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Secretariat of the Pacific Regional Environment Programme

PacWastePlus
PACIFIC WASTE MANAGEMENT

This initiative is supported by **PacWastePlus**-a 72 month project funded by the European Union (**EU**) and implemented by the Secretariat of the Pacific Regional Environment Programme (**SPREP**) **to sustainably and cost effectively improve regional management of waste and pollution.**

Model National Healthcare Waste Management Strategy & Implementation Guidelines

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Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

About PacWastePlus

The impact of waste and pollution is taking its toll on the health of communities, degrading natural ecosystems, threatening food security, impeding resilience to climate change, and adversely impacting social and economic development of countries in the region. The PacWastePlus programme will generate improved economic, social, health, and environmental benefits by enhancing existing activities and building capacity and sustainability into waste management practices for all participating countries.

Countries participating in the PacWastePlus programme are: Cook Islands, Democratic Republic of Timor-Leste, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.

KEY OBJECTIVES

Outcomes & Key Result Areas

The overall objective of PacWastePlus is "to generate improved economic, social, health and environmental benefits arising from stronger regional economic integration and the sustainable management of natural resources and the environment".

The specific objective is "to ensure the safe and sustainable management of waste with due regard for the conservation of biodiversity, health and wellbeing of Pacific Island communities and climate change mitigation and adaptation requirements".

KEY RESULT AREAS

- Improved data collection, information sharing, and education awareness
- Policy & Regulation - Policies and regulatory frameworks developed and implemented.
- Best Practices - Enhanced private sector engagement and infrastructure development implemented
- Human Capacity - Enhanced human capacity

Acknowledgment: This National Healthcare Waste Management Strategy & Implementation Guidelines was developed by Tandem Solutions Pty Ltd. with the technical and financial support of the PacWaste Plus Programme. The National Healthcare Waste Management Strategy is one of several strategic documents that will need to be developed to effect sustainable change in the management and treatment of healthcare waste generated in facilities across the country.

How to Use This Document

This Model Strategy and Guideline should be tailored to develop a Model National Healthcare Waste Management Strategy and Implementation Guidelines that meets the requirements of your jurisdiction. Guidance is provided in the following ways:

Instructions to drafters	Instructions on use of the Model Strategy and Guideline will be provided in boxes like the example below. Instructions are provided in dotted boxes throughout the Model Strategy and Guideline. It is intended that all dotted boxes be removed from the final policy, as they are provided for development purposes only.
Specific text requiring modification to suit local context	Most text is expected to be suitable and relevant for use, specific areas where government consideration of language or inclusions is noted by grey highlighting and red test.
Guidance and considerations provided to assist tailoring of the Model Strategy and Guideline to local context.	Drafting guidance for specific issues will be provided in boxes like the example below: **Drafting Guidance:** **Specific Guidance is included in Guidance Boxes like this.**

When utilising this Model Strategy and Guideline to develop your specific Code, please note the following:

- This Model Strategy and Guideline is designed to assist Pacific Island Countries, and Timor-Leste to reflect the requirements of appropriate national Act and the Regulations, as they apply to managing the health and safety risks, and environmental risks posed by healthcare waste.
- The Model Strategy and Guideline should be tailored to the individual legislative framework of the country seeking to adopt and implement the Strategy and Guideline. As such, this Model Strategy and Guideline is designed to provide base information, that is easily tailored to specific circumstances and legislation used in Country.
- This document contains all critical elements needed to produce a National Healthcare Waste Management Strategy and Implementation Guideline. However, depending on circumstances, some of the Strategy and Guideline sections may not be needed. In those situations, those sections should be excised from the final document adopted. Depending on circumstances there may be additional information, restrictions, or controls that some jurisdictions wish to add to the Model Strategy and Guideline prior to adoption.

The following table provides details for the use and modification of each section of the Model Strategy and Guideline.

<table>
<tr><td>PART I: Introduction</td><td rowspan="4">Each Part is designed to assist in navigating challenging areas of healthcare waste management regulation; offers consistent standards; is easily adapted to fit the diverse needs of PICTs.

The Model Strategy and Guideline provides the basis for a complete listing of appropriate best practices for healthcare waste management. In some jurisdictions these practices may not be appropriate and/or attainable due to a lack of experienced personnel or resources to undertake the practice set out in these parts. In some jurisdictions these practices may be superseded by more detailed practices. It is the intention for drafters to review and modify as needed for their specific circumstance.</td></tr>
<tr><td>PART II: Vision for Healthcare Waste Management</td></tr>
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<tr><td>PART IV: Continual Improvement Programs</td></tr>
<tr><td>Annex 1: Operational Procedures for Waste Categories</td><td rowspan="8">These sections are recommended to be included in their entirety (not withstanding local tailoring for contextual accuracy).</td></tr>
<tr><td>Annex 2: Waste Audit/Assessment Tools</td></tr>
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FOREWORD

Healthcare waste can contain potentially harmful micro-organisms that can infect healthcare facility patients, healthcare workers and the public. In addition, discharge of types of healthcare waste such as pharmaceuticals and chemicals can contaminate land or water environments.

There is also the potential for air quality issues, should such as activities such as treating wastes is not undertaken to reduce any such emissions (e.g., incineration at appropriate temperatures and use of air pollution control equipment).

The Healthcare Waste Management Policy provides detail as to the specific objectives for effective and sustainable HCWM.

This HCWM Strategy & Implementation Guidelines provides the specific requirements for implementation of that Policy for Healthcare and related facilities.

Table of Contents

Definitions and Acronyms

The following provides definitions for contents in this Healthcare Waste Management Strategy.

years	Definition
Anatomical Waste	Limbs, organs, placenta, pathological specimens, biopsy specimens and body tissue taken during laboratory testing, surgery, or autopsy and/or resulting from investigation or treatment of a patient. It does not include corpses.
Container	This refers to any rigid walled receptacle designed for healthcare waste (or other wastes) to be deposited into it. Retractable syringes are not considered as a sharp's container.
Contamination	Any waste item that has been deposited into the incorrect container.
Cytotoxic Waste	Material, which is, or may be, contaminated with a cytotoxic drug during the preparation, transport, or administration of cytotoxic therapy.
Disposal	Intentional burial, deposit, discharge, dumping, placing or release of any waste material into or on air, land, or water. Disposal is undertaken without the intention of retrieval.
General Waste	Waste that does not pose an immediate hazard or threat to health or to the environment, and includes: ▪ domestic waste; ▪ building and demolition waste; and Inert waste.
Government	The Government of Country
Hazardous waste	Component of the waste stream which poses a danger to humans, the environment, equipment, and physical structures.
HCW	Healthcare waste
HCWM	Healthcare waste management
Health Care Waste Management Advisory Committee	A Committee established under authority of the National Institute for Public Health.
Home Healthcare Waste	Healthcare waste that is generated in a domestic setting by a visiting healthcare professional (eg. doctor, nurse, veterinarian), in the course of their employment.
Health Care Facility (HCF)	An institution that has health care as its core service, function, or business. Health care pertains to the maintenance or improvement of the health of individuals or populations through the prevention, diagnosis, treatment, rehabilitation; and chronic management of disease, illness, injury, and other physical and mental ailments or impairments of human beings.
Health Care Workers	All staff in the Health Care Facility (HCF), i.e., doctors, nurses, midwifes, administrative staff, paramedics, ancillary workers, institution workers, nursing attendants, dental aides, laboratory aides, janitors, maintenance, radiology aide, social workers, etc.
Incineration	Any dedicated method, technique or process to convert waste by means of thermal oxidation.
INSP-TL	National Institute for Public Health.

years	Definition
Landfill	A disposal method where waste is buried in the ground and covered with layers of earth or geotextile material.
Pathological (otherwise known as anatomical) waste	i. deceased animals or animal parts infected with zoonotic diseases; ii. human and animal tissues, organs, body parts, blood, fluid blood products and body fluids; iii. containers or equipment containing blood that is fluid or blood from animals known or suspected to be infected; and human foetuses; but excludes teeth, hair, and animal carcasses generated by the public.
Pharmaceutical Waste	Consists of pharmaceutical (drug, remedy / medicinal substance). Pharmaceutical waste may arise from expired or discarded pharmaceuticals, those no longer required by patients or departments and waste materials/substances generated during the manufacture and administration of pharmaceuticals.
Recycle / recycling	Set of processes (including biological) for converting recovered materials that would otherwise be disposed of as wastes, into useful materials and or products.
Recyclables	While this term strictly applies to all materials that may be recycled, in this document the term is generally used to refer to the recyclable containers and paper/cardboard component of kerbside waste, i.e., it excludes garden organics.
Resource recovery	Process that extracts material or energy for a useful purpose
Sharps waste	means any waste resulting from medical, nursing, dental, veterinary, pharmaceutical, skin penetration, or other related clinical activity, and that contains instruments or devices that: (a) have sharp points or edges capable of cutting, piercing or penetrating the skin (e.g., needles, syringes with needles or surgical instruments); (b) are designed for such a purpose; and have the potential to cause injury or infection.
Standard Operating Procedures	Procedures developed to implement this Policy and be followed as “Standard Practice” for various aspects of HCWM.
Treatment	A process that changes the physical, chemical, or biological character of waste to reduce its environmental threat. Treatment can neutralize waste, recover energy or material resources from waste, render the waste less hazardous or make the waste safe to transport, store or dispose of.
Waste	Materials and energy which have no further use and are released to the environment as a means of disposal.
Waste generator	Any person or organisation that consumes goods and services resulting in addition to the waste stream.
Waste hierarchy	A concept promoting waste avoidance ahead of recycling and disposal, often referred to in community education campaigns as ‘reduce reuse recycle’. The waste hierarchy promotes management of wastes in the order of preference: avoidance, reuse, recycling, recovery of energy, treatment, containment, and disposal.
Waste management	Entire process of monitoring process of monitoring, collecting, sorting, storing, and transporting for processing and reclamation of materials and energy resources and disposal of waste.

Introduction

1.1 Country Profile

[Country to add details]

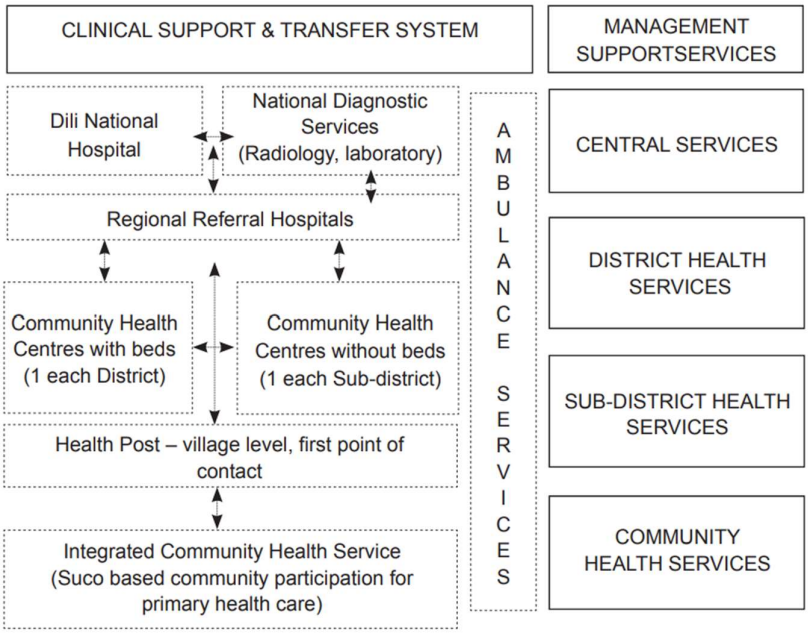
This section should include information on size and demographics of the country. These should be: Population numbers, major cities, median age and population growth, country jurisdictions, and any other information related to the health care system in country.

1.2 Healthcare Management in Country

[Country to add details]

This section should include information on healthcare challenges in the country as well as the current health system configuration. The private sector healthcare capacity should be included as well

See example below.



Hospital Healthcare

Country to add details]

This section should include information on hospital care and how the nation system is organized

Drafting Guidance:

EXAMPLE: There are two levels of hospitals providing secondary care. Tertiary health care is currently provided overseas because of limited technology and specialized human resources required to perform complex interventions which are the main causes of medical evacuations abroad.

