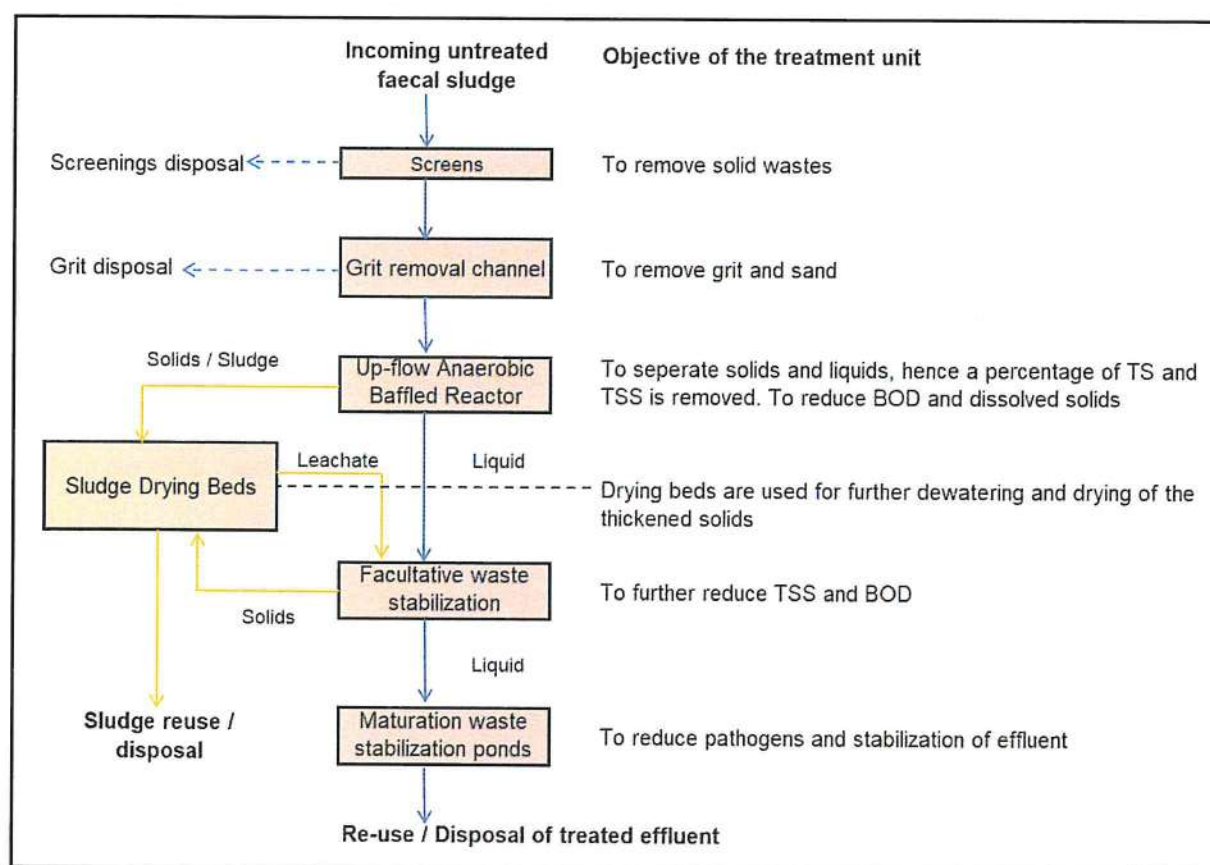


Figure 5: Lagooning system

Figure . Treatment Processes for Waster Water Lagoons (Source: Kagga & Partners)

10.9.6 Operation and Monitoring of Sewerage Systems

- Most challenges in Healthcare facilities are mainly due to insufficient operation and maintenance.
- Disposal of liquid hazardous waste via the sink is practiced daily thus leakages and blockages are likely to increase where sewers are insufficiently maintained.

10.9.7 Common challenges and corresponding solutions in the operation of wastewater systems

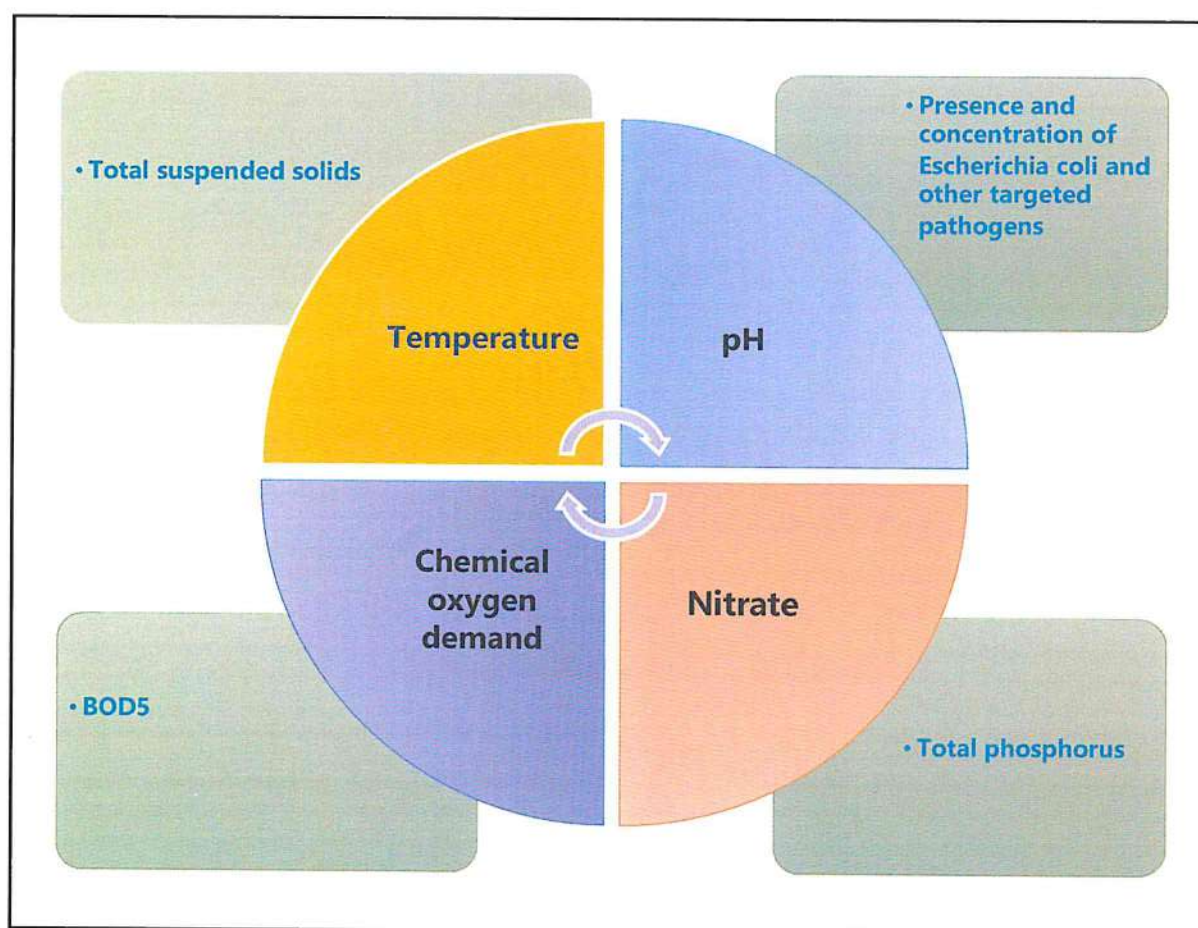
Table 10: Common challenges and corresponding solutions in the operation of wastewater systems

Common Challenge	Proposed Solution
Lack of awareness among senior staff on wastewater challenges	• Assign roles to the available technical officer to handle wastewater challenges • Conduct awareness and training sessions.
Insufficient or non-functioning pre-treatment/ primary treatment systems	• Conduct wastewater audits • Install or upgrade pre-treatment and hazardous wastewater systems.
Little or no preventive maintenance programme	• Develop and implement a maintenance plan (both corrective and preventive).
Non-availability of basic maintenance tools	• Procure essential tools and allocate budget for regular maintenance.
Systems too complex or operational costs too high	• Design user-friendly, cost-appropriate systems • Ensure operational costs are budgeted.

10.9.8 Wastewater systems Monitoring

This includes two aspects:

- Monitoring the sewerage system and
- Monitoring effluent quality.
 - Loss of wastewater during collection and transport is often underestimated.
 - Losses of 10–30% of the wastewater due to broken sewer pipes, non-watertight access holes and leakages at pipe connections are common.
 - Installing a flow meter at the discharge point of the Healthcare facility is recommended for accurate monitoring.
 - Maintenance and leakage problems can often be identified through regular (daily or weekly) comparison of water consumption and discharged wastewater quantities.



