



Republic of Malawi

**MALAWI EMERGENCY OPERATION TO PROTECT ESSENTIAL HEALTH
SERVICES**

(P180231)

INFECTION CONTROL AND WASTE MANAGEMENT PLAN

(ICWMP)

FEBRUARY 2023

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ABBREVIATION / ACRONYMS

CHAM	Christian Health Association of Malawi
COM	College of Medicine
CMST	Central Medical Stores Trust
DC	District Commissioner
DHO	District Health Officer
DHSS	Director of Health and Social Services
EHS	Environmental Health Safety
EHU	Environmental Health Unit
EOC	Emergency Operations Centre
EPR	Emergency Preparedness Response
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESHS	Environmental, Social, Health and Safety
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
GCP	Good Combustion Practice
GDP	Malawi's Gross Domestic Product
GMPP	Good Microbiological Practices and Procedures
GoM	Government of Malawi
HCF	Health Care Facilities

HCW	Health Care Waste
HCWs	Health Care Workers
HCWM	Health Care Waste Management
HAIs	Hospital Acquired Infections
HH	Hand Hygiene
HSAs	Health Surveillance Assistants
ICWMP	Infection Control and Waste Management Plan
IPC	Infection Prevention and Control
LMP	Labour Management Procedure
MCM	Medical Council of Malawi
MLW	Malawi Liverpool Welcome Trust
MOH	Ministry of Health
MP	Member of Parliament
NGO	Non-Governmental Organization
NHRL	National Health Reference laboratory
NMCM	Nurses and Midwives Council of Malawi
NTF	National Task Force
NWP	National Water Policy
OPC	Office of President and Cabinet
PEHO	Principle Environmental Health Officer
PFP	Private for Profit
PHIM	Public Health Institute of Malawi

PIU	Project Implementation Unit
PMRA	Pharmacy Medicine Regulatory Authority
PNFT	Private Not for Profit
PPE	Personal Protective Equipment
QMOs	Quality Management Offices (Zonal)
SATBHSSP	Southern Africa Tuberculosis and Health Services Support Project
SEP	Stakeholder Engagement Plan
T/As	Traditional Authorities
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
ZHSO	Zonal Health Support Offices

1.0 Introduction

Malawi is a landlocked country with a surface area of 118,484 km of which 94,276 km is land. Administratively, the country is divided into three regions, namely the northern, central and southern regions. The country has 28 districts, which are further divided into traditional authorities (TA) ruled by chiefs. The Traditional Authorities are sub-divided into villages, which form the smallest administrative units. Politically, each district is divided into constituencies that are represented by Members of Parliament (MPs) in the National Assembly and constituencies are divided into wards, which are represented by local councillors in District Councils.

The country had an estimated population of 17.4 million people in 2017 with an average annual growth rate of 2.7%, giving an estimated population of 20.4 million people by 2022. An estimated 84% of the population lives in the rural areas as compared to 16% in urban centres. Malawi is predicted to experience an average annual urban population growth rate of 4.2% from 2013 to 2030, which will result in an increase in urbanization. Malawi has a young population with 64% of the total population under the age of 15, 18% under the age of 5 and only 3% above 65 years. Life expectancy at birth is estimated at 63.9 for both sexes in 2017.

Malawi's Gross Domestic Product (GDP) per capita in 2015 was estimated at USD381.404. Real GDP growth for Malawi was reported as 2.9% in 2016. The economy is predominantly agro-based, with agriculture and forestry and fishing contributing to 28% of GDP⁶. Informal employment is higher than formal employment, estimated at 89% and 11% respectively. The mean and median earnings per month for the total economically active population were estimated at USD114 and USD37, respectively. Development aid plays a key role in the economy and in the health sector it accounts for on average 62% of total funding. In addition, diaspora remittances increasingly contribute to the country's economy, estimated at USD34 million in 2015.

Literacy is higher among men (83%) than women (72%). The median number of schooling years completed has increased significantly over time; in 1992 it was estimated at 0.4 years for women and 4.3 years for men compared with 5.6 years for women and 6.6 years for men. This shows that Malawi has also made significant strides in narrowing gender disparities in education. The 2015-16 Malawi Demographic and Health Survey has demonstrated increased women empowerment over time by various attributes. For example, the percentage of women involved in decisions about

their health care increased from 55% in 2010 to 68% in 2015-16 and women's involvement in decisions about major household purchases increased from 30% to 55% over the same period.

2.0 The Malawi Health Care System

The health service delivery system in Malawi is organized at three levels (primary, secondary, and tertiary), which are linked by a referral system. The services are delivered through a network of public, Non-Governmental Organizations (NGOs), Private-not-for-Profit, and Private-for-Profit providers. Health services in the public sector are free-of-charge at the point of use. As of 2019, there were a total of 1,098 health facilities in Malawi, of which 52 percent were owned by the government, about 23 percent were Private-for-Profit and the remaining 25 percent were private-not-for-Profit, NGO, and institutional clinics (e.g., military). The public health facilities deliver nearly 60 percent of health services and directly employ over 70 percent of the health workforce. The Christian Health Association of Malawi (CHAM) owns 15 percent of health facilities and delivers about 35 percent of health services.

CHAM complements public facilities through a memorandum of understanding (MOU) or Service Level Agreements (SLAs) with the MoH. The MoH provides oversight to the health sector in Malawi and its specific functions include strategic planning, policy making, standards setting, technical support, monitoring and evaluation, quality assurance, resource mobilization, and international representation. Five Zonal Quality Management Offices (QMOs) are an extension of the central level MoH and provide technical support to districts. The MoH is also responsible for the oversight of central hospitals. At the district level, in line with the decentralized architecture, District Councils oversee the management, planning, execution, and evaluation of the health District Implementation Plans (DIPs) and budgets.

The councils' secretariats have several directorates of which one is for Health and Social Services, whose director heads the District Health Management Team (DHMT). The functions of the DHMT include managing all public health facilities at district level and directing provision of both primary and secondary level health services at the district level.

3.0 Background and significance of the project

Malawi has made significant progress in improving the health of its population over the last decade. Average life expectancy has increased over the last 10 years for both men and women. This is attributed mainly to reductions in adult and childhood mortality because of robust implementation of HIV and maternal and child health lifesaving interventions. The maternal mortality ratio declined from 439 per 100,000 live births in 2015 to 349 per 100,000 live births in 2019. Under-5 mortality rate declined from 63 per 1000 live births in 2015 to 56 per 1000 live births in 2019. Infant mortality rate and neonatal mortality have trended downwards with 42 and 27 per 1000 live births in 2015 and to 40 and 26 deaths per 1000 in 2019 respectively. Similarly, mortality from HIV has decreased by more than 50 percent since 2010 with a stable TB death rate of 14 cases per 100,000 people in 2020.

Despite these gains, Malawi is still lagging in certain health outcomes. About 40 percent of Malawi's children below the age of five are stunted, 3 percent are wasted, and 12 percent are underweight. The adult survival rate in Malawi is also worse than the averages for regional and peer countries. Non-communicable disease and injury mortality has been on an increase over the last decade and now account for over 40 percent of mortality in Malawi. Only 73 percent of the children aged 15 in Malawi today will survive until the age of 60 and adolescent fertility rate, which was estimated at 132 births per 1,000 women aged 15-19 in 2018, is higher than the averages for regional and peer countries.