Referral hospitals are in five strategic regions. The referral hospitals have OPD, Emergency and In-patient departments. They are staffed with general practitioners and specialists in four clinical areas such as surgery, paediatrics, gyneco-obstetrics and internal medicine.

The national hospital is the top tier referral facility for specialized services and has linkages for tertiary care with facilities abroad. Both national and referral hospitals provide training facilities for cadres of health workers who function at the primary care level. These facilities also serve as internship centres for all staff up to Medical Officers.

Referral arrangements between the three levels of services are linked with ambulance services, with ambulances based in hospitals and district ambulance stations. However, to promote efficiency in health service utilization the system must facilitate supportive supervision of lower levels of care by higher levels.

Services at the secondary and tertiary levels shall be oriented to support service quality in the health facilities and to improve the performance of the referral chain and level of excellence that is expected from both secondary and tertiary health care services.

1.3 Types of Hazards

Exposure to hazardous healthcare waste can result in disease or injury, as it has a higher potential of infection and injury than any other type of waste. This is due to this waste having one or more of the following characteristics:

Healthcare waste potentially contains one or more of the following:

- infectious agents – a great variety of pathogenic micro-organisms (bacteria and viruses).
- cytotoxic materials.
- hazardous chemicals.
- pharmaceutical substances.
- radioactive substances.
- sharps.

1.4 Public and Environmental Risks

If HCW is inappropriately managed, or dumped in the environment, human and environmental health is at risk. All generators of healthcare waste must therefore respond to this National Strategy and develop and implement appropriate strategies to ensure safe and effective management of wastes.

It is for this reason that the INSP-TL in this HCWM Strategy advocates the use of the "Precautionary Principle", to guide HCWM programs.

This principle requires decision makers to act in a conservative manner when there is dispute over scientific conclusions in relation to, in this instance, appropriate healthcare waste management strategies.

1.5 Definition of Healthcare Waste

Country to add details]

This section should summarise the legal basis for management of healthcare waste and the definitions to be used for classifying wastes in country

Drafting Guidance:

EXAMPLE: Decree-Law XXXXXX – Urban Solid Waste Management System (Article 6); Defines urban solid waste as wastes originating from housing, the service sector, commercial or industrial establishments, and healthcare units, if the daily output does not exceed 1100 litres.

Includes bulky waste; organics; waste produced in public places; animal waste; construction waste; dangerous waste; and healthcare waste.

Article 6 (viii) defines healthcare waste as:

Hospital waste: waste from hospitals, health centers, laboratories, clinics veterinary or other similar establishments and that may be contaminated by any products biological, physical or chemical, which pose a risk to human health or danger to the environment.

To provide guidance and clarity over the types of materials that are to be defined as healthcare waste, the following expanded definition is to be used:

i. Human tissue or anatomical waste.
ii. A sharp discarded object or device capable of cutting or penetrating the skin ('sharps').
iii. A diagnostic specimen.
iv. A laboratory culture.
v. Tissue, carcasses or other waste arising from animals used for laboratory investigation or for medical or veterinary research.
vi. Materials or equipment reasonably suspected of being contaminated with human blood or body fluids other than urine or faeces. However, materials or equipment contaminated with faeces of patients who have or are suspected of having infectious gastroenteritis or any diseases transmitted via the faecal oral route are classified as healthcare waste.
vii. Waste from patients known to have or suspected of having a communicable disease.
viii. Sanitary napkins from patients, although this excludes sanitary napkins from non-patient areas provided an appropriate disposal system is used.
ix. Wastes within the waste stream which constitute, or are contaminated with, cytotoxic drugs, chemicals or pharmaceuticals.

1.6 Categories of Healthcare Waste

The main categories of HCW are listed below. There may be other types of wastes generated and each healthcare facility should undertake a waste audit/assessment to determine types of wastes and in what quantities are being generated to implement appropriate management actions.

Type	Container	Management
Infectious waste	Yellow container with biohazard symbol	**Transported to a treatment facility**
Sharps waste	Yellow container with biohazard symbol	**Transported to a treatment facility**
Cytotoxic waste	Purple container with cytotoxic waste symbol	**Transported to a treatment facility**
Pharmaceutical waste	Yellow container with biohazard symbol (depending on treatment facility)	**Transported to a treatment facility**
Radioactive waste	Red container with trefoil symbol	**Stored on-site and then disposed of to a licenced landfill**
Chemical Waste	Non-reactive for the type of chemical	**Disposed of to a facility permitted to receive and treat the chemical**
General waste	Black, white or clear container	**Landfill disposal**
Recyclables	Depending on type of recyclable and contractor	**Recycling facility**
Organics (Food and Garden Materials)	**Not specified**	**On-site or off-site composting**

1.7 Sources of Healthcare Waste

While hospital and similar medical sources are obvious generators of healthcare waste, there are many other sources where the same management actions and requirements as specified in this Strategy shall also be adhered.

These include (but are not restricted to), the following:

- Acupuncture clinics.
- Collection of sharps and healthcare waste from commercial buildings and workplaces (e.g., first aid waste).
- Collection of sharps from public areas.
- Community health clinics.
- Emergency services.
- Forensic situations such as crime and trauma scenes.
- Funeral parlours.
- Home Healthcare.
- Hospital laboratories.
- Local Government waste collection programmes.
- Aged-care facilities.
- Medical research facilities.
- Pathology laboratories.
- Schools.
- Tattooists.
- Universities.
- Veterinarians.

1.8 Role of Infection Control in Waste Management

Management of health-care waste is an integral part of healthcare facility hygiene and infection control. Health-care waste is a reservoir of pathogenic microorganisms, which, if someone is exposed, could give rise to an avoidable infection. If waste is inappropriately managed, these microorganisms may be transmitted to people or the environment. The following procedures apply when handling waste to adhere to infection control protocols:

i. Apply standard precautions to protect against exposure to blood and body substances during handling of waste;
ii. Body fluids, blood suction fluids and excretions, depending on the sewage system, may be carefully emptied down a drain connected to a sewer, unless vacuum sealed, if appropriate PPE is worn;
iii. PPE should always be worn when handling HCW (gloves, masks and eye protection) – adequate supplies of PPE and waste containers/bin liners should be maintained so that they are always available and particularly in case of a health event such as a pandemic;
iv. Wash hands following procedures;
v. Sufficient and appropriately labelled bins to allow for health care waste segregation must be provided;
vi. Segregation should occur at the point of generation;
vii. Waste should be contained in the appropriate receptacle (identified by colour and label) and disposed of according to the facility waste management plan;
viii. Sharps containers must be puncture resistant, waterproof and leak-proof, with the opening wide enough to allow sharps to be dropped into the container by a single hand operation;
ix. Waste bags should not be over filled (approx. 2/3 full);
x. Bin liners should be held away from the body and placed in a mobile garbage bin or trolley for transport to the storage area(s);
xi. Waste handlers should receive immunisation such as Tetanus and Hepatitis A and B;
xii. Healthcare personnel should be trained in the correct procedures for waste handling; and
xiii. Waste storage facilities should be covered and secure.

All healthcare facilities should undertake ongoing risk assessments to ensure that all wastes are managed safely and correctly. It is important that when designing healthcare facilities (or even expanding existing ones), consideration be given to the requirements for waste management so that there is appropriate space for the required type and number of waste containers.

2 Vision for Healthcare Waste Management

Your countries vision for HCWM should be provided here

2.1 National Healthcare Waste Management Strategy Vision

That Healthcare Waste Management reflects international best-practice by creating a strategy and framework for an enduring system that ensures that the principles of ecological sustainable development apply and implemented within the healthcare sector.

2.2 Objectives

The primary goal of this Healthcare Waste Management Strategy and Implementation Guideline is to provide a framework for Health Care Waste Management (HCWM) within Country for all healthcare and related facilities and organisations. This Strategy provides direction on how Healthcare wastes are to be properly managed in accordance with the following:

i. HCWM will be closely linked to infection prevention and control in healthcare with emphasis on the critical importance of infection control for effective health management;
ii. HCWM shall take into consideration the Waste Management Hierarchy and give attention to the different waste management options as part of the integrated waste management system approach;
iii. Consideration given to sustainable development principles in the acquisition and use of resources minimising them where possible, reusing items when appropriate medically, maximising the recycling of materials and taking account of sustainable development issues in the management of wastes;
iv. HCWM shall give attention to "Cradle-to-grave" practices to manage waste from source to final disposal;
v. Adoption of policies and procedures to minimise the environmental impact of waste treatment and disposal;
vi. Consistent colour coding of waste/recycling containers shall be implemented by all facilities generating HCW as a measure to effectively segregate waste at source to prevent mixed waste entering the entire healthcare waste stream;
vii. Minimise waste to landfill through sustainable waste management practices which incorporate reduce, reuse, recovery and recycling principles;
viii. Infrastructure such as on-site waste storage areas and treatment facilities will be constructed to ensure risks to all personnel are avoided;
ix. All healthcare facilities shall develop and implement waste management plans and ensure that the plan is regularly reviewed (every two years or sooner if there are any changes that can impact on management of wastes);
x. A responsible properly trained and competence assessed waste management Officer and Focal Point appointed for each healthcare facility. The is responsible for developing a Position Description for this role and distributing to all healthcare facilities;

Your countries ministry/agency responsible for developing a Position Description for this role and distributing to all healthcare facilities should be included here

xi. Foster commitment from all staff and management to actively participate in waste avoidance, reduction, reuse and recycling programs;
xii. Development and maintenance of a waste management education program for all staff to increase awareness of Health and Safety issues and waste minimisation and segregation principles;
xiii. Appropriate resourcing for equipment such as personal protective equipment (PPE) will be provided to all facilities generating HCW; and
xiv. HCWM shall be integrated with other national policies and procedures within the country, and with laws and regulations regarding environmental management and general health issues and specifically with the

Your countries ministry/agency responsible for developing and enforcing healthcare waste management laws and regulations should be included here.

xv. Reduce waste and emissions to zero while using renewable energy sources;
xvi. Keep materials, products, tools, or technology within a system if feasible (i.e., reduce leakage); and
xvii. Apply circular economy principles to the entire healthcare cycle: from design or manufacturing of supplies through use, repair, refurbishment, and disposal of wastes.

2.3 Responsibilities and Obligations

Every generator of HCW has the responsibility of ensuring that there are no adverse health effects and environmental consequences resulting from the handling, collection, storage, treatment, and disposal of HCW it generates.

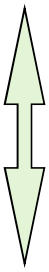
Compliance with the requirements contained within this HCWM Strategy will result in benefits such as:

i. Protection of human health and safety by controlling and/or reducing exposure of persons at risk to hazardous HCW and minimizing indirect impacts from environmental exposures to HCW;
ii. Committed compliance of Health Care Facility (HCF) to the regulatory laws, policies, and guidelines required by national and local authorities in observing proper HCWM;
iii. Advancing of community ecological awareness and relationship by demonstrating commitment and dedication in implementation of HCWM programs and activities;
iv. Sustainability of the HCWM Program of HCFs including continuous improvement, less events of accidental exposure and incidents of injury among HCW handlers; and
v. Resiliency of HCFs in the face of emergencies, disasters, threats of emerging pathogens and diseases, and ever-changing socio-cultural and regulatory changes that impact the efficiency and effectiveness of HCWM implementation.

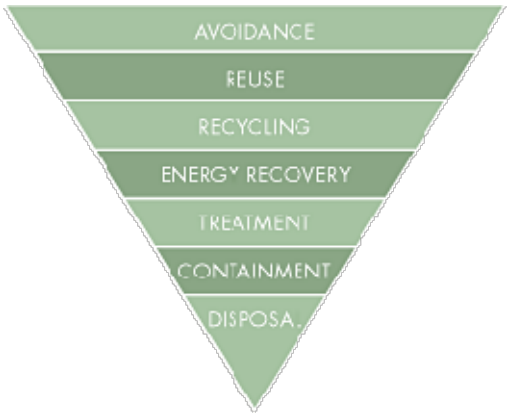
2.4 Guiding Principles

This HCWM Strategy is based on the waste management hierarchy as illustrated below.

More Desirable Option



Less Desirable Option



This hierarchical approach advocates avoidance of wastes as the preferred option over other options as recycling, treatment, and disposal. The World Health Organization has summarised this approach for healthcare waste in the following diagram:

https://www.who.int/multi-media/details/follow-the-waste-hierarchy-model-for-safe-and-sustainable-health-care-waste-management

While this approach is directed at minimising the volume of wastes generated in the first instance (and subsequent reduction in raw materials and energy use), it recognises that wastes will unavoidably be generated. This being the case, then treatment processes that reduce toxicity and volume, such as incineration, are preferred prior to final disposal techniques (eg., in a landfill).