10.9.9 Recommended parameters for monitoring the effluent quality

- If an onsite treatment plant is operated, the inflow of wastewater and the out flowing treated effluent should be tested regularly.
- This helps to monitor how efficiently the treatment plant reduces the concentration of contaminants.

11.0 DECOMMISSIONING OF HCWM INFRASTRUCTURE

11.1 Introduction and Procedural provisions

- Decommissioning is the process where HCWM infrastructures have to be removed from service.

11.2 Considerations for decommissioning of HCWM infrastructure

Table 11: Considerations for decommissioning of HCWM infrastructure

Consideration	Description
Unserviceable	- Damaged beyond economical repair, - Damaged by contamination, - Absence of manufacture/ supplier technical support,
Lack of spare parts	Consistent absence of appropriate spares
Obsolete	- Passed its lifespan, - Clinically or technically obsolete, - Changes in local policies for device use
Unsafe	Does not comply with safety requirements from the manufacturer
Ineffective	Unable to provide accurate results
Costly	Not economical to use
Surplus	Without a useful purpose for a healthy facility, but may be transferred or donated

- The decommissioning involves processes like notification, condemnation and removal of the infrastructure from service including safe and secure storage.

11.3 Requirements for notification

- HCWM infrastructure found not unsafe/meets any of the criteria in the table above
- The workshop managers should advise on the risk that could arise from continuous use of the equipment.
- Health facility management should be notified using the Notification form. (Appendix 7).
- Notify from Ministry of Health, NEMA, and other international relevant bodies
- Accordingly, the designated administration officers should report the cases to the accounting officers to initiate the disposal process.
- A site inspection will be done to verify that all requirements have been met.

11.4 Requirements for condemnation

- Upon receipt of the notification form from the Health Facility Management,
- A qualified technician shall conduct a technical and clinical assessment.
- A site inspection by relevant agencies will be done to verify that all requirements have been met.
- Disposal procedures of medical equipment should be in line with the Environment Laws of Uganda, and PPDA Regulations.

11.5 Decommissioning of the Health Facility

- A comprehensive decommissioning plan as per the applicable law should be followed.
- This is to ensure that the site fits its immediate environment and is amenable.
- Aftercare is required once site operations have ceased.
- This is to ensure that the site conditions after closure are environmentally and socially acceptable as recommended by the licensing body.
- A copy of the approved closure and post-closure care plan shall be kept on file at the Healthcare Waste Management Facility.

11.6 Closure and Decommissioning

- This must be preceded by the preparation of a plan clearly setting out requirements for closure, decommissioning and site rehabilitation.
- Such requirements include remedial work on drainage, leachate management and cover integrity.
- The decommissioning plan must form part of the original site selection and design.
- It should be continuously reviewed during the active life of the site to meet environmental and planning needs of the area and the intended after use of the site.

The decommissioning plan for the new Healthcare Waste Management Facility must be included the following in its initial plan:

- (i) Remedial design to address identified problem areas;
 - (ii) Final shaping and landscaping;
 - (iii) Final Healthcare Waste Management Facility cover or cap design;
 - (iv) Permanent storm water diversion measures, runoff control and anti-erosion measures; and
 - (v) any infrastructure relating to the selected end-use.
- Once the Healthcare Waste Management Facility ceases operation, the closure and decommissioning plan should be activated.
 - Site rehabilitation and restoration work will usually be required as part of the closure process.
 - Further guidance on site closure and restoration can be sought from Ministry of Health, NEMA, and other international relevant bodies.

Detailed guidance on the restoration of sites from which HCWM equipment/ devices have been decommissioned shall be as stipulated by the NEMA and other international guidelines.

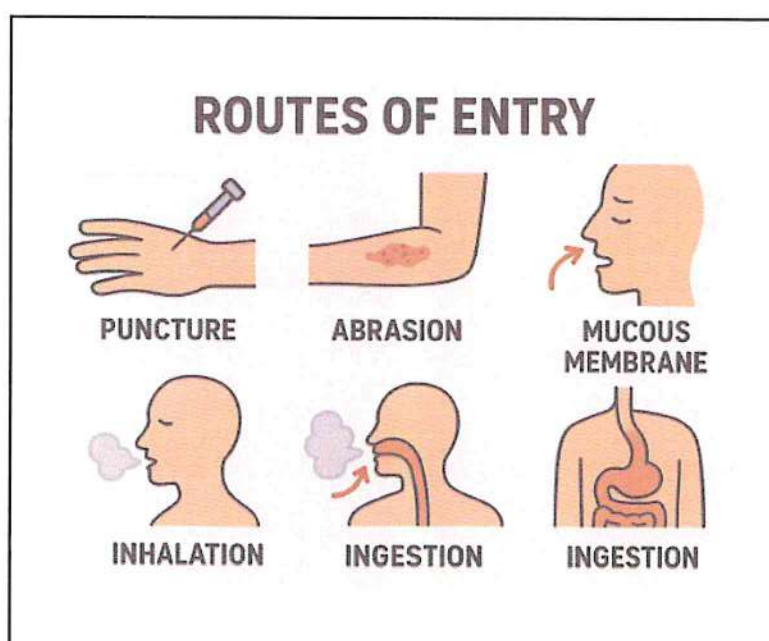
12.0 OCCUPATIONAL HEALTH AND SAFETY MEASURES DURING HCWM

12.1 Introduction

- Occupational Health and Safety (OHS) in Healthcare Waste Management refers to;
 - ▶ The practices, policies, and procedures designed to protect the health and well-being of healthcare workers and waste handlers involved in handling, transporting, treatment and disposal of healthcare waste.
- Infectious waste should always be assumed to potentially contain a variety of pathogenic microorganisms.
- This is because the presence of pathogens cannot be determined at the time a waste item is produced and discarded into a container.

12.2 Routes of exposure

Pathogens in infectious waste may enter the human body through several routes, including:



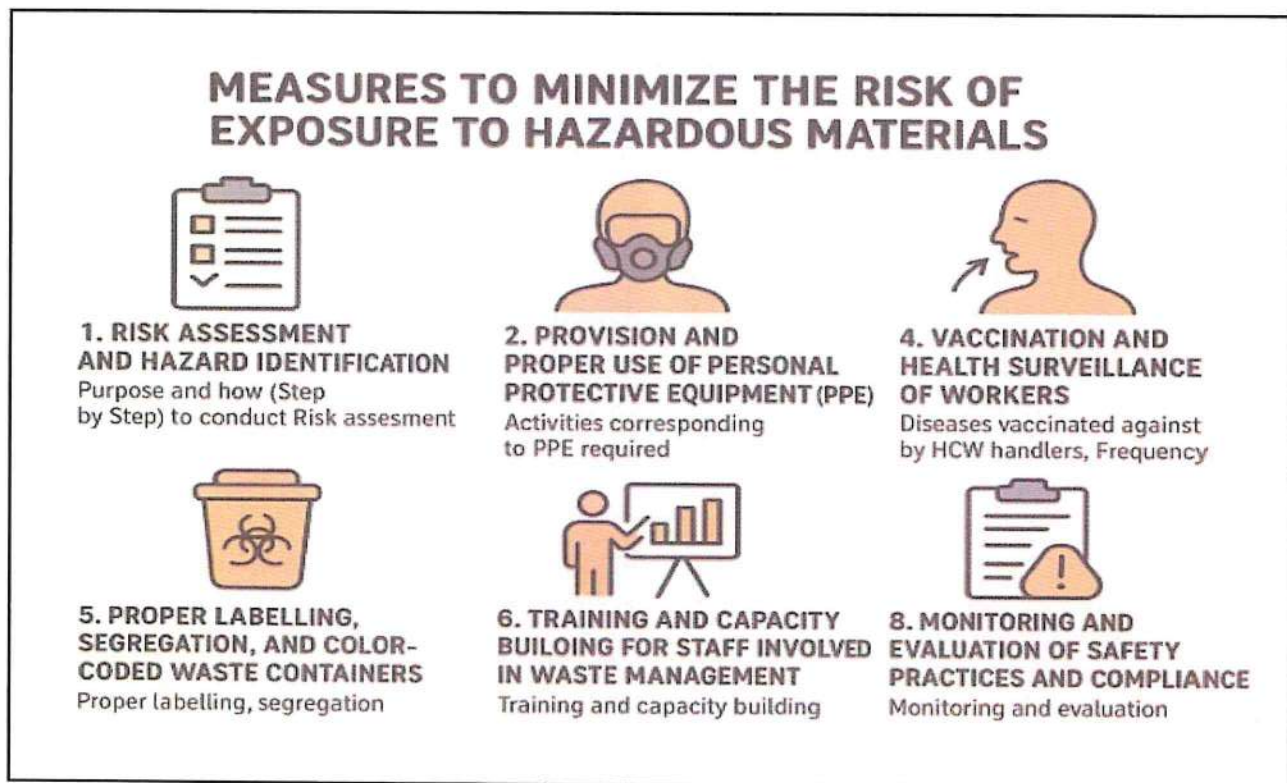
- During handling of waste, healthcare workers and waste handlers can be injured if HCW has not been managed properly.
- Sharps are considered one of the most dangerous categories of waste.
- Many injuries occur because syringes and needles or other sharps have not been collected in safety boxes or because safety boxes have been overfilled.
- Maintenance workers may also be exposed to pathogens and hazardous HCW that may be found in drainage systems and chemical stores of the health facility environment.
- At improperly kept waste storage sites, human scavengers may come in contact with infectious waste during their reusing or recycling activities.