Further to that, COVID-19 pandemic as well as the recent polio and cholera outbreaks threaten to reverse the progress made in health outcomes. These public health emergencies have added strains to the health system in terms of shortages of health workforce, financial resources, and essential medicines/supplies to support the provision of services. As a result, the delivery of EHS such as those for sexual and reproductive health, vaccine-preventable diseases, malaria, integrated management of childhood illnesses, tuberculosis, nutrition, and HIV/AIDS services has been negatively affected.

An analysis of the routine data reported by public health facilities to the Health Management Information System (HMIS) shows recurrent disruptions in outpatient consultations, child vaccination, antenatal care, institutional deliveries, and postnatal care between April 2020 and December 2021. For instance, the number of fully immunized children during the pandemic was consistently below expected levels, with the largest disruption observed during the peak of the COVID-19 second wave (February – March 2021). Similarly, institutional deliveries were consistently lower than expected during the first wave of the

pandemic (May – November 2020). Lapses in the delivery of EHS could erode the hard-fought gains over the last decade on some of the key health outcomes.

The country has a chronic shortage of critical health workers, which has further been exacerbated by recent fiscal and foreign exchange constraints. The health system, which serves over 19 million people, has about 12,000 core health workers, comprising 21 percent clinical staff, 31 percent nurses and midwives, 5 percent auxiliary staff, and 43 percent preventative services staff. Approximately 70 percent of the health workforce is made up of female health and social workers, making health the sector that employs more women in Malawi. The overall health workforce density is 10.42 core health workers per 10,000 population, which is significantly below the WHO target of 23 health workers per 10,000 population. The vacancy rate for key health workers stands at 61 percent in 2022, including 77 percent, 43 percent and 81 percent among medical doctors, nurses, and lab staff, respectively. The shortage of health workforce overstretches the health providers and affects the quality of care. The MoH has since been unable to recruit all the new health workforce graduating from the training institutions, which has led to high unemployment and a vacancy rate, which has almost doubled in the last two years. Therefore, continued investment in core health workers is critical, especially given the ongoing public health emergencies, including COVID-19, cholera, polio, and Ebola Virus Disease (EVD) which require cross-border surveillance and response, and as the country also continues to strengthen health systems for pandemic prevention, preparedness and response.

Expenditures on the health workforce absorb over half of the total public funds in the health sector. The public health sector wage bill, as a share of total public expenditure on health in Malawi, is higher than some of the lower middle-income countries in the African region such as Angola, Tanzania, Kenya, and Lesotho (while the salary level of health workers in Malawi is among the lowest in the region), but lower than Zambia, Zimbabwe, and Seychelles. High expenditure on health staff has crowded out spending on medicines and other supplies. Expenditure on Other Recurrent Transactions (ORT) comes second followed by expenditures on drugs and medical supplies, and lastly infrastructure development. The current level of funding only caters for about six months' supply of drugs and supplies, which leads to persistent shortages in health facilities.

Despite increases in health expenditure, Malawi's per capita expenditure remains well below the estimated need to provide EHS. Malawi's total Current Health Expenditure (CHE) is estimated at US\$39 per year and is lower than the funding that is required to provide essential healthcare as outlined in the

national Essential Health Package (EHP). Thus, only 44 percent of the health facilities in the country can comprehensively deliver health services outlined in the EHP. This is significantly below the 80 percent target outlined in the second Health Sector Strategic Plan (HSSP II) 2017-2022. The 2019 Malawi Harmonized Health Facility Assessment (MHHFA) revealed that there is limited health worker capacity, inadequate medical supplies and equipment, and weaknesses in governance and management. Specifically, the assessment established that on average health facilities (i) have 38 percent of the essential medicines; (ii) can perform 47 percent of the basic diagnostic tests; (iii) have 64 percent basic amenities items and 75 percent of basic equipment items; and (iv) lack the trained staff, guidelines, equipment, medicines and commodities, and diagnostic capacity required to deliver health interventions. Consequently, there is a need to invest in strengthening the availability of critical health system inputs such as essential drugs, diagnostics, equipment, and basic amenities to adequately deliver basic health services.

While drug shortages in public health facilities are not new, the current situation has been exacerbated by drug supply shortages globally and scarcity of foreign currency. The country relies on imports for 90 percent of pharmaceutical products while local manufacturers also rely on imported raw materials. The Central Medical Store Trust (CMST) is the largest purchaser of medicines in the country, accounting for 70-90 percent of total annual pharmaceutical consumption. Furthermore, CMST's operating model compromises its mission to improve health in Malawi by ensuring a reliable and continuous access to highest quality medicines and medical supplies through efficient procurement, warehousing and distribution services at affordable cost due to the mechanism in place.

CMST operates as a revolving fund; health facilities use their allocated budgets for drugs to purchase commodities and CMST replenishes stock with payments/income from the health facilities. The procurement is informed by annual quantification, which is an estimation of health facility needs. Annual quantification is also informed by annual drug budgets from districts, which are often adjusted mid-year (and under-budgeted by 50 percent). This does not give CMST adequate time to procure supplies. Consequently, shortages of preferred drugs and expiry of others are experienced at CMST, affecting the ability to recover its capital. The recent foreign exchange crisis has further impaired CMST's ability to meet the demands of essential medicines as the backlog of payments in US\$14 million has accumulated, affecting its ability to procure the types and quantities needed by public health facilities.

Persistent implementation gaps in Public Financial Management (PFM) and institutional capacity are continuing to affect value-for-money in delivery of health services. Ministries Departments and Agencies (MDAs) across Government (including MoH) continue to underutilize the new Integrated Financial Management Information System (IFMIS) capability for cash management and commitment controls. This weak management of commitments is resulting in a continued build-up of arrears, restricting fiscal space and affecting the ability to finance planned service delivery. This lack of controls, in turn, weakens the trust of development partners in the governance and financial management of the health system. Consequently, the majority of the support for the sector is being channeled through off-budget systems, which makes it cumbersome to track. In addition, payroll of the essential CHAM workers supported by the government is outside the Human Resource Management Information System (HRMIS), making it difficult to track efficiency of the system and this wage bill has been rising significantly in recent years. In this regard, the Ministry of Finance and Economic Affairs (MoFEA) has requested emergency support from the World Bank to ensure continued delivery of EHS. The proposed project has been prepared and will be implemented in accordance with the World Bank Policy for Investment Project Financing (IPF), paragraph 12: Projects in Situations of Urgent Need of Assistance or Capacity Constraints due to impending natural disaster and capacity constraints. This is justified by the emergency nature of this project in response to the impact of the emergency caused by the compounding health (COVID-19, cholera, polio), climate and fiscal crises. The reduction of funding for critical health expenditures could cause a serious deterioration of frontline EHS in the districts without emergency financial support.

4.0 Project Description

4.1 Introduction

The Ministry of Finance and Economic Affairs (MoFEA) has requested emergency support from the World Bank to ensure continued delivery of EHS. The government estimates its immediate financing gap to maintain the delivery of front-line health services to be about US\$100 million for a period of 24 months. The government's request for emergency financing from the World Bank is of a bridging nature, as it is anticipated that the fiscal situation will improve in the medium-term with the introduction of the IMF Rapid Credit Facility (RCF) and a Staff Monitored Program (SMP) in November 2022 – opening the door to a more sustainable finance path to follow through significant debt restructuring and macro-fiscal and structural reforms under a potential IMF ECF, currently under negotiation, and a potential two-

part World Bank DPF series to follow. Over the medium term, GDP growth is expected to return to 4 percent per annum, with the government taking measures to achieve significant year-on-year reductions in the primary deficit.