To ensure clarity on the principles of healthcare waste management, the below are established as the core principles to be utilised by all Healthcare workers.

Principle 1	The principle of "Best Practicable Environmental Option" shall apply to HCWM. by adopting practices that offer overall better outcomes than the "do nothing" alternative. While in the short / medium term INSP-TL and other generating facilities will have a direct and immediate role in management, treatment, and disposal activities such as incineration and land disposal, every effort shall be made to explore other opportunities that may offer environmentally and / or economically more attractive alternatives.
Principle 2	No waste/recyclable is to be transported and/or stored in a container that has been designated for other waste/recyclable under any circumstances.
Principle 3	Hazardous and non-hazardous wastes should be transported and stored separately. Transportation routes for hazardous wastes should, as far as possible, avoid public areas, areas where infection-prone patients are housed, and food storage and preparation areas. Waste transportation should avoid visiting hours and mealtimes.
Principle 4	Wastes should not be disposed of via the sewer system except for bulk blood and body fluids that has the approval of the Infection Control Officer and all safety precautions such as wearing PPE are utilised.
Principle 5	The INSP-TL will not allow untreated healthcare waste to be disposed of to landfill or other land disposal options.
Principle 6	If there is uncertainty as to correct classification of wastes, then healthcare personnel such as Infection Control Officers and/or the INSP-TL be consulted.
Principle 7	All wastes are managed in accordance with the greatest hazard in the bin/bag. For example, if there is a small volume of healthcare waste placed into a bag of general waste, then the whole bag must be treated as healthcare waste.

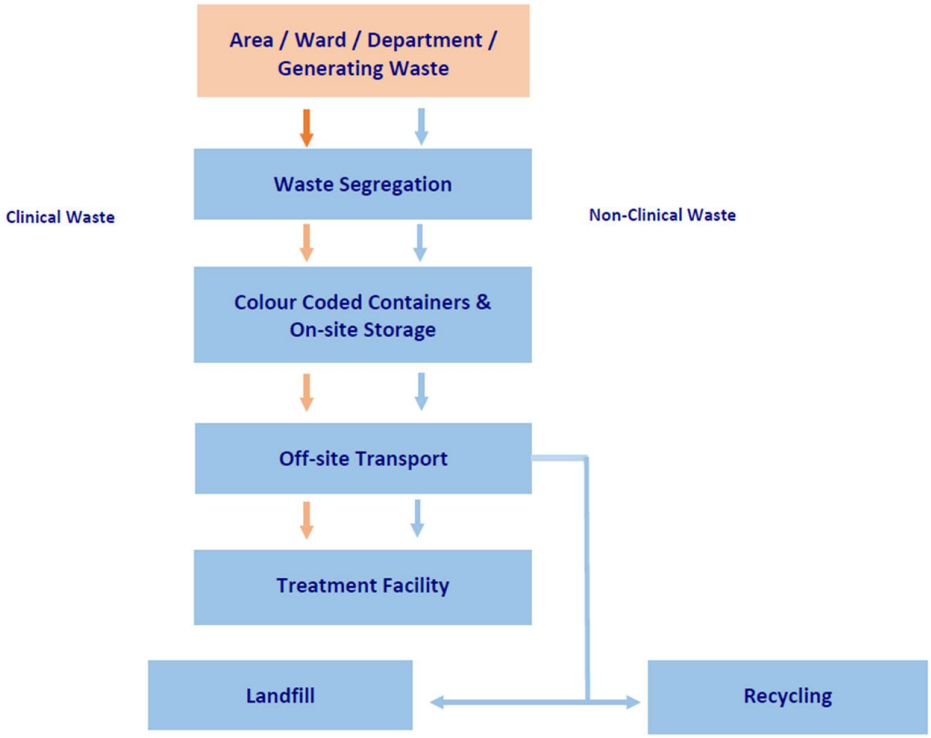
3 Implementing Healthcare Waste Management Best Practices

3.1 Healthcare Waste Management System Requirements

Following are a series of waste management elements to be managed to ensure the strategic vision is realised.

3.1.1 Healthcare Waste Management Process

The following summarises the process for managing healthcare waste. Yellow is for healthcare waste and green represents general waste and recyclables.



3.1.2 Waste Segregation

The determination of appropriate treatment and disposal practices for waste is dependent on an accurate classification of the waste.

The classification of wastes generated in a healthcare facility is typically done according to its:

- Potential hazard i.e., toxicity, corrosivity, flammability, radioactivity, pathogenicity, etc; and/or
- Source i.e., oncology, pathology, microbiology, etc; and/or
- Offence i.e., a subjective aesthetic that is abhorrent to an individual or the public, e.g., human tissue, body parts; and/or
- Requirements for treatment prior to disposal; and/or
- Capacity to be recycled or recovery of resources (eg., composting); and/or
- Acceptance for disposal to landfill.

Correct waste segregation of all types of HCW is important to ensure that they are managed correctly. This reduces the potential for pollution and safety for all staff, patients, visitors, and the wider community. Poor segregation practices may mean that a greater quantity of HCW will need treatment prior to disposal and reduce the potential for recycling where possible.

Segregation at the source (where the waste is produced) is essential to reduce the amount of waste requiring special treatment, to maximize the amount of waste that can be recycled and to protect workers. When health care waste is not segregated and is combined, all the mixed waste becomes hazardous requiring special treatment.

Some general rules for waste segregation include:

1. Use a consistent colour coding throughout the facility. Use either nationally approved coding or, if there is no national scheme, use that recommended in **Section 3.13** below.
2. Size the container for the appropriate quantities of waste generated per area or department.
3. All bins should be clearly labelled (in appropriate languages), with a poster or chart nearby explaining exactly where wastes should be disposed. Use of pictures can assist in understanding correct segregation.
4. Bin placement
   a) Place the appropriate bins where different types of waste are likely to be generated.
   b) Avoid placing individual bins by patient beds as they will be used for all types of waste. Involve employees in the determination of container placement.
5. Only non-hazardous waste and recycling bins should be placed in publicly accessible areas.
6. Bins for infectious and other hazardous waste including sharps containers should be placed on treatment trolleys and safe areas such as dirty utility rooms.
7. Sharps containers should be available within arm's reach and in sight of the provider wherever injections are given, including on the treatment trolley.
8. Ensure an adequate supplies of sharps containers, bins, and colour coded bags so staff will be able to always comply with the system.

Annex 1 contains the procedures required for the management of the various waste types generated in the HCF.

3.1.3 Waste Containers

The success of the waste/recycling system will depend on having a clearly identified container for each type of material.

This is achieved using colour coded containers, symbols and wording. In addition, signage must be placed so that those wanting to dispose of materials can clearly and readily identify which container to deposit such materials into.

Container Type & Size

The following are the types of equipment that should be used in every healthcare facility – the actual type and number will be dependent on the size of the facility and the types of health services provided:

- Bins with lids (and colour coded) – these should range from smaller bins such as 30-60 litre for wards/departments though to 120/240 litre mobile garbage bins for larger wards/departments (eg., theatre, emergency and pathology).
- Larger mobile garbage bins (eg., 240/660/1100 litre) for collecting from wards/departments, consolidating waste loads and transporting to the treatment facility.

- Sharps containers for sharps – these should range in size from approximately 1.0 litre though to 60 litres for larger waste (note though in areas such as theatre, 240 litre mobile garbage bins can be used for larger surgical equipment that could also be classified as a sharp).
- Containers should be colour coded – yellow for healthcare waste and purple for cytotoxic. There is no designated colour for pharmaceutical waste, but some places use orange.
- Bins should have lids rather than be open.
- Bin liners (bags) for healthcare and cytotoxic waste should also be colour coded and have symbols on them.
- There are many different sharps containers (eg., disposable/reusable and plastic or cardboard).

Colour Coding

Use of colours to indicate what materials are to be deposited into a container is essential to clearly show this as well as to indicate to waste handlers' potential hazards with the contents as well as for identifying incorrect disposal. Colours and signage for the main categories of HCW are described below.

For other waste streams use of colours different to these ones is recommended. If coloured containers and bin liners are not available, the essential point will be to ensure that the waste containers are correctly labelled as to the contents.

Waste	Container Colour	Symbol On Bag	Wording on Bag
General waste	Clear, white, black or translucent	None	None
Infectious waste	Yellow		Infectious or contaminated waste
Cytotoxic waste	Purple		Cytotoxic waste
Radioactive waste	Red		Radioactive waste

3.1.4 Signage

Signage must be clear and consistent and designed specifically with the healthcare facility and their practices in mind.

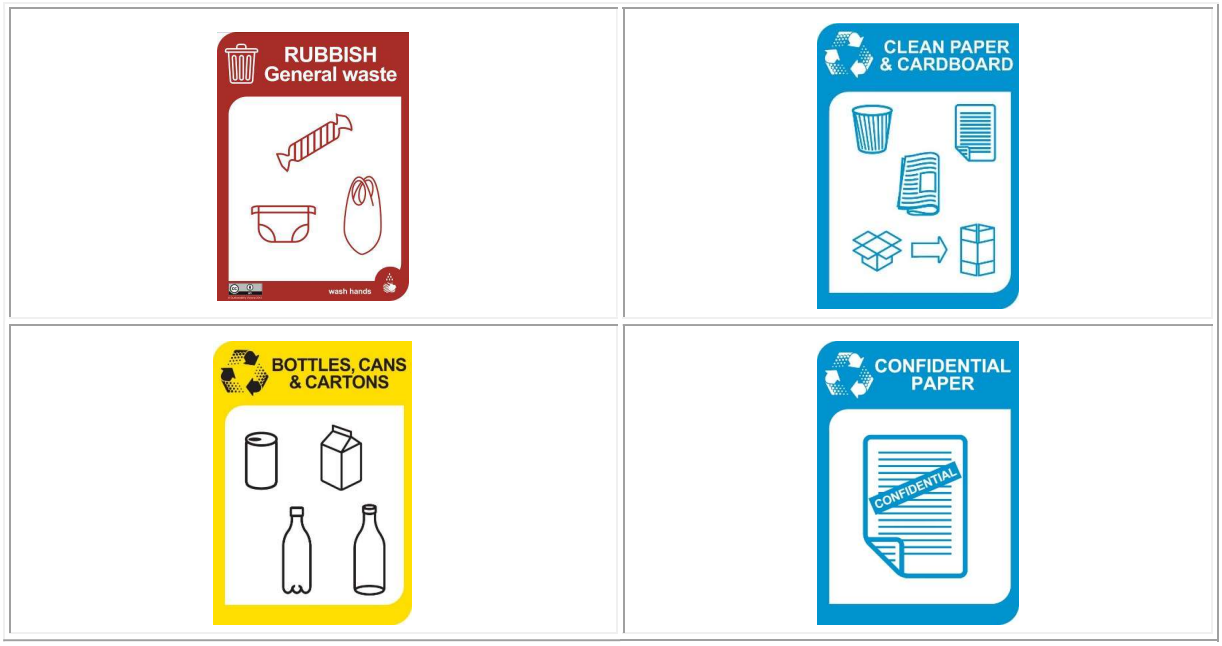
In wards/departments, and waste room/waste storage areas, large, colour coded signage needs to be rolled out. This signage should be highly visible and detail which items are acceptable in each stream.

The following should apply:

- Visual imagery should be clear and unambiguous.
- Keep signs clean looking and simple; do not clutter.
- Where possible signs should be at eye level and on the opening to the bin.
- To avoid confusion, language and terms should be kept simple and should be in the appropriate language for understanding/readability (eg., in Tetun/Bahasa).

There can be two styles of signage. One that appears on containers and other equipment simply to designate what is in the container, and the other what is placed on walls or lids of containers advising what to deposit into the respective containers.

The following are samples of signs that should be used.



3.1.5 Waste Handling

Handling waste should be undertaken in a manner so that minimises manual handling of items such as waste bags and containers. This though is not always able to be undertaken. It is important that when handling healthcare waste that all care is taken to ensure that there are no injuries, or impact on the environment from spilt waste.