12.3 The Goal of OHS in HCWM

To minimize the risk of occupational exposure to a range of hazardous materials present in healthcare waste.

Measures to minimize the risk of exposure to these hazardous materials include;

1. Risk assessment and hazard identification- Purpose and how (Step by Step) to conduct Risk assessment
2. Provision and proper use of personal protective equipment (PPE)- Activities corresponding to PPE required
3. Standard operating procedures (SOPs) for safe handling and disposal
4. Vaccination and health surveillance of workers- special considerations should be made to ensure that these workers are vaccinated against the priority diseases like hepatitis A, hepatitis B and tetanus.
5. Proper labelling, segregation, and color-coded waste containers to guide the users on appropriate use.
6. Periodic training and capacity building for all staff involved in waste management should be prioritized
7. Make provisions for emergency preparedness and response protocols for spills, injuries, or exposures
8. Monitoring and evaluation of safety practices and compliance should be prioritized for the safety of the workers



12.4 Hazards Associated with HCW Treatment Methods

In addition to the specific hazards posed by different types of Healthcare waste, there are occupational hazards associated with waste-treatment processes:

12.4.1 Incineration

12.4.1.1 Flue gases from waste incinerators

- This may have an impact on people living or working close to a treatment site.
- The health risk is most serious where an incinerator is improperly operated or poorly maintained.
- If poorly controlled, emissions from waste incinerators may cause health concern.

12.4.1.2 Particulate matter

- These are associated with increased cardiovascular and respiratory mortality and morbidity.

12.4.1.3 Volatile metals

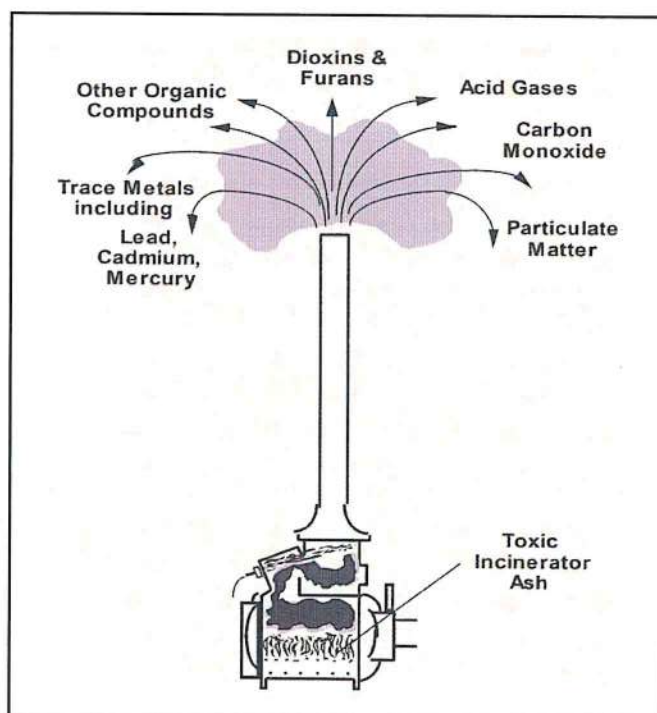
- These may include mercury and cadmium (associated with damage to the immune system, neurological system, lungs, and kidneys).

12.4.1.4 Dioxins, furans, and polycyclic aromatic hydrocarbons

- These are known carcinogens but may also cause other serious health effects.

12.4.1.5 Ash from the incineration

- This may continue to pose a risk since it contains elevated concentrations of heavy metals and other toxic items.
- Ash provides ideal conditions for the synthesis of dioxins and furans, because it is often exposed for a long time to a temperature range of 200–450°C.



Source: MODULE 16: Incineration of Healthcare Waste and the Stockholm Convention Guidelines (WHO)

12.4.2 Burnt needles and glass

- These may have been disinfected but can still cause physical injury.

12.4.3 Autoclave and steam disinfection treatment

- Possible physical injuries from high operating temperatures and steam generation.
- Discharges with high organic and inorganic contaminants concentrations that are poorly discharged.

12.4.4 Mechanical equipment (shredding devices and waste compactors)

- Physical injury when improperly operated or inadequately maintained.

12.4.5 Landfill sites

- The risks are often difficult to quantify, and the most likely injury comes from direct physical contact with waste items.
- Chemical contaminants or pathogens in landfill leachate may be released into surface streams or groundwater.
- At poorly controlled land-disposal sites, the presence of fires and subsurface burning waste poses the further hazard of airborne smoke.
- The smoke may contain heavy metals and other chemical contaminants that over time may affect the health of site workers and the general public.

13.0 SOCIAL-CULTURAL CONSIDERATIONS

- The general public should be sensitive about health and environmental impact of poorly managed healthcare waste.
- Special attention should be paid to infectious waste including sharps, human body parts, including fetuses among others.
- Communities should therefore be vigilant in identifying and reporting streams of poorly managed healthcare waste for adequate implementing of OSH protocols.

Efficient implementations of OSH protocols by health systems not only reduces the risk of injury, infection, and long-term illness among workers but also enhance the efficiency and sustainability of HWCM.

14.0 PLANNING, IMPLEMENTATION, COORDINATION AND FINANCING

14.1 Guidance on planning for HCWM at health facilities

- Each health facility should integrate the HCWM plan as part of the overall health facility approved activity implementation plan.
- Reference should be made to the National HCWM strategy for priority interventions
- Implementation of HCWM plan shall be coordinated by the Environmental Health Officer/Health Inspector/Assistant at each health facility or jurisdiction in close collaboration with the health facility in charge.
- This role should complement other stakeholders who may be involved in supervision of Healthcare Waste Management practices.
- Provisions for innovative financing for HCWM such as revenue generation and financing mechanisms like adoption of user-fee models for PNFPs and PFPs as guided by the National HCWM strategy
- Additional activities such as training, mentorships and supervision shall also be budgeted for under this arrangement.
- For facilities within emergency prone areas such as epidemic belts, considerations should be made to cater for critical interventions on HCWM in emergency situations.
- HCWM planning should make use of actual records of waste volumes (quantities) generated from day-to-day activities for proper budgeting.

14.2 Guidance on estimation of healthcare waste quantities by HCFs

Health facilities that have not yet institutionalised quantification/ weights of waste volumes generated from day-to-day activities, Managers shall use the following guidance at different levels of service.

Note: *This estimation guidance is based on a national HCWM assessment in Uganda (Carl Bro, 2003). However, the Ministry of Health shall continuously give guidance in this regard on basis of evolving evidence.*

Table 12: estimated quantity of hcw generated per day for the various service levels

Quantity	Service level
0.1kg/bed/day (excluding pathological waste)	Hospital level
3.0kg/day	HCIV level
2.0kg/day	HCIII level
0.5kg/day	HCII level



14.3 Guidance on coordination for HCWM

14.3.1 National level coordination

The mandate of coordinating HCWM at National level shall be led by the National HCWM steering Group chaired by the Director General Health Services. The Department of Environmental Health shall be the secretariat for this committee with composition of the following key stakeholders;

- Environmental Health Department
- Pharmaceuticals and Natural Medicines Department
- Clinical Services Department
- Health Infrastructure Department
- National Health Laboratory and Diagnostic Services Department
- Community Health Department
- Emergency Medical Services Department
- Integrated Epidemiology, Surveillance and Public Health Emergencies Department
- National Environment Management Authority
- National Medical Stores
- Joint Medical Stores
- Kampala Capital City Authority
- Development and Implementing Partners
- Representatives from the National Regional Referral Hospitals
- Selected representatives from Academia
- Private Operators

The main roles and responsibilities of this committee shall include but not limited to;

- ▶ Offer technical oversight for effective implementation of strategic interventions for HCWM across the country
- ▶ Spearhead the development, dissemination and implementation of policies, strategies, guidelines, manuals and protocols for HCWM.
- ▶ Spearhead resource mobilization through innovative financing mechanisms for effective HCWM along service chain
- ▶ Support coordination of all private service providers along the HCWM service chain
- ▶ Supervise and monitor compliance to set standards for effective HCWM at sub-national level
- ▶ Spearhead training and capacity building for HCWM across the country

14.3.2 Regional level coordination

- The regional HCWM committee shall oversee and support the effective implementation of HCWM strategies and guidelines within the region.
- The committee shall comprise staff from the Regional Referral Hospital and Technical staff from the host District/City Technical Planning Committee (TPC).