4.2 PDO Statement

To ensure resources are prioritized to enable the continued delivery of essential health services in Malawi in an efficient and accountable manner.

4.3 Project components

The proposed operation will provide emergency financing for the health sector to optimally deliver Essential Health Services to the most vulnerable populations in the midst of crisis response. The proposed project in the amount of US\$100 million (IDA grant) will:

- Protect the provision of resources for payment of front-line health service providers and timely access to essential operating expenditures (such as fuel and energy) that are necessary to keep facilities running and ambulances operational.
- Provide bolstered provision of essential medicines to public health facilities while increasing confidence in systems for procurement and distribution to last-mile to increase access to health commodities.
- Support the strengthening of core human resource management (HRM), public financial management (PFM), and accountability processes in the health sector that are necessary for ensuring sustainability and value-for-money of service delivery.

5.0 Rationale / Objectives of the ICWMP

Wherever healthcare service is being provided, there is a risk of acquiring or transmitting infections more especially if Infection Prevention and Control measures are not followed and if. Health care wastes generated from the project are not properly managed. Considering the high risk of infections associated with health care activities, this guarantees the need of following standard precautions for infection prevention and waste management. Therefore, having an Infection Control and Waste Management Plan (ICWMP) in place is paramount.

The Infection Control and Waste Management Plan (ICWMP) has been developed to act as a guide in infection prevention and control while providing healthcare services. The overall objective is to detail steps that will ensure that Health Care Wastes generated during healthcare services in the health care facility are handled appropriately and safely, consistent with international good practices. It also aims to facilitate the implementation of appropriate waste management practices which include generation, segregation, collection, storage, treatment, and disposal to avoid the spreading of infection and environmental pollution. The ICWMP is to be used by relevant stakeholders including health care facilities, the community, and the Ministry of Health. The recommendations have been developed using the best available sources of information, including the WHO and national guidelines or policies.

ICWMP plays a key role in achieving sustainable waste management and infection control. The purpose of this plan is to ensure that effective procedures are implemented for infection control and for the generation, segregation, collection, storage, transportation, treatment, and final disposal of wastes that are generated from the health care activities occurring in the Health Care Facilities.

The scope of this ICWMP specifically could relate to the following waste management issues:

- Identification and classification of wastes for the HCFs;
- Waste hierarchy and waste minimization strategies (i.e. reduction at source, recycling, treatment, and practical as disposal practices)
- Waste handling (Collection; separation, treatment and storage; transportation; and disposal)
- Monitoring ,Reporting and record keeping.

6.0 Targeted Healthcare Facility

This Project is being implemented national wide although the exact facilities to be supported have not been determined. In these facilities the project will ensure that there is safe disposal of medical

wastes generated by medical activities/ services. For the waste treatment facilities, the project will select these basing on available supporting infrastructure and resources such as reliable resources of power, fuel, total amount of medical waste generated by the HCF, and would consider the need for temporal storage.

7.0 Infection Control and Waste Management

7.1 Health-care Waste

Health Care Waste (HCW) includes all the waste generated within health-care facilities, research centres and laboratories for medical procedures; and includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices and radio-active materials (WHO, 2014)¹. This waste carries greater potential for causing infection and injury than any other form of waste due to its contamination state (*Ibid*) and this necessitates its proper handling and management² (WHO, 2004). Between 75% and 90% of the waste produced by health care providers is equivalent to domestic waste which is usually called ‘non-hazardous’ or general health care waste (figure 6.1).

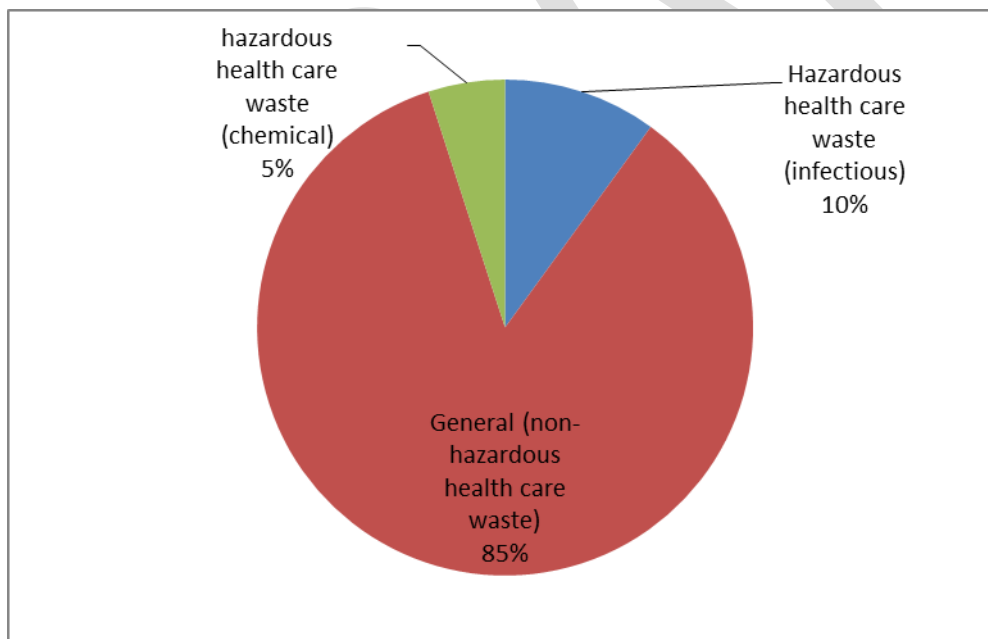


Figure 1:Typical waste composition in a Health Care Facilities (Source: WHO, 2014)

There are generally two major classifications of waste: hazardous and non-hazardous waste. Hazardous waste includes cytotoxic drugs and clinical waste (e.g. sharps and non-sharps) while non-hazardous waste includes biodegradable waste (e.g. kitchen waste or generally domestic waste) and inorganic waste (i.e. waste that is recyclable and can be sold at the market). Table 1 shows more categories of waste (hazardous and non-hazardous) according to WHO (2014) classifications.

Table 1: Waste Categories

Waste category		Descriptions and examples
Hazardous HCW		
1	Sharps waste	Used or unused sharps (e.g. hypodermic, intravenous or other needles; auto-disable syringes; syringes with attached needle infusion sets; scalpels; pipettes; knives; blades; broken glass)
2	Infectious waste	Waste suspected to contain pathogens and that poses a risk of disease transmission (e.g. waste contaminated with blood and other body fluids; laboratory cultures and microbiological stocks; waste including excreta and other materials that have been in contact with patients infected with highly infectious diseases in isolation wards).
3	Pathological waste	Human tissues, organs or fluids; body parts; fetuses; unused blood products.
4	Pharmaceutical waste	Pharmaceuticals that are expired or no longer needed; items contaminated by or containing pharmaceuticals.
5	Cytotoxic waste	Cytotoxic waste containing substances with genotoxic properties (e.g. waste containing cytostatic drugs – often used in cancer therapy; genotoxic chemicals)

6	Chemical waste	Waste containing chemical substances (e.g. laboratory reagents; film developer; disinfectants that are expired or no longer needed; solvents; waste with high content of heavy metals, e.g. batteries; broken thermometers and blood-pressure gauges)
7	Radio-active waste	Waste containing radioactive substances (e.g. unused liquids from radiotherapy or laboratory research; contaminated glassware, packages or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources).
Non-hazardous or general HCW		
Waste that does not pose any particular biological, chemical, radioactive or physical hazard.		