Waste containers should be managed/transported safely (i.e., should not be carried against the body, as needles could be sticking out, or the outside contaminated with blood/body fluids or chemicals).

All staff who handle waste and recyclable materials must receive training in all relevant Safe Operating Procedures. Training includes infection control, personal hygiene, safe handling techniques, correct use of Personal Protective Equipment and spill management procedures.

In addition, it is recommended that all waste management personnel:

- Are issued with a comprehensive statement of duties and standard operating procedures and work instructions;
- Are issued with appropriate Personal Protective Equipment and required to wear it while handling waste;
- Have access to equipment and facilities that minimise manual handling and promote personal hygiene;
- Are aware of the requirements of the Infection Control Policy; and
- Are offered appropriate vaccination.

3.1.6 Personal Protective Equipment (PPE)

Personal protective equipment is to be used when handling all waste and is to be supplied by the healthcare facility, includes:

- Eye shields;
- Gloves;
- Gowns;
- Masks;
- Aprons; and
- Footwear.

3.1.7 Internal Collection & Transport

Transportation of health care waste within the facility must take place during less busy times of the day (eg., in the evenings or very early in the morning).

All health care wastes should be transported using designated wheeled trolleys that are not used for any other purpose. A spare trolley should be readily available in case of breakdowns and maintenance. To avoid infection transmission trolleys must be cleaned and disinfected after every use.

A trolley should have the following characteristics:

i. Safe to load and unload and appropriately sized according to the volume of waste generated at the health care facility, easy to push and to pull, and not too high (to avoid restricting the view of personnel transporting the waste);
ii. No sharp edges that could damage waste bags or containers during loading and unloading;
iii. Easy to clean and, if enclosed, fitted with a drainage hole and plug; and
iv. Labelled and dedicated to a particular waste type and secured with a lock if used for hazardous waste.

Routes for transport of infectious waste from patient areas to storage should be established by the health facility.

3.1.8 On-Site Storage

Cleaners and/or waste management staff are responsible for depositing materials collected from their area of responsibility into the correct container within the appropriate storage area.

Chemical wastes are required to be stored so that the different classes or types of chemicals cannot react with each other.

Radioactive waste if generated must be stored in accordance with Government specifications for this waste type.

Waste Management Staff are responsible for maintaining these storage areas located within each building in a hygienic manner.

The waste storage areas should be clearly signed so that wastes/recyclables are stored correctly. Each stream will be in a designated area. This will assist in easy identification of correct bins by cleaners and staff.

Signage will be displayed in the storage areas advising of acceptance criteria within each system.

The storage area shall be designed and constructed so that:

(a) Its base is an impervious surface (eg. concrete) surrounded by a bund appropriate to contain any spill;
(b) All loading/ unloading takes place within the bunded area in such a manner to ensure any spills are appropriately managed;
(c) The base and walls of bunded areas are free of gaps or cracks;
(d) Where vehicular access to the bunded area is required, bunds are constructed to prevent them from being damaged by vehicles;
(e) Be signposted labelling appropriate to the types of waste stored in the area (eg. infectious, cytotoxic); and
(f) No liquid waste, wash down waters or stormwater contaminated with healthcare waste are disposed of via the stormwater drainage system. Spill Kits for waste shall be in the storage areas.

Infectious waste storage time should not exceed the following periods:

a. 48 hours during cool season; or
b. 24 hours during hot season.

If available, a refrigerated storage room can store infectious waste for more than a week with a temperature between 3°C and 8°C.

The compacting of untreated infectious waste, or waste with a high content of blood or other body fluids destined for off-site disposal, is not permitted.

Disinfection of storage areas must be done regularly, or at least once a day.

3.1.9 Off-Site Transport

Any vehicle that transports waste off-site should be covered so that all wastes are always contained. The way this is to be achieved will depend on the waste types and volumes. This could be an enclosed vehicle with sides and a roof through to a tarpaulin used to cover all loads.

Loose waste liners shall not be transported. All such waste liners shall be placed into an outer container for transport – this includes shipping containers. Transport of loose waste liners poses workplace health and safety concerns regarding manual handling and potential environmental issues should a spill occur.

At all times off-site transport of infectious, sharps, pharmaceutical, chemical or radioactive wastes must be done in accordance with the requirements of the United Nations Recommendations on the Transport of Dangerous Goods – Model Regulations (Rev.22), 2022.

Collection schedules should be arranged with the service provider so that timing of the collections is separate to the delivery of other goods to the facility.

A record of all collections must be provided and this to include details such as:

i. Date/time of collection;
ii. Name of service provider and their representative undertaking the collections;
iii. Types and volumes of waste collected; and
iv. Destination for treatment or disposal.

The collection vehicle should be disinfected at the conclusion of all collections each day and records kept of this.

All waste management staff should be trained in safe waste handing techniques and provided with (and use), appropriate PPE.

3.1.10 Waste Treatment & Disposal

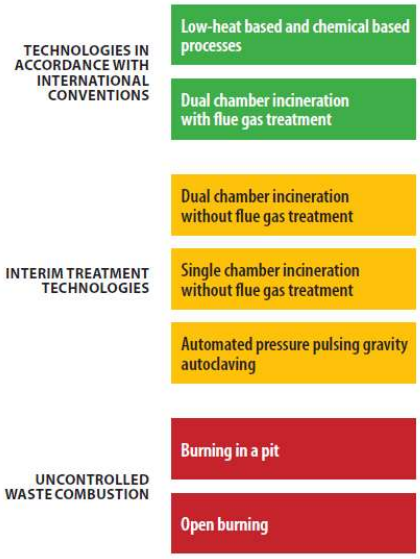
In determining the method to be used in HCW treatment and disposal the choice of treatment system involves consideration of waste characteristics, technology capabilities and requirements, environmental and safety factors, and costs – many of which depend on local conditions.

The treatment technology must comply with the national standards and international conventions.

Factors to consider include: types and quantity of waste for treatment and disposal/capacity of the system; treatment efficiency; volume and mass reduction; occupational health and safety and environmental considerations; infrastructure and space requirements; locally available treatment options for final disposal; training requirements for operation of the method; cost of operation and maintenance; location/surroundings of the treatment site and disposal facility; regulatory requirements; social and political acceptability; cost of transport and disposal of treated waste; and cost of decommissioning.

Recommended treatment and disposal options for healthcare waste can be sourced from the Secretariat of the Pacific Regional Environment Programme publication "*Technology Options: Safe Destruction of Healthcare Waste Other Than Traditional, High-Temperature Incineration, September 2022*".[1]

The following figure summarises the preferred approach for the selection of treatment technologies[2].



A healthcare facility may have all or some of the HCW managed by external contractors. Annex 6: Waste Management Tender Framework, provides some guidance as to the tender contents and responsibilities for these external contractors.

[1] https://pacwasteplus.org/resources/technology-options-safe-destruction-of-healthcare-waste-other-than-traditional-high-temperature/

[2] World Health Organization, Overview of technologies for the treatment of infectious and sharp waste from health care facilities, 2019.

Principles

The purpose of the treatment process is to change the wastes biological or chemical hazard to reduce or eliminate its potential to cause disease by meeting acceptable biological standards and to ensure that there is minimal adverse environmental impact in respect to water, soil, air and noise.

The following are key aspects for managing the disposal of healthcare wastes:

i. Healthcare waste should be treated before disposal;
ii. Disposal of ash must be undertaken to prevent it "dispersing" into the environment;
iii. Chemicals should not be disposed of via drains; and
iv. Pharmaceuticals should be incinerated or encapsulated prior to disposal.

Minimum Standards

Sources of advice on treatment technologies and processes are in the following publications:

- Secretariat of the Pacific Regional Environment Programme, Waste Technology Management Options: Healthcare Waste, November 2020.[3]
- Secretariat of the Pacific Regional Environment Programme, Assessment of Small-Scale Technology Suitable for Waste Management in the Pacific and Timor-Leste, November 2020.[4]

Annex 5 provides summaries of the treatment technologies that can be used for the management of HCW.

3.1.11 Education Programs

Staff are the most important element of waste management, and therefore require appropriate training to be provided to ensure they fulfill their responsibilities as established by this Strategy.

Education for waste management is a component of an overall waste management program. Without education, staff and other stakeholders will not know or understand what their responsibilities are for the safe, economic and environmentally responsible management of all waste generated within all healthcare facilities.

Annex 4 contains recommendations for the curricula and delivery of a HCW education program.

[3] https://pacwasteplus.org/resources/waste-technology-management-options-healthcare-waste/

[4] https://pacwasteplus.org/resources/assessment-of-small-scale-technology-suitable-for-waste-management-in-the-pacific-and-timor-leste/

3.2 Roles and Responsibilities for Facility Waste Management

To facilitate the development of a sustainable waste management framework for healthcare facilities, INSP-TL requires that the following be implemented in all facilities.

3.2.1 Management Responsibilities

Healthcare facility managers must ensure that all workers are aware of how his or her action or inaction can influence the effectiveness of the waste management system, through implementing a staff education program. Both senior management and a Waste Management Committee should convey an enthusiastic approach to achieving better resource management.

Management should also provide ongoing opportunities for all stakeholders to participate in the planning, establishment, and maintenance of the waste management system.

3.2.2 Waste Management Committee

To assist Management with their responsibilities and acknowledge the role each employee plays in Workplace Health and Safety and waste management, all HCF shall establish a Waste Management Committee as described below.

Formation of A Waste Management Committee

To ensure all waste is managed in accord with this Strategy, the formation of a committee will provide a process of investigating all opportunities and analysing them for their applicability to the facility.

The Waste Management Committee has an important role in ensuring that this Waste Management Plan is implemented, based on the concept of “continual improvement” and reviewed on a regular basis. This Committee will also assume responsibility for the implementation of an ongoing staff education program.

Members of the Waste Management Committee should be fully conversant with the types of waste that are generated, procedures and correct management strategies and avoidance/minimisation techniques.

This Committee does not necessarily undertake all activities themselves, but by the nature of the members and the professions/departments represented will ensure that there is a balanced approach to the investigations and analysis to ensure that patient and staff safety will not be compromised.

The Committee approach will enable advocates for such factors as environmental and economic performance to be heard in a balanced manner.

The Waste Management Committee should liaise with healthcare facility staff, stakeholders and the wider community to develop a culture of environmentally responsible waste management through information sharing and education.

Its members will ensure that waste management issues are considered on committees that deal with product evaluation, infection control and occupational health and safety, and in user groups such as Unit/Department Managers.

Waste Management Committee Composition

The Waste Management Committee should, as a minimum, consist of;

- A facilities Officer/Supervisor;
- An environmental services or Waste management Officer;
- Infection control officer;
- Representatives from each ward/department; and
- A purchasing Officer.

To ensure the success of this Strategy, the membership of this Committee should be widely publicised on staff notice-boards, together with appropriate contact details should any staff member wish to clarify issues or provide suggestions.

Roles of the committee include:

- Implement and review of the Waste Management Plan, policies and procedures;
- Development and review of waste and environmental strategies and education programs;
- Review legislation and standards pertaining to or affecting the management of waste;
- Develop, monitor, implement and evaluate waste and environmental strategies;
- Report program activities and outcomes to the facility management;
- Review waste incidents and breaches; and
- Monitoring audit trends and actions plans.

The following table can be used to list the members of the waste management committee and specific responsibilities (other roles can be added as required):

Name	Position	Waste Management Committee Role
	Facility manager	
	Waste Management Officer	
	Infection Prevention & Control Officer	
	Purchasing Officer	
	Environmental Services Supervisor/Chief of Department	
	Representatives from wards/departments	
	Others as relevant	

Waste Management Officer

The Waste Management Officer will be appointed by the facility. This could be an existing appointment such as a Facilities or Environmental Manager.

Appropriate resourcing for the waste management officer will enable them to undertake their role as well as supported by the facility management to ensure that all staff recognise the importance of adopting waste management practices that are in accord with this document.

One of the roles of the appointed INSP-TL Waste Management Officer will be to provide support as required to the healthcare facility waste management committee and Officer.

Responsibilities of the waste management officer include:

- Develop and monitor implementation of the Waste, Environment and Sustainability programs;
- Oversee Waste, Environment and Sustainability audit and inspection programs;
- Develop and monitor the implementation of Waste, Environment and Sustainability audit and inspection action plans;
- Assist Department Managers review and investigate waste and environment incidents;
- Incident analysis and reporting; and
- Preparation and submission to INSP-TL on required reports related to HCWM.