The Director of the RRH shall be the head of the regional HCWM committee who will report to the RRH board.

The secretariat shall lie under the District/ City health office. The regional HCWM committee shall be comprised of;

1. Hospital Director
2. IPC Focal person
3. Hospital Engineer
4. Environmental Health Officer/Senior Health Inspector
5. District/City Health Officer
6. District Planner
7. Hospital Pharmacist
8. Environment Officer

14.3.2.1 Roles and responsibilities of the regional HCWM committee

These shall include but not limited to;

- Supporting the implementation of HCWM policies, strategies, guidelines at both regional and local levels, ensuring adherence to national standards and best practices.
- Providing oversight to the management of healthcare waste in regional sites, including monitoring compliance with regulations and verifying the effectiveness of the disposal methods.
- Promote the efficient use of the regional incinerators by districts within the catchment.
- Ensuring the security of HCWM equipment to prevent unauthorized access, tampering, or theft, safeguarding public health and environmental safety.
- Supporting private HCW operators in their operations, providing guidance, technical assistance, and facilitating collaboration with relevant stakeholders.
- Monitoring the entire HCWM value chain in the region while identifying potential vulnerabilities, and implementing measures to enhance efficiency, sustainability, and accountability.
- Assisting districts in planning and budgeting for HCW management by providing technical expertise and resource allocation recommendations.

14.3.3 Coordination at District/ City level

- The District/ City Health Officers will offer technical oversight for implementation of effective HCWM interventions within the District/ City.
- The Assistant District Health Officer-Environmental Health/Principal Health Environmental Health Officer will support the District/ City Health Officer support in planning, coordination, implementation and monitoring of strategic interventions. This shall be done with close collaboration with the District Health Teams (DHTs).

The roles and responsibilities of the District/City Coordination mechanism for HCWM shall include:

- ▶ Oversee the implementation of the District HCWM interventions in close collaboration with all the relevant national and sub-national stakeholders.
- ▶ Advocating for prioritization of HCWM strategic interventions at all levels of healthcare service delivery within the District/City.
- ▶ Disseminate policies, strategies, guidelines and protocols developed by the Ministry of Health for effective HCWM

- ▶ Ensure periodic supervision, monitoring, documentation and feedback to ensure compliance to the set standards for effective HCWM at all levels of healthcare service delivery in the District/ City
- ▶ Supporting and promoting operational research to inform evidence-based decision making for effective HCWM.
- ▶ Coordinate strategic HCWM interventions during public health emergencies at District/ City level.
- ▶ Spearhead mentorships and training of the health workforce in appropriate HCWM practices at all levels in the District/ City

14.3.4 Coordination at Health Facility level

- Each health facility shall integrate the HCWM plan as part of the overall health facility approved activity implementation of effective HCWM interventions within the District/City.
- The Environmental Health Officer/Health Inspector will support the health facility In-Charge in planning, coordination, implementation and monitoring of strategic interventions. This shall be done with close collaboration with the Health Unit Management Committee (HUMC).

14.3.4.1 Roles and responsibilities of the Health Facility Management

- The facility In-charge shall be responsible for the provision of efficient HCWM services.
- Ensure allocation and optimal utilization of available financial and human resources for effective HCWM.
- Ensure continuous mentorship for all Healthcare workforce, waste handlers and caregivers at facility level for adequate HCWM skills, knowledge transfer and enhanced behavior change.
- Conduct routine compliance checks through monitoring and supervision across the health facility and identify bottlenecks for re-dress.

14.3.4.2 Roles and responsibilities of the Officer In-Charge of Environmental Health

- These Officers shall include, Environmental Health Officer, Health Inspector, Health Assistant and shall undertake these roles in collaboration the Health Facility In-charge.
- Plan, budget and implement all HCWM interventions at the healthcare facility level.
- Conduct periodic assessments to inform the progress of the implementation of the National Healthcare Waste Management Strategy.
- Identify critical gaps in the implementation of the HCWM interventions for redress by the health facility/District level management.
- Share periodic implementation reports across management levels under areas of jurisdiction.
- Participate in periodic reviews of HCWM implementation progress within areas of jurisdiction.
- Conduct a needs assessment on areas for HCWM mentorship and training, plan and coordinate execution of the same.
- Participate in health facility surveillance of healthcare-associated infections, Anti-Microbial Resistance, Bio-safety and Bio-security related activities in collaboration with the relevant coordinating entities.
- Periodically engage communities within the health facility catchment area to create awareness, identify and address nuisances related to healthcare waste management.
- Profile, research specific areas on healthcare waste management and propose these to the relevant structures under areas of jurisdiction.

15.0 TRAINING, CAPACITY BUILDING AND RESEARCH

Capacity building for healthcare waste management is essential for enhancing the knowledge, skills of healthcare personnel and institutions to effectively manage healthcare waste. This includes comprehensive training, establishing clear Standard Operating Procedure for HCWM, Investment in the necessary infrastructure, such as proper waste storage areas, labelling, and transportation systems. It also ensures the availability of appropriate personal protective equipment (PPE) for staff involved in waste management and Regular assessment of the compliance of healthcare facilities with waste management protocols.

15.1 Objectives

The main objectives include;

1. To increase the technical competence of healthcare workers and waste handlers in appropriate HCWM
2. To raise awareness amongst the public about HCW risks and safe practices.

The Ministry of Health shall be responsible for development, update and dissemination of training manuals to facilitate capacity building in HCWM. It's also important that a capacity needs assessment is done through routine supervision to identify performance gaps to ensure targeted training.

15.2 Targeted categories

The following categories of people should be targeted for training in appropriate HCWM;

- ▶ Managers and administrators in health facilities and institutions.
- ▶ Health workers in both public and private HCFs
- ▶ Health training institutions (pre-service training)
- ▶ Waste generators in health facilities and communities (care givers, patients).
- ▶ Waste handlers (generators, cleaners, collectors, transporters, treatment and incinerator operators).
- ▶ Community health support persons including VHTs, CHEWs, condom distributors, attendants of hotel and lodging services and the general public.

15.3 Knowledge and skills transfer communication channels

The following communication channels should be used to enhance knowledge and skills for appropriate waste management

- ▶ Routine mentorships should be conducted for healthcare workers and waste handlers including cleaners, porters during the Continuous Medical Education sessions (CMEs).
- ▶ Separate training activities should be designed for managers and administrative staff responsible for implementing regulations on HCWM
- ▶ Health Education sessions should be conducted for the community and caretakers at healthcare facilities on appropriate HCWM and the public health risks involved.
- ▶ Displaying posters at strategic points in the healthcare facility. Such as waste bin locations and giving instructions on waste segregation. Posters should be simple, using diagrams and illustrations to convey the message.

- ▶ Simple messages designed for different channels like social media, radio or television can be conveyed to schools, notices in public places, raising awareness about the risks involved in scavenging discarded healthcare waste.

15.4 Considerations for designing training programs

The following considerations should be made when designing a training program

- ▶ Number of participants
- ▶ Capacity needs of the participants (specific needs of different healthcare facilities, such as hospitals, clinics, pharmacies, drug shops, health research institutions, laboratories and communities.
- ▶ Conducive environment for learning
- ▶ Organisational support (financial, human resource, facilities, equipment)
- ▶ Availability of a facilitator
- ▶ Availability of training materials
- ▶ Emphasis should be on hands-on, practical training sessions to allow healthcare personnel to apply theoretical knowledge in real-work scenarios.
- ▶ Provisions should be made for participants to readily access online resources and databases for continuous learning.

15.5 Training target audience

Preparation for training programs for different target audience should prioritize appropriate and key aspects of the HCWM value chain as clarified in various sections of this document.

15.5.1 Pre-Service Training

The Ministry of Health shall work with the Ministry of Education and Sports and the Council for Higher Education to periodically revise and update relevant training modules in the health courses curriculum as informed by the National Healthcare Waste Management Strategy.

15.5.2 In-Service Training

Health facility managers shall implement ongoing training programs and refresher courses to keep healthcare workforce updated on new regulations, technologies, and best practices for HCWM. On a regular basis, HCWM training should comprise Continuous Medical Education sessions (CMEs), on-site mentorship, coaching, and support supervision, and it should be based on the findings of the HCWM practice Assessment.

15.6 Frequency of Training

1. During orientation for new health workforce.
2. During orientation for existing employees with new responsibilities.
3. Periodic refresher training of all healthcare workers

15.7 Research and innovation

- The Ministry of Health shall collaborate with research institutions in cross-sharing of knowledge and other emerging issues on HCWM
- Set up a system to collect, analyse data and disseminate findings on HCWM

16.0 MONITORING AND EVALUATION TOOLS

16.1 The HCWM Score Card

- This is a standardized evaluation instrument designed to systematically assess HCWM practices at National and facility level.
- This structured checklist and scoring mechanisms is translated into a performance monitoring dashboard for tracking and reporting healthcare waste management indicators at both National and facility level.
- This will support generation of evidence for informed decision making for equitable resource allocation, priority setting and strategic planning.
- It will also serve as an accountability mechanism and a communication tool for demonstrating progress in HCWM to stakeholders including partners, donors, and the public while identifying systemic challenges that require national and sub-national level interventions.