Hazardous healthcare waste is of primary concern, due to its potential to cause infections, disease or injury. On the other hand, Infection prevention and control (IPC) is defined as the discipline concerned with prevention of the spread of infections within the health-care setting and at community level. IPC are evidence-based practices and procedures that are applied consistently in health care settings to prevent or reduce the risk of transmission of micro-organisms to health care providers, clients, residents and visitors. Therefore, either at health care or community setting, IPC is concerned with interventions relating to health and environment, which can be divided into 4 parts; Personal (staff) protection; Patient protection; Population (Community) Protection and Environment protection.

According to WHO, about 15-25% of total health-care waste should be infectious waste, and improper handling of health care waste can cause serious health problems for workers, community and environment. WHO reports showed that worldwide, about 5.2 million people (including 4 million children) die each year from waste related diseases. The hazards of exposure to health care waste can range from gastro-enteric, respiratory, and skin infections to more deadly diseases such as HIV/AIDS, and Hepatitis (Babanyara et. al 2013). WHO reported that globally, injections with contaminated syringes caused 21 million hepatitis B infections (32% of all new infections), 2 million hepatitis C infections (40% of all new infections) and 260,000 HIV infections (5% of all

new infections). More specifically medical waste has a high potential of carrying micro-organisms that can infect people who are exposed to it, as well as the community at large if it is not properly disposed of. Many of these infections were avoidable if the wastes had been disposed of safely (WHO 2004).

Although treatment and proper disposal of health-care waste reduces risks, indirect health risks may occur through the release of toxic pollutants into the environment through treatment or disposal. For instance, landfills can contaminate drinking-water if they are not properly constructed. Occupational risks exist at disposal facilities that are not well designed, run, or maintained. Furthermore, incineration of waste has been widely practiced but inadequate incineration or the incineration of unsuitable materials results in the release of pollutants into the air and generate ash residue.

Incinerated materials containing chlorine can generate dioxins and furans, which are human carcinogens and have been associated with a range of adverse health effects. Incineration of heavy metals or materials with high metal content (in particular lead, mercury and cadmium) can lead to the spread of toxic metals in the environment. Dioxins, furans and metals are persistent, and bio accumulate in the environment. Materials containing chlorine or metal should therefore not be incinerated.

The health-care activities will protect and restore health and save lives however, the amount of infectious waste and by-products being generated may cause adverse potential health and environmental impacts. The average distribution on types of medical waste for purposes of waste management planning is approximately 80% non-infectious and 20% infectious such as biological/pathological waste, chemical/pharmaceutical waste and sharp materials.

8.0 Health Care Waste Management in the Health Care Facilities (HCFs).

Malawi like other developing countries faces the problem of HCWM. While less percentages of waste could be considered as infectious, this is not the case in many health facilities with poorly developed waste-segregation practices, hence many waste is being categorized as infectious. The main reason for this is the increased generation of diverse types of healthcare waste due to the multiplication and expansion of healthcare facilities as a result of population growth, ongoing immunizations and treatment of various conditions including emerging (ie Covid-19) and re-

emerging communicable and non-communicable diseases. The different types of health care wastes generated from these health care services poses potential health risks to the health workforce, the environment and community at large.

Health care settings produce infectious waste that may lead to Hospital Acquired Infections (HAIs) among health care workers, waste handlers, and patients. HAIs have been a major contributor to morbidity and mortality burden in the developing world.

The standard practice in most hospitals in Malawi is that health care waste is separated into three main categories as follows: i) Highly Infectious or hazardous health, ii) Infectious and iii) non-infectious waste.

8.1 Health Care Waste Generation

Appropriate handling, treatment, and disposal of waste by type can help to reduce costs and in the same breath serve as safeguard in the protection of public health and the environment. Critical here is the observance of health care waste production with the following being key result areas:

- **Waste Generation:** Most health facilities generate varying quantities of waste ranging from one health facility to the other in accordance with their patient workload and treatment offered in the health care facilities. However, the facilities are not able to quantify the volume of the amount of waste generated.
- **Waste Minimization:** Waste minimization is a strategy for sound management of health care waste although most health facilities in Malawi have difficulties in practicing waste minimization or showing any efforts geared towards waste minimization.
- **Waste receptacles:** The containment of waste from points of generation is critical towards the achievement of sound management of health care waste. Many health care facilities have inadequate waste receptacles, hence the poor management of the health care wastes in Malawian health care facilities.

Table 2 presents an overview of the minimal procedures that should be followed to effectively manage HCW from point of generation to point of disposal.

Table 2: Summary for HCW stream

step	location	healthcare waste stream	key points
0		<i>waste minimization</i>	<i>purchasing policy; stock management; recycling of certain types of waste...</i>
1	in medical unit	generation	
2		segregation at source	<i>one of the most important steps to reduce risks and amount of hazardous waste</i>
3		collection + on-site transport	<i>protective equipment; sealed containers; specific easy to wash trolleys</i>
4	in health facility	on-site storage	<i>lockable easy to clean storage room; limited storage time of 24-48 hours</i>
5		on-site treatment / disposal	<i>adequate storage room; limited time of max 48 hours</i>
6	outside of health facility	off-site transport	<i>appropriate vehicle and consignment note; HCF is informed about final destination</i>
7		off-site treatment / disposal	<i>appropriate vehicle and consignment note to ensure...</i>

Source: Secretariat for Basel Convention & WHO, National Health-Care Waste Management Plan: Guidance Manual. Can also be accessed at www.who.int website

8.2 Health Care Waste Handling

Health-care waste management options may themselves lead to risks in human health and environment and no perfect readily achievable solution exists in the management of health-care waste. Waste, whether generated at smaller rural clinics or larger facilities, can be managed where adequate well-operated infrastructures exist. In order to achieve sound implementation of waste management, most healthcare institutions have adopted the following steps as a strategy for success:

- **Waste Segregation Practices:** Segregation of waste by type is observed in some facilities in the country which have embraced segregation practices using color -coded bins. Segregation of HCW is done according to the following categories: infectious or clinical

waste (hazardous waste), Non-infectious or general waste, highly infectious waste, and sharps waste. Use of colour codes for waste containers is low in many facilities. The following colour codes for HCW are provided in the Ministry of Health, Infection Prevention & Wash Guidelines for Malawi

- Red for highly infectious waste.
- Yellow for infectious and sharps waste.
- Black for non-infectious waste.

Careful segregation of waste into different categories helps to minimize the quantities of hazardous waste. Poor segregation and poor choice of technology for treatment and disposal of waste are two problems that exists due in part to inadequate management practices or simply because of absence of adequate provision of waste receptacles.

- Packaging of Healthcare waste: The packaging involves putting waste in colour-coded waste bags. Many facilities in Malawi do not have the required temporary waste storage facilities, hence waste is just kept in the corner or where health care is being provided.
- Labelling: Labelling of waste bags is a recommended practice to ensure each waste category is easily identified, and waste loads can be traced back to their point of generation. The current practice in most health facilities in Malawi is that labelling is rarely done.