3.3 Waste Management Plans

The Waste Management Plan describes the current policies and procedures for managing healthcare wastes. It provides goals and targets to ensure ongoing improvements in all aspects of waste management, including the generation, handling, storage and disposal of all forms of waste.

The scope of the Waste Management Plan is to ensure that waste management practices are consistent across all wards/departments within each healthcare facility and across all facilities within the country.

This Waste Management Plan is a living document and must be reviewed annually. If new wastes/recyclables are generated, new opportunities for reuse/recycling develop (ie., systems or markets), or legislative/policy/guidelines requirements are amended, this Plan should be amended accordingly.

The specific aims and objectives of the Waste Management Plan are:

- To protect public health and safety.
- To provide a safe work environment
- To minimise the environmental impact of waste generation treatment & disposal.
- Reduce waste handling & disposal volumes/costs without compromising health care.
- To adopt and implement the Waste Management Plan throughout the facility.
- To monitor performance and review the Waste Management Plan at least annually.
- To adopt a waste minimisation policy which incorporates purchasing guidelines?
- Develop waste segregation principles and promote practical guidelines for re-usable products.
- Foster commitment from all staff and management to actively participate in waste avoidance, reduction, reuse and recycling programs.
- Introduce a continuing waste management education program for all staff to increase awareness of Occupational Health & Safety issues and waste minimisation principles.
- Adopt policies and procedures to minimise the environmental impact of waste treatment and disposal.

Completed waste management plans will be forwarded to the INSP-TL for review and approval.

Healthcare facilities should investigate and where possible implement waste minimisation actions for their facilities.

The establishment of specific waste reduction programs should be based on the conduct of a waste audit to ascertain current data regarding waste generation and management pathways and purchasing records. The waste audit will not only provide a benchmark so as progress can be measured, but also assist in prioritising materials/streams.

Annex 3 contains details of the recommended contents of a waste management plan as well as an example format.

3.4 Management of Pandemic Related Healthcare Waste

This section provides guidance on safe and appropriate handling of HCW waste during a pandemic, such as COVID-19.

Summary

- This guidance applies to healthcare and related facilities as well as non-healthcare facilities such as offices, public spaces and workplaces. During a pandemic, healthcare facilities may include aged care facilities and other locations providing quarantine or care services.
- The appropriate classification of materials as HCW or general waste should be based on a number of factors, including modes of transmission, current advice from the local regulatior, and proximity to the infection.

3.4.1 Healthcare and related facilities

It is recommended that HCF adopt the measures set out below alongside current PPE and relevant healthcare waste management practices. As a minimum, individuals handling healthcare waste, which includes moving mobile garbage bins (MGB) in and around a facility, should wear appropriate PPE (boots, aprons, long-sleeved gowns, thick gloves, mask and goggles) and perform proper hand hygiene after removing waste.

Double bag all waste from patients confirmed as infected. The easiest way to do this is by lining all healthcare waste MGBs with healthcare waste bin liners and bagging and tying all infected waste before disposing of it in the lined MGB. This will significantly increase protection from infected waste.

For bins or containers used in isolation rooms or in close proximity to patients confirmed as infected, the exterior surface should be wiped clean in accordance with the relevant World Health Organization guidelines before collection.

3.4.2 Non-healthcare facilities and sites

Waste arising from the disposal of masks and gloves, and any other PPE from persons who are not suspected of being infected can be disposed of via the general waste stream. There is no need to classify and manage these materials as healthcare waste. During a pandemic, follow the guidance below:

i. All staff and cleaners should be advised how to manage waste correctly;
ii. Materials classified as healthcare waste should remain as classified;
iii. Regardless of classification, any waste from confirmed or suspected infected persons must be disposed of in a plastic bin liner and then placed in a bin. Waste generated by a confirmed or suspected infected person, or waste containing PPE, must not be compacted;
iv. PPE should not be placed in recycling bins;
v. Always practice good hand hygiene after managing any waste. This includes after depositing waste in a bin or removing bins/bin liners;
vi. Remove the bin liner, ensuring that it has been closed/tied-off when three-quarters full, and place this into the bin for collection by the waste contractor; and
vii. A program to regularly clean all exterior surfaces of all waste and recycling bins should be implemented.

3.5 Management of Healthcare Wastes from Non-Hospital Facilities

Home healthcare waste includes waste that would be defined as healthcare waste if generated in a healthcare facility, including sharps containers.

This waste poses a health risk when not properly segregated and disposed of. For example, personnel collecting or sorting domestic waste (such as transfer stations, recycling facilities and composting operations) will be unaware of the presence of healthcare waste and will not take the appropriate safety measures.

This waste needs to be managed with the same care as similar wastes generated in healthcare facilities to prevent environmental and health and safety impacts to family members, the community, waste handlers and emergency response personnel.

The facility employing the services of the home healthcare provider is responsible for developing a waste management plan for the waste generated because of the services provided. This plan shall: be distributed to all relevant staff and education provided in good waste management techniques/practices indicate the location and operational requirements for storage/disposal facilities and identify responsible staff.

Waste management plans should be developed in consultation with local authorities to make sure they meet all applicable legislative requirements.

The following procedures shall be adopted to ensure that this source of HCW is managed in accordance with the same principles as would apply in a healthcare facility.

i. All waste collected for storage/transport/treatment by home healthcare providers shall be managed in accordance with the requirements of this Strategy.
ii. The healthcare facility shall develop specific procedures and a training program to ensure all staff that provide home healthcare are aware of their individual responsibilities. These procedures shall be distributed to all relevant staff. This plan shall indicate the location and operational requirements for storage/disposal facilities and identify responsible staff.
iii. Healthcare waste collected by home healthcare providers for storage/transport/treatment/disposal off-site shall only be deposited into containers that are appropriately coloured and labelled container (eg. yellow with the biohazard symbol for healthcare waste; or purple with the telophase symbol for cytotoxic waste).
iv. The outer container shall be secured to always prevent the escape of any waste material and shall be secured in the vehicle while the vehicle is in motion to prevent the container moving.
v. Spill kits shall be available in every vehicle transporting such waste, with staff trained in their correct use.
vi. Records shall be kept of all wastes transported and disposed of via the home healthcare provider. These records shall include the date, type of waste, quantity and disposal pathway.
vii. Transport of healthcare waste in a small vehicle (ie. car), shall be undertaken so that:
    - Waste is contained in a rigid walled container;
    - All wastes are secured so that they cannot move during transit; and
    - Wastes are contained so that any spills cannot escape from the rigid wall container.
viii. All healthcare waste and/or cytotoxic waste shall be unloaded by the home healthcare provider onto dedicated containers provided at the staff member's base.

4 Continual Improvement Programs

The HCWM system should be reviewed regularly to ensure that all aspects are functioning correctly as well as to determine potential for improvement. One of the first steps in this, is that of benchmarking.

A continual improvement program should include reviews and information from:

- Waste types and volumes;
- Audit outcomes;
- Waste related incident and injuries;
- Operating and waste treatment/disposal costs; and
- Progress towards compliance with this Strategy.

4.1 Monitoring and review

A waste reporting system provides the first step in a monitoring program. Waste reporting is about understanding what is happening and then ensuring that actions implemented are achieving their targets.

Continual monitoring allows for early identification of any issues that may be impacting on successful resource efficiency programs as well as determining if other actions are possible.

Monitoring is not a one-off activity. As an example, if waste containers are not regularly monitored, then inappropriate disposal of waste may occur resulting in an adverse health and safety incident.

The key is to use resources that you currently have. These are cleaning staff and internal facility staff. The role of each is explained below (note that the intent listed should be reviewed against the contractual services that each provide to the facility).

Cleaning Staff

Cleaners are a key element in the effectiveness of the systems in place. It is essential that cleaners understand the rationale for and ensure that materials segregation occurs. To achieve this, a training program must be implemented to ensure full understanding by all cleaners.

These staff are in an ideal position to report on issues such as number of containers generated by each ward/department/facility per material or stream. They can also identify the "degree of fill" of each container as well as any issues with contamination or leakage of recyclables.

Providing cleaning staff with monitoring sheets, storage room tally sheets, these staff can record daily numbers of containers, levels of fill and any other issues. The information gained from these records can validate data/invoices from the waste management contractors.

Monitoring of the system will be carried out by the cleaning supervisor and site management throughout the term of the contract. This will be undertaken by annual waste assessments/audits.

In addition, cleaners will be required to feed back to site management any non-compliance issues they observe during their cleaning activities. This may include contamination of recycling; non-participation in the recycling system or missing or damaged bins. In this way issues can be promptly dealt with by management.

To assist cleaners in this monitoring activity as well as for consistency and accuracy in the data collection, an electronic or similar logging system could be developed for their use.

Facility Staff

All staff should take ownership of the waste management system. Providing them with the tools and processes to report on issues is an effective way of ensuring that the systems are operating at an optimum level. Providing staff with forms so as issues such as missing containers, non-removal of full containers, dirty containers or missing systems can be reported helps in maintaining effective waste management.

4.2 Annual Review

The first step in the monitoring and review program is to obtain accurate data on the quantities of materials generated per stream as well as on the effectiveness of the actual systems.

This review should be scheduled on an annual basis, however, there must be a process for conducting the review earlier depending on circumstances (eg., new clinical services, changes in support services contracts, legislative changes and new recycling systems).

The facility must be able to respond to and ensure all staff adapt to changes because of the regular reviews of the WMP.

The implementation of a continual improvement program should be viewed as an approach that will provide an ongoing framework for the development of better and more cost-efficient waste management. Undertaking the series of steps outlined in this following section will provide guidance and systems to ensure the waste management practices continue to meet the needs of the facility into the future.

4.3 Waste Assessments/Audits

Two tools that can be used for this are waste assessments and the more comprehensive waste audits. A schedule of waste assessments for individual departments should be developed.

On a cycle of every 2 to 3 years a full waste audit should be conducted of the entire facility. These audits will provide detailed information on the Healthcare facility's performance against long term goals as well as identify any further resource minimisation initiatives that could be undertaken.

4.3.1 Waste Audits

The waste audit:

- defines sources, quantities and types of waste generated;
- identifies where, when how and why these wastes are generated;
- identifies areas of wastage and waste problems; and
- establishes targets and priorities for waste reduction.

A waste audit is a review of where and what wastes are produced, why it was produced and finally by whom it was produced.

The audit should enable the organisation to be able to state what they are doing in relation to waste generation and ensure that it is in compliance with government regulations, guidelines, and policies.

The analysis of audit results will tell you where wastes are produced and in what volumes or weights. This information can be used to:

- Identify trends, eg., are waste generation rates rising and from which departments;
- Identify what recycling services can be instituted and where;
- Measure the effectiveness of education programs; and
- Observe if waste segregation occurs correctly.

The information gained from an effective waste audit will assist the organisation to realise the following benefits:

i. Reduction in waste generation;
ii. Reduction in resource use and therefore costs;
iii. Reduction in waste collection, treatment and disposal costs;
iv. Improve safety of workers;
v. Better meets community expectations;
vi. Ensure regulatory compliance;
vii. Develop base-line data for future benchmarking or measurement; and
viii. Evaluate alternatives to minimise wastage of resources.

4.3.2 Waste Assessments

Waste assessments need to be conducted monthly on a rotating basis for wards and departments.

A waste assessment is a visual assessment of the contents of. The waste assessment involves a visual analysis of the waste and recycling containers, storage areas, management procedures and other aspects of the waste management system. The waste assessment may and generally does take place on several occasions. It will be supported by a review of documentation and a site analysis.

The waste assessment provides a reasonable indication of the issues facing the organisation in relation to their waste. It is a good tool where a full physical analysis of the waste is not practical.

The waste assessment is conducted to ascertain such issues as:

i. Levels of contamination.
ii. Types of contamination.
iii. Location of waste/recycling containers.
iv. Compliance with contractual and regulatory obligations.
v. Opportunities for waste avoidance and improved diversion rates.
vi. Waste handling issues.
vii. Costs of waste management.

The waste assessment as indicated shall be conducted so that all wards/departments are assessed at least once per annum.

4.3.3 Audit/Assessment Outcomes

Outcomes from audits will be used to:

1. Determine a baseline from which improvements can be measured; and/or
2. Develop a plan of action to improve environmental practice.