See appendix 1

16.2 The Health Facility Waste generation reporting template (Weekly, Monthly Quarterly)

- This shall be used to document waste volumes (weights) which are generated during the day-to-day activities.
- Data generated shall guide on adequately planning of collection, storage, transportation, treatment processes.

See appendix 1, 2 and 3

16.3 The HCWM Manifest

- This is a HCWM tracking document that provides a comprehensive chain-of-custody record for HCW from generation to final disposal.
- It helps document the type, quantity, and origin of waste, along with detailed information about transporters, treatment facilities, and disposal methods used.
- It's aimed at ensuring regulatory compliance by maintaining an auditable trail that demonstrates proper handling of healthcare waste management.
- It also enables healthcare facilities to verify that their waste has been properly treated and disposed of according to environmental and public health standards.

See Appendix 4

16.4 The HCWM Potential risks, Exposure Actions and Remedial Actions guide

- This is a compilation of the most common risks to poor management of HCW, matched with their respective exposure actions and remedial actions.
- Health facility managers may use this tool to guide the interpretation of findings from their periodic assessments and further course of action.
- Additionally, this tool may be used during mentorship and trainings on HCWM

See Appendix 6

16.5 The Facility-based HCWM Action Plan Guide

- This tool provides for a template for healthcare facilities to refer to when generating HCWM action plans.

See Appendix 8

APPENDIX

APPENDIX 1: THE Healthcare WASTE MANAGEMENT SCORE CARD

Date of assessment			
Name of the healthcare facility			
Address/District Name			
Name of assessor			
Name of respondent			
Contact of respondent			
Cadre of Respondent during assessment			

HCWM Scoring Definitions			
Action			
Not applicable	Needs Urgent Remedy	Needs Improvement	Meets Expectations
0	1	2	3
NA	Poor	Average	Good

User Definitions

Not Applicable -

Poor – Inadequate, poorly maintained, non-existent to meet minimum standards

Average – Efforts in place towards meeting minimum standards

Good – Meets minimum standards

	HCWM Domain	RESPONSES		N/A - Not applicable Score 1 - Poor Score 2 - Average Score 3 - Good	
		Yes	No	Score	Comment
1.	Health Facility Organization on HCWM				
a	Presence of a dedicated staff in charge of healthcare waste management				
b	Availability of clear roles and responsibilities of staff on HCWM				
c	Availability of a functional HCWM committee				
d	HCWM committee meets regularly (Proof of minutes)				
e	HCWM committee meetings held in the last Quarter (indicate number of meetings)				
f	The health facility discusses and displays HCWM score card data periodically				
2.	HCWM Policy, Planning and Implementation				
a	Availability of copies of the National HCWM strategy and related policies				

	HCWM Domain	RESPONSES		N/A - Not applicable Score 1 - Poor Score 2 - Average Score 3 - Good	
		Yes	No	Score	Comment
b	Availability of approved HCF work plan and budget integrating HCWM				
c	Availability of guidelines, checklists or protocols on HCWM				
d	Inspection of the facility performed periodically and recommendations recorded				
		Yes	No		
3.	HCW Identification and segregation				
	Availability & displayed IEC materials on IPC at appropriate locations				
	Availability of the appropriate waste bin and bin liner categories at each service point				
	HCW waste properly segregated into recommended categories (infectious=red, non-infectious=black, sharps=yellow/white box, pharmaceutical=brown)				
	Appropriate packaging done for each waste category				
4.	On-Site collection and transportation of waste				
	Is waste routinely collected from wards/departments?				
	Proper on-site collection equipment available to transport HCW only				
5.	Off-Site collection and transportation of waste				
	Is waste routinely collected from Health facilities?				
	Availability of proper off site collection equipment to transport HCW only				
6.	Temporary waste storage room management				
	Is storage area secured (fenced off and lockable)				
	Storage areas routinely cleared				
	Waste segregation maintained in the storage area				
7.	Infectious Healthcare Waste treatment & disposal				
	Does the facility have a functional standardized incinerator (burning 850C and above)?				
	Incinerator fully compliant and operating optimally (Social and environmental safe guards e.g. air pollution control [high chimney stack/air filters], ash pit etc.)				



HCWM Domain	RESPONSES		N/A – Not applicable Score 1– Poor Score 2 – Average Score 3 – Good	
	Yes	No	Score	Comment
				Does the facility have a functional autoclave?
				Does the facility have a functional placenta pit?
8. Non-infectious Healthcare Waste treatment & disposal				
				Waste transported to offsite treatment and disposal facilities by contracted operator/local authority (General waste Landfill)
				Availability of onsite waste treatment and disposal options (Recycling, Decomposition, Sanitary Disposal Pit)
9. Occupational Safety and Health				
				No. of needle stick injuries recorded in the last quarter
				Availability of appropriate PPE for waste handlers & healthcare workers
				Consistent use of appropriate PPE by waste handlers & healthcare workers
				Healthcare waste spillages reported during the last quarter
				Staff awareness of risk and medical staff training on HCWM
10. Quantification of waste				
				Waste routinely weighed and volumes recorded
				HCWM data is available, secure and accessible
				Total monthly weight of sharps wastes generated in Kgs
				Total monthly weight of infectious waste generated in Kgs (including pharmaceutical)
				Average weight of waste in Kgs disposed of per week
	Yes	No		
11. Logistics management				
				Sufficient ¹ supply of sharps containers (in #) _____
				Sufficient supply of appropriate (color and size) color-coded bins (in #) _____
				Sufficient supply appropriate (color and size) of color-coded bin liners (in #) _____

¹ Sufficient means availability of a monthly supply of the item

HCWM Domain	RESPONSES	N/A - Not applicable Score 1 - Poor Score 2 - Average Score 3 - Good			
Sufficient supply of appropriate PPE (gloves, overalls, eye masks, gumboots, disposal aprons, facial masks)(in #) _____					
Sufficient supply of cleaning and disinfection materials (cleaning tools, Sodium Hypochlorite, liquid soap, alcohol-based sanitizer)(in #) _____					
12. Budget					
Was there a budget allocation for HCWM in the health facility approved budget in the last quarter?					
How much was allocated for HCWM in the health facility approved budget in the last quarter?					
How much was accessed for HCWM by the health facility in the last quarter?					
13. Sources of funding for HCWM					
PHC funds					
Local Partner support (Private sector, Local NGOs/Associations)					
International Partner support					
Health Facility Revenue (patient fees)					
Others (specify)					

APPENDIX 2. HEALTH FACILITY WASTE GENERATION WEEKLY REPORTING TEMPLATE

(To be filled by the Designated Waste Handler and submitted to the Environmental Health Officer)

Name of Health Facility:

Level:

Assessment Week:

...../...../..... to/...../.....

Waste Category	Quantity of Healthcare Waste Generated per day (weight in kilograms)							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	TOTAL
Infectious Waste (red)								
Non-infectious waste (black)								
Pharmaceutical Waste (brown)								
Sharps (yellow/white)								
TOTAL								

Name of Waste Handler:

Signature:

Date:

Name of Supervisor:

Signature:

Date:

APPENDIX 3. HEALTH FACILITY WASTE GENERATION MONTHLY REPORTING TEMPLATE

(To be filled by the Environmental Health Officer and submitted to the Records Officer/Biostatistician)

Name of Health Facility:		Assessment Month:/...../..... to/...../.....			
Level:					
Waste Category	Quantity of Healthcare Waste Generated per week (weight in kilograms) <i>*With reference to the quarterly reporting template</i>				
	Week 1	Week 2	Week 3	Week 4	TOTAL
Infectious Waste (red)					
Non-infectious waste (black)					
Pharmaceutical Waste (brown)					
Sharps (yellow/white)					
TOTAL					

Name of Environmental Health Officer:
Name of Supervisor:

Signature:
Signature:

Date:
Date:

APPENDIX 4. HEALTH FACILITY WASTE GENERATION QUARTERLY REPORTING TEMPLATE

(To be filled by the Records Officer/Biostatistician)

Name of Health Facility:		Assessment Quarter:/...../..... to/...../.....	
Level:			

Waste Category	Quantity of Healthcare Waste Generated per week (weight in kilograms)			
	Month 1	Month 2	Month 3	TOTAL
Infectious Waste				
Non-infectious waste				
Pharmaceutical Waste				
Sharps				
TOTAL				

Name of Bio-statistician:

Signature:
Date:



REPUBLIC OF UGANDA
MINISTRY OF HEALTH

APPENDIX 5: HEALTHCARE WASTE MANAGEMENT MANIFEST



HCW Generator	Institution's Name:		Tel. No:	
	Address:			
	Waste Issued: Sharps _____ Kgs, Infectious _____ Kgs, Pharmaceutical _____ Kgs			
	Total Weight Issued (Kgs) _____			
	I certify that the information provided is true and correct, and that the generated materials are properly classified, described, packaged, labelled, and are in proper condition for transportation according to the appropriate Hazardous waste transportation regulations for Uganda			
	Name of Company Representative (Print)		Signature	Date
HCW Transporter	Name(s) of Person Collecting, Transporting or Unloading Waste:			
	Company Name:		Tel. No:	
	Vehicle Registration No.:		Waste Collection Date:	
	Transportation Licensing No.:		Total Weight Collected:	
	I certify that the information provided above is true and correct and that only untreated hazardous waste are contained in this load. I am aware that falsification of this manifest may result in penalties by authorities including revoking my transporter's license.			
	Name of Company Representative (Print)		Signature	Date
HCW Treatment Facility	Name(s) of Person Transporting or Unloading/Delivering Waste:			
	Company Name		Tel.no	
	Address		Waste Delivery Date	
	Operation Licensing No.		Total Weight Delivered	
	I certify that I have been authorized by relevant licensing bodies in Uganda to receive Healthcare wastes for treatment and that I have received this waste in accordance with the requirements outlined in the National HCWM authorization guidelines.			
	Name of Company Representative (Print)		Signature	Date

Instructions for completing Uganda Healthcare Waste (HCW) Manifest

Purpose of this manifest

This form is used to track the movement of HCW from the point of generation through transportation, and finally to the treatment and disposal facility. It ensures compliance with all the relevant national regulations, improves accountability, and promotes safe, environmentally sound handling of hazardous waste.



SECTION A: HCW GENERATOR

To be completed by the health facility or related establishment where the waste is generated.

- Enter the name, address, and contact details of the health facility or related establishment.
- Record the date of waste collection.
- Indicate the volume/weight of waste collected (e.g., safety boxes, infectious, highly infectious,)
- Record the total volume/weight of waste collected in kilograms.
- The representative of the facility must:
 - ▶ Print and sign their name.
 - ▶ Confirm the waste is correctly segregated and packaged.
 - ▶ Certify that no treated or general waste is included.

SECTION B: PRIMARY TRANSPORTER

To be completed by the individual or company licensed to transport healthcare waste.

- Enter the name of the waste transportation company and its license number.
- Provide the vehicle registration number and telephone contact.
- The representative of the transporter must:
 - ▶ Confirm safe handling and transportation.
 - ▶ Sign and date to certify proper documentation and packaging as per national standards.

SECTION C: TREATMENT AND DISPOSAL FACILITY

To be completed by the final destination where the waste is treated or disposed (e.g., incineration site).

- Provide the name and location of the facility along with its NEMA permit number.
- Indicate the date the waste was received and processed.
- Record the total weight received.
- The facility representative must:
 - ▶ Certify that the waste was handled according to Ugandan public health and environmental regulations.
 - ▶ Sign and date.

ADDITIONAL NOTES

1. Emergency Contact: Provide a 24-hour emergency number for waste spills or accidents during transport.
2. This form must travel with the waste from the point of generation to final disposal.
3. Copies should be retained by each party (generator, transporter, and treatment facility) for at least 2 years.
4. Submit summary data to District Health Offices for reporting into the national HCWM monitoring system.

APPENDIX 6: HCWM POTENTIAL RISKS, EXPOSURE ACTIONS AND REMEDIAL ACTIONS MAPPING

Waste Generation		
Nature of risks	Exposure risky Actions	Remedial Action
1. Contamination of waste like sharps with infectious agents	● Careless or unintended disposing of waste into inappropriate bins	▶ Install leak proof, peddle operated colour coded waste bins with tightly fitting covers and sharps containers at every point of use (NB. Bins should be dressed with their respective colour coded liners)
2. Exposure of Healthcare colour-coded waste handlers and communities to infections		▶ Integrate mandatory training/mentorship on proper waste disposal procedures during daily debriefs before and after work shifts
		▶ Institute regular spot checks to reinforce proper waste disposal practices
	● Inappropriate usage of PPE like gloves, masks, or gowns etc.	▶ Re-train health workers on proper donning and doffing procedures
		▶ Pin visual guides and step-by-step instructions in conspicuous places near work areas
		▶ Ensure adequate supply of appropriate PPE sizes and types for all staff
▶ Implement routine supervision and peer monitoring systems to ensure compliance to PPE usage		
	▶ Enforce protocols for when and how to change PPE between patients or tasks	
	● Manual handling HCW without proper PPE and other supporting commodities like bins and bin liners	▶ Institute mandated use of appropriate PPE (heavy-duty gloves, protective clothing etc.)
		▶ Advocate for provision of waste handling aids like trolleys
		▶ Ensure adequate supply of appropriate color coded bins and quality bin liners
		▶ Re-train staff on safe waste lifting techniques and weight limits
		▶ Institute two-person handling protocols for very heavy waste containers
	● Mixing/non-segregation of HCW	▶ Implement a comprehensive color-coded segregation system with clear guidelines
		▶ Provide sufficient color coded waste bins and their appropriate liners for each waste category at all generation points
		▶ Re-train all staff on waste classification and segregation requirements
		▶ Conduct regular audits and monitoring of segregation practices
		▶ Post/pin visual guides and step-by-step instructions in conspicuous places near work areas
		▶ Establish and institute penalties for non-compliance and rewards for proper segregation



Waste collection		
Nature of risks	Exposure risky Actions	Remedial Actions
1. Overfilled or damaged waste bins causing spills, direct contact with hazardous waste and environmental contamination	Collecting waste from overfilled or damaged waste bins	Adhere to the regular waste collection schedules to prevent overfilling (daily or twice-daily rounds)
		Immediately replace any damaged color coded bins and establish a clear bin maintenance assessment schedule
		Train all health workers and waste handlers to never compact waste in overfilled waste bins
		Ensure adherence to protocols guiding on safe transfer of waste from damaged bins using appropriate tools
	Non adherence to use of PPE during collecting waste from overfilled or damaged waste bins	Ensure mandated use of heavy-duty gloves, protective clothing, closed footwear etc.
		Enforce strict supervision during waste collection activities
		Provide readily available PPE at collection points and storage areas
		Establish disciplinary measures for non-compliance with PPE requirements
		Conduct regular safety briefings emphasizing increased risks with overfilled/damaged containers
	Emptying of filled waste bins by scooping using inadequately protected hands	Advocate for provision of appropriate tools like tongs, scoops for waste handling
		Train staff on proper container handling techniques - tip and pour, never scoop
		Use containers with secure, easy-to-remove liners that can be lifted out intact
		Implement strict no-hand-contact policies for waste handling
	Manual handling of unsegregated waste	Implement strict waste segregation at source before any handling occurs
		Provide adequate commodities like colour-coded bins and liners to avoid direct contact during segregation
		Train and empower waste handlers to refuse collection of improperly segregated waste
	Collecting waste in open bags/poorly sealed bags leading to accidental spills	Provide high-quality, leak-proof waste bags/bin liners appropriate for different waste types
		Train health workers and waste handlers on proper bag sealing techniques using twist ties or tape where possible
		Institute double-bagging protocols for liquid or potentially leaking waste
		Enforce spill response protocols with immediate cleanup materials and procedures available
		Ensure availability of wheeled containers or trolleys to reduce handling of individual bags

Waste transportation		
Nature of risks	Exposure risky Actions	Remedial Actions
1. Leaks and spills resulting from improper packaging exposing health workers, waste handlers, the public to infectious pathogens and the environment to contamination	● Transporting waste in open or uncovered bins	▶ Ensure strict use of secure, tight-fitting lids on all waste containers during transport
		▶ Conduct routine visual inspection on lid security before transport of begins
		▶ Intentionally use containers with a lid covers during transportation of waste form wards to storage sites
		▶ Institute quality control checks at waste loading points to ensure all containers are properly covered
	● Using damaged-cracked, leaking, or those not designed for HCW transportation	▶ Conduct periodic inspections for all waste transport containers with suggested replacement criteria
		▶ Maintain an inventory of appropriate healthcare waste containers that meet regulatory standards
		▶ Establish an immediate replacement functional procedure for damaged containers against use of compromised equipment
	● Overloading bins and bin liners risking tear or bursting during transportation	▶ Train health workers and waste handlers on establishing maximum weight limits for different waste bins/containers like sharps boxes
		▶ Institute waste weighing processes at collection points to monitor load limits
		▶ Use double-bagging or reinforced liners for heavier waste categories
		▶ Train health workers and waste handlers on proper waste loading techniques and weight distribution processes
	● Failure to correctly label or segregate waste before transportation-unmarked containers	▶ Ensure adherence to the waste segregation categories even during transportation
		▶ Institute usage of waste tracking forms indicating waste type, source, date, and destination before any transport begins
	● Manual handling of waste without PPE or appropriate and required tools	▶ Train staff and waste handlers on mandated use of heavy-duty gloves, protective clothing, safety footwear, etc.
		▶ Advocate for provision of other waste handling equipment such as trolleys
		▶ Institute two-person lifting procedures for containers exceeding safe weight limits
		▶ Ensure strict enforcement of guidelines enhanced with supervision during transport activities
		▶ Provide training to health workers and waste handlers on safe lifting techniques