8.3 Waste Transportation and Storage

Waste Transportation: It is common practice in Malawi that most hospitals continue to use wheelbarrows and wheel chairs for the transportation of waste within the health care facilities and within its compounds, while only a few of the facilities use standard trolleys mainly in private and CHAM facilities. The use of wheelbarrows and wheelchairs should be discouraged since it leads to spillage of waste. The recommended practice for waste transportation within hospitals should be dedicated trolleys with separate ones for infectious waste to be drawn on paved surfaces to waste treatment sites.

Waste Storage: Generally, most health care facilities in Malawi do not have a standard storage area for the waste generated. Mostly the waste is just kept somewhere in a corner close to where health service delivery is occurring. In some facilities, they do improvise some small room for waste storage. Other facilities store their waste right beside the incinerators (batch burners) so that

they should be treated at the right time. This makes waste collection time differing even within the facilities. From the report on Health Care Waste Management Assessment which occurred in 2019, it revealed that the frequency of collection infectious wastes, sharps and general wastes varied significantly. The assessment revealed 76.5% (n=179) said wastes were collected daily, 9.4% (n=22) said wastes were collected two to three days, 2.6% (n=6) said wastes were collected every 4-5 days and 11.1% (n=26) said there was no definite schedule and one 0.4%) indicated collection was done every two weeks.

8.4 Waste Treatment and Final Disposal

The goal of treating health care waste is to render the waste safe for disposal, therefore it aims at eliminating hazards and exposures. WHO and Stockholm convention guidelines among other related global best practices recommend “prioritizing consideration of alternative waste treatment processes” that do not generate dioxins and furans.

It may be safer for some wastes to be treated or pre-treated on site. Laboratories are uniquely capable of treating some wastes to eliminate hazards or reduce the amount of waste for disposal, thereby cutting costs. However, the technologies are rather sophisticated and capital intensive, requiring elaborate maintenance capacity. The HCWM training manual for Malawi (2004) recommends the following treatment system; **Incineration**, which when done properly is a highly advanced technology that can adequately treat all types of special healthcare waste. The key parameters of controlled incineration are combustion at a sufficiently high temperature (between 1,000°C and 1,200°C) for long enough time in a combustion chamber with sufficient turbulence and oxygen for complete combustion to be achieved; and problematic gases to be minimized.

Environmental health reports generated by the Ministry of Health indicates that currently over 80 percent of healthcare institutions in the country have incinerators that do not meet the minimum standards (temperature of 1,000°C and 1,200°C) or have literally none and in such situation incineration of medical waste is done in open pits where burning is also not complete (Information from the draft HCWM policy,2020). Destruction of expired medicines and related supplies also poses a serious challenge because of the lack of adequate incinerators constructed for this purpose in the facilities.

In the majority of the health facilities what is available are the low-cost medical waste incinerator called Mechanical incinerators which is recommended for most hospitals and health centres. The

waste is manually loaded and de-ashed on a daily basis. A shovel is used to remove the ashes (after cooling down) and disposed of appropriately in an ash pit. It is recommended that all wastes delivered to the incinerator should be burnt within 24 hours. Most of the mechanical incinerators where installed/ built as an emergency preparation for Ebola Virus Disease.

Currently, Malawi under the Ministry of Health has two Medical Waste Incinerators that do meet minimum standards, and these were commissioned in 2020 and were purchased with funds from the GAVI/Global Fund for Health. One of these incinerators is at Queen Elizabeth General Hospital in Blantyre, which is in the southern region of Malawi and the other one is at Kamuzu Central Hospital in Lilongwe (Central Malawi).

Apart from these newly commissioned incinerators, St Gabriel Mission Hospital, which is a Christian Health Association of Malawi (CHAM) facility, has a Medical Waste Incinerator that also meets the minimum standards and has so far been used for disposal of medical waste in the country on a cost-sharing basis. The use of these incinerators requires financial resources to support the logistical aspects of transporting waste generated in various facilities across the country but also on the operational and maintenance costs of these incinerators. Transportation itself requires appropriate vehicles to maintain the safety of both people and the environment through to the incineration site, of which the ideal vehicles are not available, instead the ordinarily vehicles are used in off-site waste transportation. Medical waste disposal is even more difficult in Malawi due to the use of disposable needles, syringes, and similar items.

8.5 Occupational Health & Safety

8.5.1 Personal Protective Equipment

Awareness of the danger of disease transmission from infectious waste among health workers in most health facilities raised demand for provision of personal protective equipment (PPEs) to waste handlers. Use of gumboots for protection of waste handlers' feet, and possession of heavy-duty gloves for hand protection is common. The provision of respirators or face masks, overalls, helmets, and plastic goggles for eyes protection is poor in most health facilities. The use of the PPEs is what has not been internalized among expected users. In most waste treatment sites, waste operators have possession of face masks or goggles, however most of them do not utilize them accordingly.

Overall, adherence to occupational health and safety measures, which include occupational health and safety provisions, employer responsibility, use of PPEs and workers protection and coordination of OHS activities in the management of health care waste is still weak in Malawi.

8.5.2 Capacity Building

Training plans on HCWM: Best practices in Health Care Waste Management require that all healthcare staff receive induction and repeated training on health care waste management. Information was not found on how many health staff have received training in health care waste management per facility, but many have received trainings. However, most staff members who are deployed to handle waste are also engaged in doing other chores apart from waste management.

Development of Waste Management Plans: A good waste management plan is a good basis for implementing waste management plans that has allocation of roles, responsibilities and resources. A well-thought-out plan describes the actions to be implemented by authorities, health-care personnel and waste management workers. At the national level, a plan is critical for government to define its intentions to make improvements, and the resources required across the country for successful implementation of environmental safeguards. All central and district hospitals in Malawi have Infection Prevention and Waste Management work plans which will be refined to management plans. 15 district hospitals managed to develop management plans with support from SATBHSSP.

The government and the respective health facilities for the emergency project are expected to develop their health care waste management plans and allocate resources for their operationalization in accordance with the relevant strategic objectives.

8.6 Finance and Resources

Most health care facilities do not have the direct vote for the costs involved in managing healthcare waste. In most cases, it is difficult to separate the cost of managing waste; currently the cost is lumped up with other operational costs. Obtaining resources to purchase bins, bin-liners, funds for personnel deployment and maintenance of health care waste treatment equipment is complicated by these budget limitations.

8.7 Infection Control and Hand hygiene

WHO notes that management of healthcare waste is an integral part of health facility or hospital hygiene and infection control. Healthcare waste can be considered as a reservoir of pathogenic micro-organisms, which if someone is exposed could give rise to an avoidable infection. If waste is inadequately managed, these micro-organisms can be transmitted by direct contact, by inhalation or by a variety of animal vectors (e.g. flies, rodents, roaches), which could come into contact with waste.

Standard precautions are the basic level of infection control precautions which are to be used, as a minimum, in the care of all patients. Hand hygiene in both health care and non-health care settings is one of the most important measures that can be used to prevent transmission of some of the infectious diseases. In health care settings, health care workers (HCWs) should apply the WHO's 5 Moments for Hand Hygiene approach before touching a patient, before any clean or aseptic procedure is performed, after exposure to body fluid, after touching a patient, and after touching a patient's surroundings. Functioning hand washing facilities with water and soap should be available within 5 meters of toilets.