A report outlining a range of issues pertaining to waste management should be provided to senior management on an annual basis.

This report is to be prepared by the staff member who is responsible for waste management with advice and assistance from the Waste Management Committee. The report should be submitted to the Chief Executive Officer (through normal reporting lines), in combination with any other reports relating to environmental performance.

It is important that this report also include performance against the Key Performance Indicators.

The following are suggested categories that should be included in the report. These will assist in an independent assessment of performance.

a) Current data on total wastes generated and landfill diversion rates (per stream and/or material type) – specific details include:
   - Number of bins/containers collected per stream per day;
   - Volumes of each stream/material;
   - Percentage "fill" of each container; and
   - Comparison of benchmark units against other "like" healthcare facilities.
b) Summary of waste management programs implemented since the previous report and measured successes of these programs:
   - Percentage reductions of materials;
   - Specific waste reduction programs and achievements; and
   - Education programs implemented and attendance records.
c) Assessment of current management methods:
   - Are wastes being managed in the most environmentally and cost-effective manner, and in a way that reduces potential liabilities; and
   - Actions improve the situation.
d) Costs of waste management
   - Management costs per stream
   - Staff costs;
   - Cost/benefit analysis of alternate management systems and
   - Forecasts of waste disposal charges in the future and implications for waste management.
e) Legal and other liabilities:
   - Details of all non-compliances and remedial actions.
f) Five years forward planning:
   - Projected waste generation rates - including waste minimisation objectives and implications if these are not achieved; and
   - Relationship to legislation and changes that may need to be made to the current Waste Management Program.
g) Operational needs:
   - Equipment needs to meet legislation and OH&S requirements;
   - Requirements to achieve waste minimisation targets; and
   - Changes to staff responsibilities or purchasing policies.

4.4 Benchmarking

Benchmarking refers to comparing waste type/quantity generation rates and potential for reduction of those waste types/quantities (ie., waste reduction targets/potential). This requires comparison with a data set based on the current practice each healthcare facility – not just best practice. When developing benchmarks for the Healthcare Sector, many additional factors must then be addressed.

Some of these are (the above ones included):

a) Different services provided by the facility including.
b) Quality assurance programs/procedures.
c) Number of staff and patients.
d) Implementation of waste management (especially waste minimisation) systems/programs.

To establish benchmarks, data should be collected for the generation of waste types and quantities generated over a 12-month period (ideally weight and volume).

To simplify the process, benchmark “units” should be collected in a manner that is easy/simple and currently collected if possible.

For example, collecting waste data in volume measurements would probably be easier and undertaken. The problem would be accuracy so that data from the healthcare facility is valid and that there is not a great amount of variance.

Annex 2 contain examples of forms that can be used for the conduct of audits of the HCWM systems for each healthcare facility.

Annex 1: Operational Procedures for Waste Categories

Management of Infection Control and Occupational Health & Safety are priority issues. Systems must be designed (and operation of them enforced), so that staff do not lift bins and/or bags out of bins. The following principles are to be adopted in all facilities generating healthcare waste:

The following management procedures apply to each of the waste types.

1. No waste is to be placed into a container designated for any other waste/recycling type; and
2. PPE shall be always worn when managing waste containers.

The following summarises the procedures required for managing each waste type/stream.

Waste Stream	Procedures / Requirements
Infectious waste	1. Infectious waste should be segregated and contained at the source of generation using appropriately colour coded and labelled containers (MGB or bin liner); 2. When the liner is about 3/4 full seal so that no contents can escape. If there is concern over the weight or contents of the bag (such as hard plastic) a second liner should be used. 3. Place sealed bags in yellow mobile bins or in the ward or department waste collection area. 4. All non-sharp infectious waste is to be deposited by the generator into a yellow waste container that has been specifically labelled with the words "Healthcare waste" and the "Biohazard Symbol". 5. The lids of mobile bins should be kept always closed. 6. The infectious waste MGB when full (no more than three-quarters) will be collected and transported by cleaning staff to the ward/department waste storage area. 7. Once deposited into an MGB, no bin liner is to be removed. 8. Waste management staff are to transport the MGB to the dedicated storage area awaiting treatment at the on-site incinerator or collected by a contractor for treatment and then disposal of residues.
Sharps	1. The management and safe disposal are the responsibility of the healthcare professional that generates the sharps. 2. Sharps should not be re-sheathed and should be discarded as soon as practicable, after the procedure is completed. In general, this will be at the point of use and into an approved sharps container. 3. Re-sheathing of used needles is not recommended due to the high risk of needle stick injuries. However, in certain circumstances such as dentistry, re-sheathing may be required. Where re-sheathing of needles cannot be avoided: • the practitioner is responsible for ensuring the needle is properly recapped; • the sheath should not be held in the fingers; and • either a single-handed technique using forceps, or a specially designed protective guard or approved recapping device should be used. 4. Sharps containers will be provided at the point of use or secured to mobile trolleys. 5. Needles should not be removed from syringes for disposal, purposely broken, or otherwise manipulated by hand.

Waste Stream	Procedures / Requirements
	6. Sharps containers should: • not be filled above the line indicated on the container; • not be double handled from one container to another; • be positioned for easy access; • be out of reach of children (opening should be approximately 1.2m from • floor level); • be closed before disposal; and • be disposed of by a licenced healthcare waste contractor. 7. Waste management staff are to transport sharps containers to the dedicated storage area. 8. Waste management staff are to transport the MGB to the dedicated storage area awaiting treatment at the on-site incinerator or collected by a contractor for treatment and then disposal of residues. 9. Untreated sharps are not to be disposed of to a landfill or "dumped" on any land.
Anatomical	1. Anatomical waste should be segregated and contained at the source of generation using appropriately colour coded and labelled containers (MGB or orange bin liner). 2. When the liner is about 3/4 full seal so that no contents can escape. If there is concern over the weight or contents of the bag (such as hard plastic) a second bag should be used. 3. Place sealed bags in a yellow with orange lidded MGB, labelled with the words "Anatomical Waste" in the ward or department waste collection area. 4. The lids of mobile bins should be kept always closed. 5. The anatomical waste MGB when full (no more than three-quarters) will be collected and transported by cleaning staff to the ward/department waste storage area. 6. Once deposited into an MGB, no bin liner is to be removed. 7. Waste management staff are to transport the MGB to the dedicated storage area awaiting treatment at the on-site incinerator or collected by a contractor for treatment and then disposal of residues.
Pharmaceutical	1. All empty pharmaceutical containers must be disposed of in the wards or departments and not returned to pharmacy. 2. Ampoules with small amounts of reconstituted antibiotics or other small glassware that has contained liquid pharmaceuticals should be disposed of in a sharp's container. 3. Large quantities of plastic containers that have had liquid pharmaceutical should be placed in infectious waste bags. 4. Plastic containers that have contained dry tablets or capsules and are totally empty can be disposed of as general waste. 5. Pharmaceutical waste can only be treated by incineration – this must be at the appropriate temperature.
Cytotoxic	1. All sharp and non-sharp cytotoxic waste is to be deposited by the generator into a purple container or MGB and marked with the cell in telophase symbol in white. The words "Cytotoxic Waste" should be clearly displayed on bags and containers.

Waste Stream	Procedures / Requirements
	2. Sharp cytotoxic waste shall only be deposited into a sharps container that is purple, has the telophase symbol and the words “Cytotoxic Waste” clearly displayed. 3. The MGB or container when full will be collected and transported by cleaning staff to the waste storage area in a trolley. 4. The lids of mobile bins should be kept always closed. 5. Once deposited into an MGB, no bin liner is to be removed. 6. Waste management staff are to transport the MGB and/or container to the dedicated storage area. 7. Cytotoxic waste can only be treated by incineration – this must be at the appropriate temperature (ie., 1100^{o}C for a minimum 2 second residence time).
General Waste	1. All general waste to be deposited into ward/department waste bins provided, that have been lined with a green, black, white or clear plastic liner. 2. Cleaning staff are required to empty these waste bins into green MGB and transport waste on a trolley to the ward/department waste storage area. 3. If the general waste is in large quantities or is too bulky for the ward/department waste bins, it should be deposited directly into the general waste container. 4. Waste management staff are responsible for cleaning the waste containers on an ‘as required’ basis. 5. The general waste container or MGB is to be transported by the waste management staff to the central general waste bin. 6. The waste collection contractor will empty the central general waste bin as per contractual obligations. Alternatively, the facility generating this waste may transport to the landfill as required.
Recyclables	1. All recyclables should have any contaminants removed (eg., food, drink, straws). 2. All recyclables should be deposited by the generator into the dedicated recycling MGB at the ward/department level. *Glass should be deposited so that it does not break.* 3. Waste management staff are responsible for inspecting these dedicated MGB and transporting them to the central storage area. 4. The MGB should be sufficiently clean to not contaminate the recyclables or attract vermin such as ants and mice - this may mean that the container needs to be washed on a regular basis. 5. The recycling contractor will service the central recycling bins as per contractual obligations.
Other Waste	Other wastes or recyclables may be generated by the individual healthcare facility. Advice should be sought from INSP-TL as to the correct management procedures for the specific waste/recycling types.

Annex 2: Waste Audit/Assessment Tools

Introduction & Objectives

The objective of this Self-Assessment - Compliance Audit Checklist is to assist all healthcare care facilities ensure that HCF waste management is safe and effective for all.

It has been designed for healthcare facilities to determine what systems and procedures have been implemented to specifically manage healthcare care facilities waste. It could also be used to determine if the waste management system complies with regulatory requirements and is the "best-practice" for this sector.

Instructions

To complete this compliance audit checklist, tick the Compliant Box if the statement is true or present. If the statements are not demonstrated or observed, tick the non-Compliant box. A question mark should be placed if it is uncertain or could not be verified at the time of completing the audit.

To ensure that correct responses are achieved, it may be necessary to undertake the process of completing the checklist a number of times to guarantee that the responses accurately reflect the management aspects and personnel's actions and compliance with the procedures.

All actions indicated as "non-compliant" should be rectified and be discussed with the facility's infection control and waste management committee/s to determine the corrective actions, prior to the succeeding re-evaluation using the compliance checklist.

Following completion of the Self-Assessment – Compliance Audit Checklist, it is to be forwarded to the healthcare care facilities Waste Management Officer for review.

Name of Healthcare Facility:	
Date:	
Name of Person accomplishing the compliance audit:	
Designation of person accomplishing the compliance audit:	
Name of Manager in-charge of Waste Management:	
Name of Person responsible for HCW training at the facility:	

Management System

Note: *When completing this section, it will be necessary to ensure that you observe documents as indicated, ask a number of staff whether they have been trained, and observe practices (eg., use of PPE, cleaning etc.) at times that would normally occur – that is, not asking the staff to perform the task just to comply with the review.*

Compliant	Non- Compliant	Criteria
☐	☐	A HCW waste management plan or guideline/memorandum has been prepared and circulated to all relevant wards/departments and personnel
☐	☐	Instructions and procedures have been implemented to ensure that all healthcare wastes generated in all areas where HCW patients (probable, suspected or confirmed) can only be disposed of via the infectious waste stream
☐	☐	All relevant staff have been trained in management of HCW related waste
☐	☐	All staff are updated on HCW waste management every 6 months.
☐	☐	Staff observed disposing of HCW related waste correctly (note that these observations should be undertaken in all areas of the healthcare facility)
☐	☐	Proper segregation of wastes is observed in all points of generation
☐	☐	All waste bins are of the correct colour
☐	☐	If plastic liners are used, they are of the correct colour (Black container or black bag liner for non-infectious or general waste; Green container or green bag liner for non-infectious or wet / biodegradable waste; and Yellow container or yellow bag liner for infectious waste)
☐	☐	All waste bins are properly covered all the time
☐	☐	Waste bins are strategically located in wards/departments
☐	☐	Waste bins provided in other areas such as in ambulance parking
☐	☐	All waste bins are always available and maintained clean
☐	☐	All waste bins are disinfected at least daily
☐	☐	Sharps and vials are disposed in safety boxes, not mixed with other infectious wastes
☐	☐	Anatomical and pathological wastes are properly disposed