Waste treatment		
Nature of risks	Exposure risky Actions	Remedial Actions
1. Open burning of generated waste materials	● Using open burning or other uncontrolled treatment methods	▶ Use controlled treatment technologies like incinerators with pollution control systems
2. Irregularities resulting from incineration of waste potentially releasing pollutants like particulate matter among others		▶ Implement regulatory-compliant treatment methods that meet national and international environmental standards
3. Chemical exposure of workers involved in waste treatment processes		▶ Provide training on proper operation of approved treatment equipment to their users and operators
		▶ Establish partnerships with licensed healthcare waste treatment facilities for outsourced processing/ services
	▶ Conduct periodic environmental impact assessments and ensure compliance with emission standards	
	● Manual handling of waste before or during treatment without PPE	▶ Ensure adequate provision and usage of PPE including heavy-duty gloves, respiratory protection, protective suits, safety footwear, etc
		▶ Provide automated feeding systems and mechanical handling equipment to minimize direct contact
		▶ Implement strict PPE protocols with supervision and compliance monitoring
		▶ Ensure availability of emergency shower and eyewash stations in treatment areas
		▶ Establish decontamination procedures for all personnel after treatment activities
	● Improper ventilation of waste treatment areas increasing the risk of respiratory infections ● Mixing of waste prior to treatment	▶ Install adequate natural and mechanical ventilation systems
		▶ Provide adequate PPE (N95 masks or higher grade respirators)
▶ Conduct regular air quality monitoring and ventilation system maintenance		
▶ Maintain strict segregation protocols throughout the treatment process		
▶ Use separate treatment cycles or chambers for different waste categories where most appropriate		
▶ Train Healthcare workers and waste handlers on waste-specific treatment requirements		
▶ Establish verification procedures to confirm proper segregation before treatment begins		

Waste treatment		
Nature of risks	Exposure risky Actions	Remedial Actions
	Faulty or poorly maintained equipment waste treatment facility	Implement preventive maintenance schedules with regular inspections and servicing
		Establish equipment performance monitoring systems with temperature, pressure, and cycle verification
		Maintain spare parts inventory and backup equipment for critical systems
		Provide technical training for maintenance staff and equipment operators
		Conduct regular calibration and validation of treatment parameters
		Establish contingency plans and alternative treatment arrangements during equipment downtime
		Keep detailed maintenance logs and equipment performance records

Waste disposal		
Nature of risks	Exposure risky Actions	Remedial Actions
1. Direct contamination of soil, groundwater, air and attracting rodents, flies, and other vectors that can spread diseases to the community	Disposing of healthcare waste in open/unregulated waste disposal sites	Establish partnerships with licensed healthcare waste disposal facilities that meet regulatory standards
		Use only authorized waste disposal facilities with proper engineering controls
		Operate secure disposal sites with restricted access and environmental monitoring
		Conduct site inspections and audits to verify compliance with waste disposal regulations
	Failure to segregate/treat Infectious waste before disposal	Ensure efficient pre-treatment of all infectious waste using remedies like autoclaving, incineration, or approved chemical treatment
		Register treatment certificates and documentation for all processed infectious waste
		Conduct regular testing of treatment processes to ensure pathogen destruction effectiveness
	Burning of waste in open refuse pits at disposal sites	Install controlled incineration systems with pollution control equipment (scrubbers, filters, emission monitoring)
		Advocate and or implement alternative treatment methods such as autoclaving or microwave treatment that eliminate the need for burning
		Enforce HCWM guidelines against open burning
		Provide training to key stakeholders on environmental and health hazards of uncontrolled waste burning



Waste disposal		
Nature of risks	Exposure risky Actions	Remedial Actions
	Allowing unauthorized scavenging at disposal sites	- Implement strict site security and controlled access points - Establish penalties for unauthorized scavenging activities - Establish legal frameworks with penalties for unauthorized scavenging activities - Engage and advocate for alternative livelihood programs for waste pickers, redirecting them to safer recycling activities - Post clear warning signs about health hazards and legal consequences of scavenging - Coordinate with local authorities for regular monitoring and enforcement of site security

APPENDIX 7: A SAMPLE DECOMMISSIONING FORM

Demographic	Specifications
Facility name	
Location	
Department	
Item name	
Manufacturer	
Model	
Serial number	
Reason for decommissioning	
Unserviceable	
Lack of spare parts	
Obsolete	
Unsafe	
Ineffective	
Costly	
Surplus	

Requested by	Acknowledgement of receipt
Name: _____	Name: _____
Title: _____	Title: _____
Sign: _____	Sign: _____

APPENDIX 8. HEALTHCARE FACILITY-BASED HCWM ACTION PLAN

Facility Name:						
Implementation Period: [Insert Year/Quarter]						
Prepared by: [Name/Title]						
Date: [Insert Date]						
Note: <i>This Action plan is simply a guide and therefore should be modified to suit other inclusions as should be found necessary.</i>						
Objective	Key Activities	Inputs / Resources	Expected Outcomes	Timeline/ Period	Means of verification	Person Responsible
1. Ensure proper segregation of healthcare waste at each point of generation	▪ Conduct a needs assessment on availability and adequacy of functional color-coded bins and liners at each service station	Needs assessment checklist, Color-coded bins specifications, posters, PPE, training materials	Waste properly segregated; reduced incidences of cross-contamination, reduction of health facility acquired infections (HFIs), reduction of Antimicrobial resistance	Q1	Reports	
	▪ Provide functional color-coded bins and liners at each service station					
	▪ Train all healthcare workers and waste handlers on waste segregation best practices					
	▪ Display waste segregation posters/IEC materials in all departments					
2. Strengthen waste collection and internal transportation	▪ Establish and display a waste collection schedule in each department	Waste collection schedule, Instituted waste handler, waste trolleys, PPE	Safe and timely waste collection; reduced exposure risks resulting from over stayed waste on wards	Continuous	Cleanliness of departments, Reports	
	▪ Assign trained waste handlers with clear roles and responsibilities at each department					
	▪ Supervise waste collection and internal transportation at departmental level					

Objective	Key Activities	Inputs / Resources	Expected Outcomes	Timeline / Period	Means of verification	Person Responsible
3. Improve waste storage and treatment	Establish a centralized and standardised waste storage area	Site suitability check and gazetting, Weighing platform, weighing scale, weighing log, security of the storage area	Functional waste storage area; improved compliance	Q1-Q4	Reports	
	Institute weighing and documentation of waste weights by category for storage, transportation and or incineration					
	Supervise adherence to waste segregate and safe management during temporary storage					
	Monitor and supervise operations of waste incineration processes to adherence to required standards					
4. Build staff capacity in HCWM	Conduct a training needs assessment among staff on HCWM	Needs assessment report, Trainers/ facilitators profile, Training manuals, Training budget	Improved staff knowledge, compliance, and safety	Quarterly	Incorporate HCWM indicators in performance appraisals	
	Conduct quarterly staff training and refresher courses					
	Integrate HCWM into staff induction					
5. Strengthen monitoring, supervision, and reporting	Establish a functional HCWM Committee	HCWM Committee formulation meeting minutes, Supervision checklists/ tools	Improved accountability and compliance to HCWM best practices	Monthly	Submit periodic HCWM reports to Health facility and District authorities	
	Conduct monthly monitoring and supervisions					
	Ensure proper documentation of HCWM records and reports					

Objective	Key Activities	Inputs / Resources	Expected Outcomes	Timeline / Period	Means of verification	Person Responsible
6. Ensure occupational health and safety for waste handlers	Conduct a PPE needs assessment for all healthcare workers and waste handlers	Checklists, PPE, first aid kits, spill kits	Safe working environment; reduced infection risk	Continuous	Reports on conducted regular health checks for waste handlers	
	Provide adequate PPE to all healthcare workers and waste handlers					
	Conduct periodic safety audits					
	Develop and adhere to emergency procedures for spills and injuries					
7. Strengthen financial and institutional support for HCWM	Review/develop the HCWM plan to establish the budgetary need	Budget allocations, partner support, policy documents	Sustainable HCWM operations and compliance	Quarterly	Reports on Improved HCW financing	
	Participate in health facility budget formulation to include HCWM in facility budget					
	Secure the HCWM budget to support implementation of HCWM processes across the value chain					
	Compile and submit periodic implementation reports to Health facility managers for accountability					
	Participate in other resources mobilization activities to support HCWM					