Treatment and handling requirements for excreta by implementing WASH practices, particularly hand washing with soap and clean running water, should be strictly applied and maintained because these provides an important additional barrier to COVID-19 virus transmission and other infections.

9.0 Waste Management Guiding Principles for the Project

Improper management of health care waste can cause serious health problem for health workers and other workers along the waste management chain, community and the environment. Medical wastes have a high potential of carrying micro-organisms that can infect people who are exposed to it, as well as the community at large if it is not properly disposed of. Wastes that will be generated from healthcare services could include solid and liquid contaminated waste (e.g. blood, other body fluids and contaminated fluid) and infected materials (used water; lab solutions and reagents, syringes, bed sheets, majority of waste from labs and quarantine and isolation centres, etc.), which requires special handling and awareness, as it may pose an infectious risk to healthcare

workers in contact or handling the waste. It is also important to ensure that sharps are properly disposed of.

Infectious waste if not managed properly has the potential to endanger the health of patients, health-care workers, waste-handlers, and the general population. To manage the waste generated from the health facilities the following waste mitigation strategies (**Error! Reference source not found.**) usually referred to as key steps in management of HCWM will be implemented:

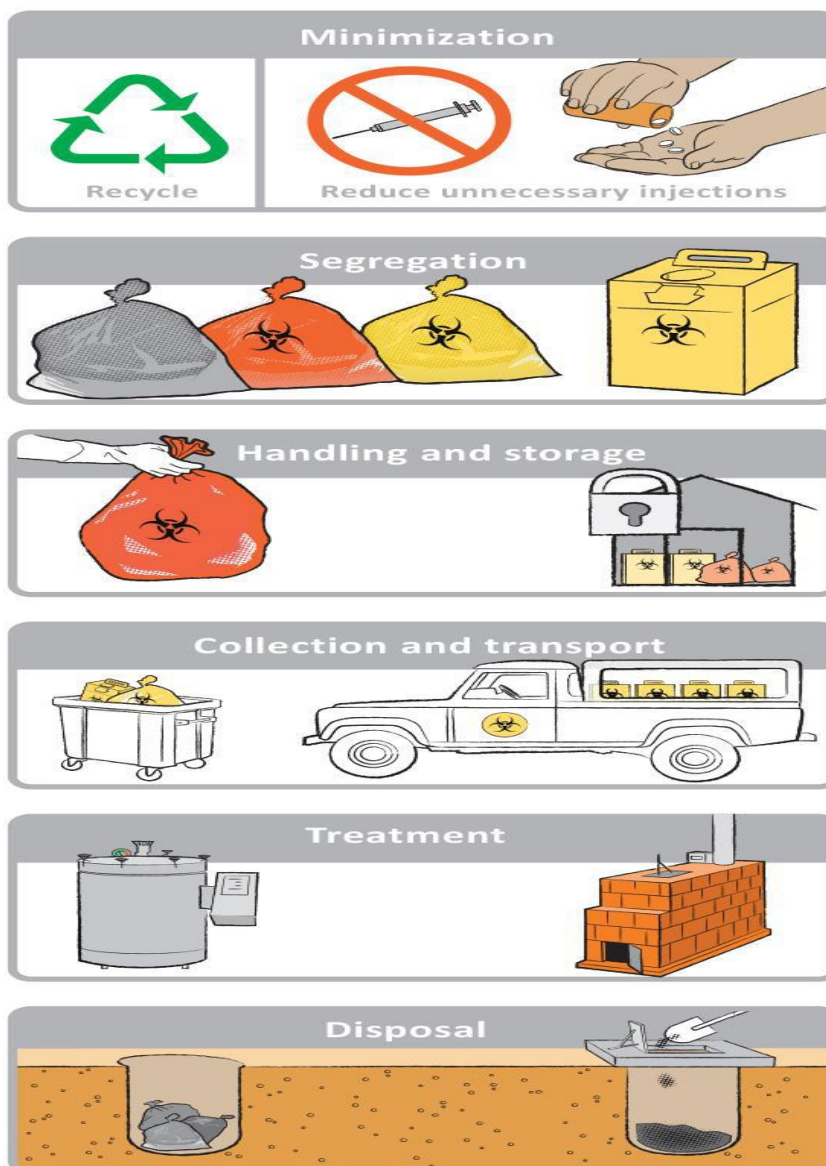


Figure 2: Infectious Healthcare Waste Management

In achieving sound management of waste, a hierarchy of waste management should always be applied. This is a ranking of waste management methods in terms of their ‘desirability’. The hierarchy is based largely on the concept of the 3R’s – reduce, reuse, recycle. The most preferable approach is that which produces as little waste as possible, thus minimizing the amount entering the waste stream, taking cautious and very careful attention to the risks involved. Therefore, while applying this to HCWM, ensuring safety of the workers and protection of the environment at every level of control is very critical (see **Error! Reference source not found.**):



Figure 3: Waste Minimization Stages

9.1 Waste Minimization

The best practice is to ensure that all health facilities (vaccination centers/points, laboratories, isolation, quarantine, treatment centers) should minimize their waste generation to the barest possible minimum amounts. Appropriate plans, strategies and actions should be established to ensure adequate medical waste minimization at source by implementing the following waste minimization strategies:

- Source reduction. Purchasing and supplying materials which are less wasteful and/or generate less medical waste.
- Stock management. Frequent auditing; use of the oldest stock first and checking the expiry date of products during receiving and issuing of commodities.
- Encouraging the use of recyclable products. Using materials that can be reused both off-site and on-site.

- Centralized purchasing, supply of medical goods to ensure the selection of less wasteful materials;
- Source suppliers who may deliver chemicals and pharmaceuticals in small quantities, this will encourage the hospital administration to make purchase in small manageable quantities,
- Ensure good management and control practices especially in the purchase and use of pharmaceuticals; and
- Enforcing a rigorous and careful segregation of the infectious waste at source.
- Segregation of waste at the point of generation. Sorting the waste into different categories helps to minimize the quantities of infectious waste generated.
- Reduction of unnecessary injections to reduce on sharps waste
- Training of relevant staff on waste minimization and benefits especially the medical staff to make changes towards less wasteful clinical practices.

9.2 Waste Segregation and Colour Coding



In the case of COVID-19 and this emergency project all the wastes generated in care of COVID-19 patients and other related emergency infections like cholera is considered as infectious waste and will be segregated in the yellow bags and adhere to MoH Infection Prevention & WASH Guidelines as well as recommended by [WHO Safe management of wastes from health-care activities](#) with the following colour- coding system:


- **Black:** All bins or bags containing non-infectious waste.
- **Yellow:** Any kind of container filled with infectious healthcare waste, including safety boxes.
- **Red:** Any kind of container filled highly infectious healthcare waste.

Double layered bags should be used for the collection of waste from isolation and treatment wards to ensure that no accidental leakage occurs from the bags.

The waste generated from treatment facilities and vaccination points, will be segregated and colour coded as outlined below in table 3.

Table 3 Three-bin and safety box system to be used at all health faculties.