☐	☐	Signage has been placed in all areas regarding correct waste management
☐	☐	No staff compacts HCW waste in a waste bin or bin liner – practices should ensure no aerosol generation
☐	☐	Hand washing area, alcohol, and/or hand sanitizer are accessible in areas where wastes are managed (wards/departments and waste storage areas)
☐	☐	All other equipment (eg., trolleys) used for managing wastes are disinfected regularly
☐	☐	Scheduled waste collections are undertaken to ensure that bins are not overflowing
☐	☐	Waste collections are undertaken at times where there is minimal staff, patient or visitors present (i.e., periods where there is less activity and people)
☐	☐	Spill kits are available to assist in managing any spilt waste
☐	☐	Advice is provided to patients confirmed or are suspected of having HCW and are isolating at home as to correct waste management practices
☐	☐	Inventory of personal protective equipment (PPE) are available
☐	☐	Inventory of cleaning supplies and materials are available
☐	☐	Cleaning materials and supplies are adequate and available at all times
The following equipment are provided to waste handlers to disinfect equipment used for waste management:		
☐	☐	Disinfectant and instructions for use
☐	☐	Mops and mop buckets
☐	☐	Cleaning cloths/rags
☐	☐	Disinfection of all cleaning materials, eg., mops and rags Indicate frequency: _____ Area where cleaning materials are disinfected: _____

Healthcare Facility Waste Handlers

Note: *Observations should be made at least twice during the times waste handlers are performing their tasks.*

Compliant	Non-Compliant	Criteria
Waste handlers have been provided with:		
☐	☐	Gloves
☐	☐	Masks
☐	☐	Safety glasses/face shields
☐	☐	Gowns/overalls
☐	☐	Training
Waste handlers were observed to follow correct procedures for:		
☐	☐	Hand hygiene
☐	☐	Donning of PPE
☐	☐	Removing PPE
☐	☐	Disposing of PPE
☐	☐	Bins or waste liners/bags are collected when ¾ full or at a regular schedule
☐	☐	Proper disinfecting of bins according to hospital infection control procedures
☐	☐	Emptying bins when bags are correctly tied off or sealed and there is no compaction and aerosol formation
☐	☐	Transport waste bags with a trolley or in a bin that can be sealed and wheeled
☐	☐	Waste trolleys are not used for other purposes
☐	☐	Waste trolleys disinfected after every collection of waste
☐	☐	Staff observed correctly disinfecting waste trolleys according to hospital infection control procedures
☐	☐	All other waste handling equipment disinfected at a minimum of twice daily

Storage

Note: *Inspections of the waste storage area should be conducted twice during the day to check that all management aspects are being undertaken.*

For collection schedules, a review of records as to when wastes are collected should be undertaken.

Compliant	Non- Compliant	Criteria
☐	☐	HCW waste storage area (or infectious waste storage area) has signage indicating the type of waste stored
☐	☐	HCW waste storage area has floors and walls made of impermeable materials and covered with a roof
☐	☐	Storage area is secured with lock when not in use
☐	☐	No waste is stored prior to transport to a treatment/disposal facility longer than 48 hours
☐	☐	Storage area is disinfected twice daily
☐	☐	Storage located in an area with no or minimal access to unauthorized personnel, eg., patients and visitors
☐	☐	Infectious waste stored in protected area and treated within a safe time (e.g., 48 hours during the cold season and 24 hours during the hot season) – Indicate frequency of collection of waste service providers: _____
☐	☐	Storage area has accessible hand hygiene facility

Transporters

Note: *Visual observations of the process of loading the wastes in the transport vehicle and upon leaving the hospital must be undertaken.*

The transport contractor should be requested to provide training records and volume/weights and types of waste collected.

Compliant	Non-Compliant	Criteria
☐	☐	All staff have been trained in correct HCW waste handling and management
☐	☐	Waste collection vehicle is enclosed
☐	☐	Timing for collection of infectious waste is scheduled at a different time than for other wastes and deliveries to the healthcare facility
☐	☐	Provide documentation specifying what wastes have been collected, the volume/weight and where they are intended to be treated or disposed for treatment or disposal
☐	☐	Practice proper hand hygiene and always have hand rub sanitiser/ alcohol
☐	☐	Have and properly use PPE same that of waste handlers
☐	☐	Disinfect all waste containers once emptied
☐	☐	Waste collection vehicle disinfected after each collection and deposit at the treatment/disposal facility
☐	☐	Inspection of the service provider's site to check if proper disinfection of bins and vehicles are observed – Indicate frequency of inspection: _____

Treatment/Disposal Facility

Note: *An inspection of the treatment/disposal facility should be undertaken to ensure that each of the points are either observed or records provided or inspected at the facility.*

Compliant	Non- Compliant	Criteria
☐	☐	All staff have been trained in correct HCW waste handling and management
☐	☐	Hand hygiene facility available at the treatment/disposal facility
☐	☐	The waste treatment facility is approved/licenced
☐	☐	If waste is not incinerated, checks have been undertaken to ensure that waste is immediately buried in a separate area of the landfill and not with mixed other waste
☐	☐	Checks have been made to ensure that the facility operates in accordance with all regulatory and infection control guidance
☐	☐	Inspection of the treatment/disposal facility to check if proper health care waste management practices are observed – Indicate frequency of inspection:

After you have conducted the review, indicate the actions needed, the actions which will be performed, the timeline and the personnel-in-charge. For actions which cannot be performed yet, please indicate the reason:

_____

_____

_____

_____

_____

Waste Management – Ward/Department Monthly Review

This form is to be used for reviewing the waste management system within the ward/department.

The objective of this review is to check that waste management is being undertaken correctly and that staff, patients, and visitors are not exposed to hazardous waste. It is for internal use only and the information will only be **used** by the Health Care Facility only to assist in ensuring that waste management is undertaken correctly. Information should not be communicated to an external person outside of the Health Care Facility and INSP-TL.

This review should be undertaken monthly, be completed by each ward/department manager or their designated staff and be submitted to the Manager in Charge of Waste Management.

Ward/Department:

Date:

Name of Person conducting the assessment:

Designation of Person conducting the assessment:

Circle YES or No for the following questions:

Yes	No	Staff have been reminded as to correct waste management procedures weekly
Yes	No	Staff have been observed managing waste correctly
Yes	No	All waste bins are of the correct colour
Yes	No	If plastic liners are used, they are of the correct colour
Yes	No	All waste bins are properly covered all the time
Yes	No	Waste bins are strategically located in areas where wastes are disposed
Yes	No	All waste bins are cleaned disinfected daily
Yes	No	Sharps are disposed in a safe container
Yes	No	Waste handlers are collecting waste regularly and no bins are overflowing Indicate frequency of collection: _____
Yes	No	Waste handlers are observed using the correct PPE when handling waste
Yes	No	No staff compacts waste in a waste bin or bin liner – practices should ensure no aerosol generation
Yes	No	Correct signage is located near all waste bins
Yes	No	Hand washing area, alcohol, and/or hand sanitizer are accessible in areas where wastes are disposed
Yes	No	PPE is available for ward/department staff when managing HCW wastes
Yes	No	Cleaning materials and supplies are adequate and available at all times

After you have conducted the review, indicate the actions needed, the actions which will be performed, the timeline and the personnel-in-charge. For actions which cannot be performed yet, please indicate the reason:

_____

_____

_____

_____

Annex 3: Waste Management Plan Proformas

The following are the core elements of a waste management plan that will be required to be developed by all generators of healthcare waste. The extent and content of the plan will be dependent on the type and quantity of healthcare waste generated and the services available to manage those wastes on/offsite. The waste management plan should be developed in consultation with all stakeholders and include, at a minimum, the following information:

Contents:

i. Scope of the waste management plan;
ii. Data collection procedures and requirements;
iii. Information on the types, quantities and sources of healthcare waste;
iv. Waste audit protocols and schedules;
v. Waste avoidance and reduction targets and programmes;
vi. Waste generation/segregation procedures;
vii. Duties of key waste management staff;
viii. Duties of waste management officer;
ix. Education programmes for all staff and other stakeholders;
x. Risk management strategies;
xi. Procedures for monitoring adherence to the waste management plan;
xii. Spill management and emergency procedures;
xiii. Waste recycling, reusing procedures;
xiv. Waste storage facilities;
xv. Waste treatment and residue disposal options;
xvi. Community relations; and
xvii. Waste management plan review procedures.

The waste management plan should be developed in consultation with all stakeholders and follows the conduct of the waste audit.

Completed waste management plans are to be forwarded to the INSP-TL for review and approval.

Estimated Waste Generation

The following table shows the estimated volume of waste anticipated to be generated from the various components of the healthcare facility. These estimates are based on averages for quantity and composition of the waste generated as determined by industry data (i.e., data/information provided by waste audits conducted in the healthcare sector).

It is estimated that the healthcare facility will generate a total of approximately **m^3** of waste and recyclables per day – a total of **m^3** per week[5].

Waste/recycle stream	Estimated volume per day (L)	Estimated volume per week (m^3)
Infectious waste		
Sharps		
Anatomical		
Cytotoxic		
General waste		
Paper/cardboard		
Commingled		
Total (m^3)		

The following summarises the servicing frequency for the various waste/recycling streams:

Stream	Container for Disposal	Servicing Frequency
Infectious waste		
Sharps		
Anatomical		
Cytotoxic		
General waste		
Paper/cardboard		
Commingled		
Confidential Documents		

Note that actual types and volumes of the various waste streams will be dependent on the type of patient services as well as treatments delivered, number of inpatients (occupied bed days) and number of outpatients.

[5] This estimate is based on a 7-day week for provision of patient services.

With healthcare, this can fluctuate according to time of year and changes in treatments and services. The HOSPITAL will be equipped to manage and cope with changes in waste types and volumes generated on a day-to-day basis through more regular collection frequencies.

Waste streams that may be generated on a less regular basis include:

- Pharmaceutical waste.
- Organic waste.
- Garden waste.
- E-waste.
- Used cooking oil.

Other waste types may be generated, but these would be in small volumes and generated on an *ad hoc* basis. The healthcare facility will conduct a waste assessment to determine the additional types and quantities of reusable, recyclables or compostable waste that may be generated. Following this, appropriate management systems will be implemented and where necessary generators advised of these management requirements.

The following diagram illustrates the layout of the waste storage area:

To be inserted by each Facility

The waste areas will be accessed by healthcare facility staff only. The waste storage area will be locked so as to prevent unauthorised access and the incorrect disposal of waste materials.

Annex 4: Healthcare Waste Management Education Program

Curricula

Any waste management education program to be developed by INSP-TL for use by each facility should focus on the following.

- Introduction to the session;
- Importance of good waste/environment management;
- Waste management hierarchy;
- Waste minimisation principles;
- Brief overview of legislation pertaining to waste management;
- The facility and INSP-TL policies on environment/waste management;
- Overview of the facility's waste types;
- Issues relating to waste reduction for the facility;
- Management responsibilities;
- Identification of, and hazards associated with the different types of wastes generated at the facility;
- Importance of effective waste segregation; and
- Waste, handling, packaging and disposal routes for the different types of wastes generated at the facility.

Delivery

The delivery of the waste management education training program may differ between the facilities and services that this WMP applies to. It is up to the management of the facility/service to determine the most appropriate way to:

- Deliver the program; and
- Assess the effectiveness of the program.

The waste management education need not be conducted solely by "formal" training sessions. It will be up to the facility/service management to ascertain how best to deliver the education program and to measure and monitor the program's effectiveness. It is recommended that the waste management program be delivered:

- To all staff regardless of their position during the induction program;
- For all staff on an annual basis; and
- Immediately following changes to the waste management system and/or regulatory/policy amendments.

The training plan should ensure that there is an appropriate means of communicating issues based on data obtained during the waste audits/assessments to all staff and relevant other personnel at the facility/service. Records should be maintained of all staff attendance at a training session to ensure that all personnel attends. Annual reports to INSP-TL shall detail the waste management education programs delivered, percentage of staff that have been trained. All facilities/services should also consider the waste management training needs for contract and other personnel who will be employed on-site.