**Table 13: List of stakeholders that contributed to the development of the guidelines**

No.	NAME	DESIGNATION	ORGANIZATION
1	Dr. Jane Ruth Aceng	Minister of Health	Ministry of Health
2	Hon. Margaret Muhanga	State Minister for Primary Healthcare	Ministry of Health
3	Hon. Anifa Kawooya Bangirana	State Minister for Health in charge of General Duties	Ministry of Health
4	Dr. Diana Atwine	Permanent Secretary	Ministry of Health
5	Dr. Olaro Charles	Director Curative Services	Ministry of Health
6	Dr. Kyabayinze Daniel	Director-Public Health	Ministry of Health
7	Dr. Herbert Nabaasa	Commissioner-Environmental Health	Ministry of Health
8	Dr. Sarah Byakika	Commissioner-Planning, Finance and Policy	Ministry of Health
9	Dr. Opengthyo DuGgum	Commissioner-Community Health	Ministry of Health
10	Dr. Seru Morries	Ag. Commissioner- Pharmaceuticals and Natural Medicines	Ministry of Health
11	Dr. Ronny Bahatungire R.	Ag. CHS-Clinical Services	Ministry of Health
12	Dr. Richard Mugahi	Commissioner-Reproductive, Maternal and Child Health	Ministry of Health
13	Dr. Stavia Turyahabwe	Commissioner-Communicable Diseases Prevention and Control	Ministry of Health
14	Ms. Annet M Musinguzi	Commissioner Human Resource Management	Ministry of Health
15	Dr. Allan Muruta	Commissioner-Integrated Epidemiology, Surveillance and Public. Health Emergencies	Ministry of Health
16	Dr. Martin Ssendyona	Head of the Standards Compliance, Accreditation and Patient Protection Department	Ministry of Health
17	Dr. Jimmy Opigo	ACHS	Ministry of Health
18	Dr. Katwesigye Elizabeth	IPC Focal Person	Ministry of Health
19	Dr. Pamela Achii	PSM Specialist	Ministry of Health
20	Ms. Mirembe Rachel Faith	Technical Coordinator-SHF	Ministry of Health
21	Mr. Tonny Tindyebwa Akankunda	Public Health Officer	Ministry of Health
22	Mr. Vallance Uragiwenimana	Principal Environmental Health Officer	Ministry of Health
23	Mr. Bosco Okia	Principal Health Inspector	Ministry of Health

No.	NAME	DESIGNATION	ORGANIZATION
24	Mr. Stephen Kayanja	Senior Environmental Health Officer	Ministry of Health
25	Mr. Rogers Batesaki	Senior Environmental Health Officer	Ministry of Health
26	Mr. Dickson Wandera	Senior Environmental Health Officer	Ministry of Health
27	Mr. Shafik Senkubuge	Environmental Health Officer	Ministry of Health
28	Mr. Bob Omoda Amodan	Environmental Health Officer	Ministry of Health
29	Mr. Mbaha Emmery	Technical Officer	Ministry of Health
30	Ms. Eva Nalwanga	Environmental Health Officer	Ministry of Health
31	Dr. Ambrose Jakira	Pharmacist	Ministry of Health
32	Dr.. Akello Harriet	Senior Pharmacist	Ministry of Health
33	Ms. Grace Kangoma	Environmental Health Officer	Ministry of Health
34	Ms. Sandra Kyobutungi	Environmental Health Officer	Ministry of Health
35	Mr. Namanya Didacus	Geographer	Ministry of Health
36	Ms. Agnes Biryetega	Accountant	Ministry of Health
37	Ms. Annet M Musinguzi	Commissioner Human Resource Management	Ministry of Health
38	Ms. Roshen Nabaterega	Senior Human Resource Officer	Ministry of Health
39	Mr. Tumwekwase Braim	Human Resource Officer	Ministry of Health
40	Mr. Ainebyoona Emmanuel	Senior Public Relations Officer	Ministry of Health
41	Mr. Roderick Atuhair	Senior Policy Analyst	Ministry of Health
42	Mr. Brian Luswata	Legal Officer	Ministry of Health
43	Dr. Ivan Akunda	M&E Officer	Ministry of Health
44	Ms. Carol Oundo	Admin	Ministry of Health
45	Ms. Suzan Nazziwa	O/A	Ministry of Health
46	Ms. Martha Naigaga	Sanitation coordinator	Ministry of Water and Environment
47	Ms. Comfort Hajra Mukasa	WASH Manager	Amref Health Africa
48	Ms. Kesande Maureen	IPC Focal person	Infectious Diseases Institute
49	Ms. Mary Ayoreka	Environment Expert	IRC
50	Eng. Peter Nzabanita	Country Director	Engineers Without Borders
51	Mr. Busingye Sital	Green label	Green Label Services Limited
52	Ms. Jane Sembuche	Country Director	WaterAid Uganda



No.	NAME	DESIGNATION	ORGANIZATION
53	Ms. Brenda Ichiro	Water for People	Water for People
54	Mr. Jonathan Hunter	WASH Manager	UNICEF
55	Ms. Hasifa Nambi	Advisor Healthcare waste management	USAID
56	Eng. Fred Nuwagaba	Country Coordinator S4M	GIZ
57	Ms. Mugidde Vanessa	M&E Specialist	GIZ
58	Mr. Allan Coikane	Technical Advisor	GIZ
59	Mr. Tom Sengalama	TL NCER	UNDP
60	Ms. Aidah Nakanjako	Technical Officer Health and Environment	UNDP
61	Ms. Atwijuka Diana	Biosafety Officer	Ministry of Health
62	Ms. Kyomuhangi Julian	RTD Commissioner	Ministry of Health
63	Dr. Mukibi Moses	Clinical Pharmacist	Ministry of Health
64	Mr. Mbulambogo Timothy	Biomedical Engineer	Mbarara RRH
65	Dr. Akello Zainab	Pharmacist	Gulu RRH
66	Mr. Mawerere Daniel	STA	Ministry of Health
67	Dr. Aguma Daniel	Pharmacist	Lira RRH
68	Mr. Nkodyo Joseph	National Biosafety Officer	NHCDS
69	Mr. Tibihika Theophilus	Town Clerk	Lira
70	Mr. Hirotot Chris	ADHO-Environmental Health	Lira-City
71	Mr. Elilu Nathan Jonah	HPMTO	Ministry of Health
72	Dr. Sseguya Simon Peter	Pharmacist	FPH
73	Dr. Tabu Fred	Pharmacist	Ministry of Health
74	Mr. Sarah Taratwebirwe	LMO	Ministry of Health
75	Mr. Paul Okwalinga	BRM Advisor	National Health Laboratory and Diagnostic Services
76	Mr. Muhwezi David	CAO	Mitooma Mbarara District Local Government
77	Dr. Ssebutinde Peter	DHO	Mbarara District Local Government
78	Mr. Tugume Erastus	ADHO-Environmental Health	Mbarara District Local Government
79	Mr. Amongin Kareen	Intern	Ministry of Health
80	Mr. Ejul Emmanuel	Chairman IPC	Gulu RRH

No.	NAME	DESIGNATION	ORGANIZATION
81	Mr. Okirwoth Denis	AEO-Electrical	Gulu RRH
82	Dr. Manzi Mbabazize G	Pharmacist	Mbarara RRH
83	Mr. Emiku Joseph	STO	Ministry of Health
84	Mr. Tumuhairwe Arnold	PA	Ministry of Health
85	Mr. Nakabugo Stella	SPSM/LO	Ministry of Finance, Planning and Economic Development
86	Mr. Kabusere Julius	Principal Policy Analyst	Ministry of Health
87	Dr. Idiba Yoweri	DHO	Gulu DLG
88	Mr. Oryem Auric	CAO	Gulu DLG
89	Mr. Opi June Bryan	M&E	Ministry of Health
90	Mr. Agababingi Peter	M&E	Ministry of Health
91	Dr. Muwaza Eriabu	Director	Fortportal RRH
92	Mr. Isabirye Micheal	CBC	Ministry of Health
93	Ms. Kyokushaba Judith	LSCA	Ministry of Health
94	Ms. Magona Sandra	STO	Ministry of Health
95	Ms. Namulindwa Noeline	Ass. Admin	Ministry of Health
96	Mr. Anthony Kirunda	SNAM	MSH
97	Dr. Barigye Celestine	Hospital Director	Mbarara RRH
98	Ms. Namuleme Christine	N/O	Mulago NRH
99	Ms. Namugema Bernadette	SNO	Mulago NRH
100	Mr. Bwangu John	P/Radiographer	Mulago NRH
101	Ms. Namale Annet	CBA	
102	Ms. Betty Mbolanyi	PEO	Ministry of Water and Environment
103	Ms. Nalugonda Barbara	Sec-DPNM	Ministry of Health
104	Ms. Nakade Shamim	NAM	Ministry of Health
105	Mr. Oundo Henry	Lab Advisor	Ministry of Health



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