Segregation category	Colour Coding	Container	Examples	Marking
Sharp Waste	White or yellow (Marked “Sharps”)	Bag or bin (Puncture Proof)	Syringes with needles, blades	Biohazard symbol and appropriate MOH messages on injection safety
Infectious clinical waste (different type)	Yellow	Bag or bin (Strong leak proof plastic bag with biohazard symbol)	Laboratory waste, materials potentially not infected with blood.	 BIOHAZARD
Highly Infectious	Red (Marked Highly Infectious)	Containers capable of being autoclaved	Laboratory waste, materials potentially infected blood, swabs, cultures / TB laboratories, contaminated blood clots, glassware, swabs containers /specimen bottles and culture media.	 BIOHAZARD
Non-Infectious/ nonhazardous (non-clinical)		Plastic Bag or container.	Paper, ash, cardboard, carton boxes	

Segregation category	Colour Coding	Container	Examples	Marking
Chemical and Pharmaceutical	Brown	Plastic bag or Container	Waste containing chemical substances (e.g. laboratory reagents; film developer; disinfectants that are expired or no longer needed; solvents; waste with high content of heavy metals, e.g. batteries; broken thermometers and blood-pressure gauges), Cytotoxic waste, expired drugs	Marking will vary with classification of the chemical
Radioactive waste	Yellow with black radioactive Symbol	Lead Box	Waste containing radioactive substances (e.g. unused liquids from radiotherapy or laboratory research; contaminated glassware, packages or absorbent paper; urine and excreta from patients treated or tested with unsealed radionuclides; sealed sources)	 Radio Active symbol

Type of waste	Area of generation	Color and label	Type of container	Removal frequency	Destination	Responsibility
Highly infectious	Lab	Yellow, marked "Highly infectious"	Strong leak-proof plastic bag or container capable of being autoclaved	Daily	Incineration Septic tank after treatment	Lab technician
Other infectious wastes, Pathological and anatomical	Maternity	Yellow, marked biohazard	Leak-proof plastic bag or container	Immediately	Pit	Clinical Officer/ Nurse

Sharps	Lab, OPD, Maternity	Yellow marked sharps	Puncture proof container	Daily	Sharps pit Incineration	Lab, Nurse
Chemicals and pharmaceuticals		Brown labelled with appropriate hazard symbol	Plastic bag or rigid container	Weekly	Incineration	Pharmacist
Radioactive wastes		Labelled with radiation symbol	Lead box	Weekly	<ul style="list-style-type: none"> - Dilute and Disperse. - Delay and Decay. - Concentrate & Contain (Rarely used) - Incineration (Rarely used) 	Radiographer
General HCW		Black	Plastic bag	Daily		
Non-clinical wastes						
Biodegradable	Kitchen	Green	Rigid container	Weekly	District waste yard	Housekeeping
Hazardous wastes	From non-clinical area	Red	Rigid container	Weekly	District waste yard	Housekeeping
Recyclables	From non-clinical area	Blue	Rigid container	Weekly	Recycling company identified	Housekeeping

9.3 Packaging and Labelling of Healthcare Waste

The packaging involves putting wastes in the colour-coded waste bags (bin liners) and label it for easy identification of waste streams and easy tracking back. All waste bags or containers should be labelled with basic information in English language and or in Chichewa (local language). Basic label information should include type of waste in the container, name of the health department, date of collection and, warning of hazardous nature. In general, labelling is important to:

- Identify the source of infectious or date of generation in case of an accident or improper segregation of the waste, ensure that the workers responsible for infectious management handle the different types of wastes safely, ensure that each staff member feels more responsible for what they put into the bag/receptacle.

- Ensure that Medical Departments gather data on the amount of waste produced in each department.

The packaging should be appropriate for the type of waste involved. In order to reduce the risk of exposure to medical waste, stringent packaging protocols including decontaminating the waste containers at point of origin must be adhered to. The following guidelines should be included for packaging sharps and other health care wastes:

- The bio-medical waste should be collected and stored separately by the same common bio-medical waste treatment facility staff prior to handling it. A dedicated collection bin labelled as infectious waste should be used to store waste from the isolation wards.
- At the waste treatment area, prioritize treatment within 48 hours and disposal of waste coming from the treatment and isolation areas immediately upon receipt.
- The inner and outer surface of the containers, bins and trolleys used for storage of infectious waste should be disinfected with sodium 0.5% chlorine solutions.
- There would be special packaging characteristics for some treatment techniques; incineration requires combustible containers while steam sterilization requires packaging material that allow steam penetration and air evacuation,
- Once the waste generated has been containerized/packaged for disposal it must not be in a position to be exposed again as it is moved from site to site to final disposal.

9.4 Waste Collection and Handling

Collection of waste from beneficiary health care facilities is extremely important particularly to avoid over spilling of infectious waste out of collection containers to medical staff and general public; collection should be done promptly and routinely or as often as required. Collection of wastes should be done by approved and trained personnel fully equipped with appropriate PPEs and conveying machinery such as waste trolley and carts. Administrators or managers, health care workers and laboratory staff of health facilities should be actively involved in collection of waste as well as the waste handlers. They should ensure that their containers/bags (Bins/safety boxes and collection receptacles) are never more than three-quarter full before sealing them at their points of generation. Replacement bags should be made available at each waste collection period. They

should also ensure that such collection containers are appropriately labelled as per WHO Health Care Waste Management.

- As a precaution double layered bags (using 2 bags) should be used for collection of waste from isolation wards so as to ensure adequate strength and no leaks.
- Dedicated medical waste collection should be made available by the facility management, to ensure the double-bagged waste bags are disposed of immediately.
- Collect and store biomedical waste separately prior to handing over in case the facility is utilizing the services of an off-site treatment facility. It is important to use a dedicated collection bin labelled as infectious waste to store all COVID-19 waste and keep separately in temporary storage room prior to handing over to authorized Biomedical Waste Collectors; and

9.5 Waste Handling Safety Measures

All health care waste handlers should wear appropriate PPE (that is, gumboots, apron, long-sleeved gown, heavy duty gloves, mask, and goggles or a face shield) and perform hand hygiene after removing it. For more information refer to the WHO guidance, Safe management of wastes from health-care activities. Personal Protective equipment should be disposed of accordingly as infectious waste.

When performing procedures where splashing may occur or when infectious medical waste bags or containers may contact more than the worker's hands and wrists, the following medical protective clothing and PPE should be provided in addition to gloves:

- Appropriate protective medical clothing should be of material that does not permit infectious medical waste from penetrating and reaching workers clothes or skin.
- Eye protection, surgical face masks, and face shields when personnel may reasonably anticipate facial exposure to infectious medical waste.

Additionally, immunization shall be undertaken for staff members, as necessary (e.g. vaccination for hepatitis B virus, tetanus immunization and covid-19 immunization).

Sharps containers (i.e., safety boxes) will be placed as close to the point of use as possible and practical, ideally within arm's reach.

Safety boxes will not be placed on a floor or in high traffic areas (corridors outside laboratory rooms or sample preparation rooms) where people could bump into them or be stuck by someone carrying sharps to be disposed of.

Infectious waste bins should be covered before collection. It should be cleaned and disinfected with 0.5% chlorine solution after emptying and before reuse.