Annex 5: Overview of Waste Treatment Technologies

HCW Treatment Facilities

The following factors must be considered for the location of the treatment facilities:

- Safe transfer routes must be provided from the storage area to the treatment facility;
- The HCW treatment facilities must be located within the HCF. However, the area must be located away from the dietary section, patient rooms, laboratories, healthcare facility function/operation rooms or any public access areas;
- The treatment facility should be located so issues such as odour, noise, and the visual nature of HCW operations does not impact on staff, patients and visitors;
- Public access and security are provided;
- Consider the proximity of the treatment facility to the temporary or central storage;
- 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 continuous water supply for cleaning purposes;
- Have locking device to prevent access by unauthorized persons;
- Be inaccessible to animals, insects, and birds;
- Have adequate ventilation and lighting;
- Have supplies of cleaning implements (eg., 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 a warning sign posted in a strategic place: “CAUTION: TREATMENT AREA: UNAUTHORIZED PERSONS KEEP OUT”; and
- Have floors, walls, and ceilings that are clean at all times.

Encapsulation where the waste is placed into a container and then placing a cement slurry into the container. Once set, the container can then be deposited in an approved landfill.

This process is recommended to only be used in emergency situations such as for pharmaceuticals and sharps waste. However, if not other treatment option is available, encapsulation can be used for these waste types.

Operation

Standards	The following are the standards that should be applied to the management of wastes within a HCW treatment facility: • Loading of wastes into treatment/disposal devices shall be performed mechanically to maintain the integrity of wastes and minimise the risk to workers; • The processing equipment shall be loaded and operated according to manufacturers' specifications; • The treatment device shall be maintained in such condition that design specifications are met, and controls, instruments and interlocks are working when the process plant is in use; • The process treatment plant shall be placed under the control and supervision of a suitably qualified and/or experienced person, thoroughly instructed by the manufacturer or equivalent in the operation of the process plant and approved by the relevant authority; • Staff shall be given thorough training and instruction in the operational procedures of the process plant. When operating, the plant shall be supervised by an appropriately trained person; and A spill kit shall be provided to manage spills of all waste types accepted at the facility. The size and capability of the spill kit shall be directly related to the amount of waste that may be on-site.
Process Sampling	All process equipment, gas discharge stacks, exhaust ducts and liquid discharge pipes should be fitted with appropriate ports and sampling facilities to enable valid samples to be obtained for chemical and/or microbiological analysis. Staff required to undertake sampling and monitoring shall be trained and qualified to undertake the tasks. Regular tests should also be conducted for all healthcare wastes treatment technologies to ensure microbial inactivation is achieved to meet the minimum requirements of safety and environmental protection. To achieve this, a suitable test procedure shall be developed, implemented and maintained to ensure acceptable microbial inactivation is achieved.
Monitoring	All healthcare waste treatment technologies should be subject to regular monitoring within the system and periodic testing of their by-products to ensure that these criteria are being achieved. Any treatment option for healthcare waste should: • Render the waste non-infectious; • Render the waste unrecognisable; • Achieve a significant volume reduction; • Result in residues being suitable for approved disposal by relevant government agencies; • Result in minimum levels of hazardous or toxic by-products as approved by relevant government agencies; • Be verifiable for the treated wastes; • Have automatic controls and built-in failsafe mechanisms; • Have continuous automatic monitoring and recording; • Ensure that the waste cannot bypass the treatment process;

	• Meet relevant occupational health and safety standards; • Have failsafe alternative treatment and disposal in case of emergency; and • Where feasible, implement materials and energy recovery strategies. In order to verify that original process conditions are maintained, monitoring for these parameters shall occur at least annually. Parameters to be monitored are process dependent. Typical parameters include, but are not limited to: • gas velocity; • temperature and temperature gradients; • volume flow rate; • pH of gases; • reagent flow level; • residence time; • chemical concentration; • residue micro-organism counts; • chemical usage; • temperature/pressure profiles; and • other as appropriate to the process. Waste treatment equipment needs routine maintenance and maintenance logs must be checked during auditing.

Treatment Capabilities

The following table illustrates what treatment processes can be used for the various types of healthcare wastes generated:

Treatment Type	Sharps	Healthcare waste	Pharmaceutical Waste	Cytotoxic Waste
Incineration	✓	✓	✓	✓
Autoclave	✓	✓	×	×
Chemical	✓	✓	×	×
Microwave	✓	✓	×	×
Thermal Treatment	✓	✓	×	×

Treatment Processes

This provides a brief description of the types of treatment technologies that could be utilised within the country for processing healthcare wastes. Currently, incineration is the only technology that is used in the Country.

Process	Description
Incineration	Incineration involves the combustion of waste materials at high temperatures to produce an inert ash, carbon dioxide, water and minimal pollutants. A modern waste incinerator equipped with air pollution control equipment destroys infectious and other healthcare waste components, reduces the volume of the waste material by 90 per cent and controls emissions to the atmosphere. Healthcare waste incinerators consist of a primary chamber and secondary chamber, which may also be referred to as an afterburner. A well-designed incinerator system utilises controlled feed rates, regulated combustion air, high temperatures, good mixing of gases under control for combustion and sufficient burn time (retention time) to destroy the waste. During the incineration process, 90% of healthcare waste volumes are volatilised off as products of combustion with residual 10% to landfill as ash (non-combustible fraction). Ash or non-combustible fraction consists of inert glass and metal. Generally, all types of healthcare wastes can be incinerated.
Autoclave	Autoclaving is the process of steam sterilisation. Steam sterilisation effectively kills microbial flora and fauna through the moisture and heat of saturated steam. The steam sterilising process is controlled by time and temperature with the parameters set to ensure steam penetrates into the most difficult part of the load. Some autoclave processes are combined with shredding/granulation. Wastes able to be processed/treated: • Sharps. • Dressing and disposable linen. • Microbiological and pathological waste. • Human and animal tissue. • Body fluids.
Chemical	This treatment process relies, as its chief means of disinfection, on subjecting shredded healthcare waste to a high pH environment, generated by the addition of a metered quantity of calcium oxide (quicklime fines) and water. The process of lime hydration and mixing with the shredded waste stream within a controlled residence time, elevates pH and temperature thereby disinfecting the waste prior to compaction and transport to landfill. There are three basic process steps: • Shredding waste to a size range of 20 to 30 mm to render waste inconspicuous and to increase the surface area for chemical reaction. • Disinfecting waste by the addition of calcium oxide and water under controlled conditions, thus elevating pH and via heat of reaction, increasing the temperature at times above 70oC. • Dewatering the admixture, compacting the waste residue and transporting to landfill.

Process	Description
	The mechanical process is continuous, using shredders, screw conveyors, flow through mixing unit and dewatering screw and compaction. Wastes able to be processed/treated: • Sharps. • Dressing and disposable linen. • Microbiological and pathological waste. • Body fluids. • Human and animal tissue.
Microwave	The microwave disinfection unit is a disinfection process that originated in Europe and is now in use in the Americas and Australia. Prior to receipt at the facility, waste is segregated, with the microwave best suited to waste not including anatomical, scheduled pharmaceutical, chemical or cytotoxic wastes. The microwave unit is designed to accept waste from mobile garbage bins, in sizes ranging from 120 L to 1,100 L. Bins are mechanically tipped into an in-feed chamber, where they are held and consolidated before being fed through a shredder. Shredded waste is then moved by an auger into a transfer chamber that is used as an intermediate storage area for shredded waste. From the transfer chamber, waste is then transferred to the process chamber, which is effectively a long auger. In this area, the waste is exposed to saturated steam from a boiler at around 150°C. Microwave units produce heat energy. The heat produced coupled with the saturated steam ensures that high process temperatures are maintained and ensures the avoidance of cold spots in the process chamber. At all times, the process chamber waste temperature is between 95°C and 105°C. The process will stop if temperatures fall below the minimum process temperature of 95°C. After waste has passed through the process chamber, an ejection auger transfers the waste to a bin or compaction unit for terminal deposition at an appropriate landfill. The system is continually monitored for temperature throughout the process and treated waste samples are taken for microbial and virological testing. Periodic inspections are also carried out for any microwave leakage. Wastes able to be processed/treated: • Sharps. • Healthcare. • Specific operating conditions in relation to waste segregation. • Anatomical. • Scheduled pharmaceuticals. • Chemical. • Cytotoxic.
Thermal Treatment	Healthcare waste is loaded into the system via various sized mobile garbage bins. It is automatically fed by a hydraulic dumper. The shredded waste enters the steam auger chamber where low-pressure steam is injected through multiple ports, immediately bringing all material to a sterile temperature and proper treatment conditions. Following this, a low-pressure flash, off chamber, converts moisture to sterile steam. Treated waste then exits the end of the conveyor into a compactor where its volume is reduced to 10% of its original state.

Process	Description
	Wastes allowed to be processed/treated: • Sharps. • Healthcare waste. • Dressing and disposable linen. • Microbiological and pathology waste. • Human and animal tissue. • Body fluids.

Disposal

In many settings, the final disposal sites- landfills- to which some of the waste is sent are not engineered to high standards. They may be poorly sited or lack the liners and caps that prevent pollution leaching out; or accessible to scavenging animals, and pests which spread disease.

Where this is the case, the healthcare facility should advocate for improvements, and ensure that their waste is not deposited in a fashion which may cause harm. Measures to prevent harm can include: disinfecting all waste before sending to landfill; making sure that healthcare facility waste is deposited in a fenced area and covered daily; using needle or hub cutters so that syringes cannot cause needle-stick injuries or be gathered for reuse.

Alternatives for depositing residues from treatment processes should be investigated to be used wherever possible. These residues contain sharps and a range of chemical compounds (eg., heavy metals). The dust from these residues can be blown into waterways and inhaled by any person in a relatively close proximity.

Encapsulating residues with cement in metal drums is an option for the management of this waste stream. However, PPE must be provided to staff undertaking this process so that they do not inhale any of the dusts during the encapsulation process.

Liquid residues from any cleaning operations conducted within the treatment technology facility should also be managed in a manner that prevents this residue from entering any drains or watercourses.

Liquid residues from treatment/disposal processes may be discharged to a sewer system if approved by the relevant authority. Before liquid residues are classified as suitable for disposal to sewer, it must be determined that any liquid wastes to be discharged do not exceed requirements for wastewater constituents and characteristics.

The following may need to be assessed:

- Biological Oxygen Demand;
  - the amount of dissolved oxygen needed (ie., demanded) by aerobic biological organisms to break down organic material present in a given water sample.
- Chemical Oxygen Demand;
  - a measure of the capacity of water to consume oxygen during the decomposition of organic matter and the oxidation of inorganic chemicals.
- Total Dissolved Solids;
  - a measure of the combined content of all inorganic and organic substances contained in a liquid.
- pH;
- chlorine;

- chlorinated hydrocarbons;
- metal content; and
- environmentally hazardous chemicals likely to pass through a wastewater treatment system unchanged.

What parameters are set for acceptable levels of performance will need to be determined by the relevant environmental and health government agencies.

Annex 6: Waste Management Tender Framework

Tender Specific Objectives

The key objectives of the tender process are:

Achieve equity of service– this means that all facilities have access to the basic services as well as the value-added items such as education and training; waste reporting and signage and communication programs.

Cost effective service – while not compromising health, safety or environment, one seeks to ensure that waste management costs are minimised through use of efficient systems; maximising diversion programs and implementing proactive management of waste services.

Consistency of service – throughout the waste program should have a consistent look in terms of signage; colour coding and management. In addition, the development of a reporting system will allow benchmarking between like facilities.

Waste Management Program

Of prime consideration will be the contractor's ability to deliver a total waste management service.

Establishing meaningful and valid waste data is a key requirement of this contract. The contractor will be required to generate monthly waste reports on a site; facility type and total contract basis. The reports must detail the quantity (by weight) of each stream collected whether directly by the contractor or by their sub-contractor.

To assist with participation and compliance, clear and visible signage is to be displayed on all waste and recycling receptacles. Signage should be easily understood; engaging and unambiguous. The contractor will provide INSP-TL with proposed draft signage for their review and approval prior to use. Once the format is approved by INSP-TL it will be a requirement of the contractor to arrange for suitable signs to be printed and displayed on all receptacles.

The contractor is to provide suitable training for all staff in regards the safe and effective operation of any waste and recycling equipment.

The contractor is to provide INSP-TL, upon confirmation of success of their submission, and prior to contract implementation, details of where each waste and recycling stream is proposed to be transported.

The waste contractor(s) will play a key role in the implementation of this WMP. As the primary contact in regard to waste issues, they will be responsible for ensuring that all facilities are working towards implementing the requirements of this HCWM Strategy. The waste contractor will proactively assist the INSP-TL and healthcare facilities in identifying new opportunities and in advising them of new technologies or practices that may assist improving their overall environmental performance.

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