9.6 Waste Storage

There will be designated multiple waste storage area designed for different types of wastes with appropriate design and capacity to store the generated waste and be classified into internal and external. Consideration for storage shall be based on the classification or type of waste being dealt with and the potential risk of infection to health-care workers and waste disposal staff. The storage place must be identified depending on the type of waste. WHO guidelines provide key recommendations for storage facilities of health care waste which includes: i) the storage area should have a hard-standing floor with good drainage that allows easy cleaning and disinfection, ii) adequate water supply and supply of cleaning equipment and PPE for staff, iii) easy access by staff handling the waste and lockable to prevent unauthorized entry of persons, iv) should be away from any food preparation areas and patients' wards.

The following rules will be observed for proper storage of infectious waste:

- Initial packaging and storage should take place where infectious waste is generated.
- Medical waste from isolation/quarantine areas should be pre-treated or decontaminated to reduce the microbial load,
- Treatment processes methods may include autoclaving, incineration, chemical disinfection, grinding/ shredding/disinfection methods,
- Storage of waste shall then be moved to a temporary on-site storage location that is secure and completely closed or lockable,
- The facility should have earmarked segregation points, as close to the generation points of infectious waste as possible.
- The facility should ensure availability of good quality and adequately sized containers for waste segregation and on-site storage. These should preferably be thick plastic and should be lined with non- chlorinated plastic liners, refer to additional information in WHO [water](#),

[sanitation, hygiene and waste management for COVID-19](#) and [WHO Safe management of wastes from health-care activities](#).

Internal storage is the temporary placement of waste at the point of generation before transfer to external storage points. A temporal storage location for the infectious waste should be designated within the health-care facilities, PoE, isolation and quarantine areas and laboratories. External storage refers to the transit point where waste is stored after removal from primary storage to the time it is collected and transported for treatment and final disposal. External storage location should be isolated and stored in the larger containers found near the waste treatment facilities awaiting treatment. Infectious waste should not be stored for more than 48 hours after generation before treatment.

To ensure infectious waste is kept separately, the central storage receptacles for each color-coded bag should be placed in similarly color-coded receptacles. This waste should be pre-treated (autoclaving, chemical treatment) before being transported to final treatment point.

9.7 Transportation

Consideration for transportation will be based on the classification or type of waste being dealt with and the potential risk of infection to health-care workers and waste disposal staff. Transportation is classified into On-site transport and Off-site transport, the waste generated from HCF is treated and disposed both at (on-site) and also there shall be off-site transport. On-site transport involves conveying of wastes from the various points of generation to a temporary storage location also within the same area. Waste transportation within hospitals should be done by using dedicated trolleys with separate ones for infectious waste to be drawn on paved surfaces to waste treatment sites.

9.7.1 On-site Transportation

On-site transport should take place during less busy times whenever possible. Set routes should be used to prevent exposure to staff and patients and to minimize the passage of loaded carts through patient care and other clean areas. Depending on the design of the health-care facility, the internal transport of waste should use separate floors, stairways as far as possible. Regular transport routes and collection times should be fixed and reliable. Transport staff should wear adequate personal protective equipment, gloves, strong and closed shoes, overalls and masks.

Hazardous and non-hazardous waste should always be transported separately. In general, there are three different transport systems; the following should be adhered to when carrying out On Site transportation.

- Waste transportation trolleys for general waste should be painted black, only be used for non-hazardous waste types and labelled clearly “General waste” or “Non-hazardous waste”.
- Infectious waste should not be transported together with other hazardous waste, to prevent the possible spread of infectious agents. Trolleys should be coloured in the appropriate colour code for infectious waste (yellow) and should be labelled with an “Infectious waste” sign.
- Waste should never be transported by hand even if the distance is short due to risks of accident/exposure to infectious material,
- Other hazardous waste, such as chemical and pharmaceutical wastes, should be transported separately in boxes to central storage sites.
- The collected waste should not be left even temporarily anywhere other than at the designated storage room.
- Containers should be covered with lids during storage and transport.

9.7.2 Off-site Transportation

During the transportation of waste outside the health facility the following safety precautions should be included: -

- Off-site transportation of waste should comply with WHO guidelines.
- Single-bagged waste and containers of sharps and liquids should be placed within a rigid or semi rigid container such as a bucket, box, or carton lined with a plastic bag.
- When transporting plastic bags of infectious waste, care should be taken to prevent tearing of the bags.
- Infectious waste should not be compacted before treatment.
- Outside selected HCFs, infectious waste should be transported in closed, leak-proof, rigid containers.
- The transportation should be properly documented, and all vehicles will carry a consignment note from the point-of collection to the treatment facility.

- Staff should be fully aware of emergency procedures for dealing with accidents and spillage.
- Recycling of waste MUST be avoided to prevent human contact with COVID19 infections.
- Landfill sites with informal waste picking shall need increased education awareness, management and security.

Vehicle requirements: Off-site transportation of infectious waste should follow i) the WHO guidelines for the vehicle requirements for transporting infectious waste for both the Pick Up and Truck ii) carry adequate supplies of protective clothing, waste bags, cleaning tools and disinfectants in case of spillage iii) internal finish of the vehicle should be good to allow for ease in cleaning and disinfecting the vehicle after use;

Labelling of the transport vehicle: The transport vehicle should be labelled according to the type of waste that is being transported. The label that is displayed will depend on the United Nations classification of the waste. Before sending hazardous health-care wastes off-site, transport documentation (commonly called a “waste tracking note”) should be prepared and carried by the driver with the following information: i) waste classes ii) waste sources iii) pick-up date iv) destination v) driver name vi) number of containers or volume vii) Receipt of load received from responsible person at pick-up areas;. On completion of a journey, the transporter should complete a consignment note and return it to the waste producer for filing.

9.8 Waste Treatment and Disposal Methods

Waste Treatment: The project will adopt the World Health Organization (WHO) waste treatment techniques which minimize the formation and release of chemicals or hazardous emissions. In general, proper treatment and disposal of healthcare waste is necessary to ensure that its impact on the environment and human health is minimized or eliminated. Among all the current existing technologies for the treatment and disposal of infectious waste, the most appropriate technology shall be applied, and this should be the safest, reliable, affordable, and sustainable taking into considerations technical, human, financial and available infrastructure and resources (power and fuel) available. Foremost, the technology so chosen should be able to guarantee minimization of the immediate public health risks associated with infectious waste management as well as with the lowest negative impact on the environment.

There are several methods appropriate for infectious waste treatment, depending on the type of waste material. These treatment methods shall include one of the following options or combination of options: steam sterilization (autoclaving), incineration, thermal inactivation, gas/vapor sterilization, chemical disinfection, shredding, maceration, and sterilization by radiation, or electromagnetic radiation.

All biological wastes from health Care facilities (isolation and quarantine centres) should be decontaminated and marked as “Treated Biohazard Waste” prior to disposal in designated containers for treated infectious waste. HCFs, Isolation & Quarantine Centres Infectious Medical Waste should be handled in the following ways:

- Workers shall be provided with adequate PPEs, including three (3) layer masks, splash proof aprons, gowns, nitrile gloves, gumboots and safety goggles.
- All PUI/PUM related waste should be double bagged, “swan neck” tied and the outside sprayed with a 0.5% chlorine disinfectant solution (1% household bleach solution).
- If dedicated medical waste collection is available, then the double-bagged waste should be disposed of immediately.
- The surface of containers/bins/trolleys (inner and outer) used for storage of waste should be disinfected with 1% Sodium Hypochlorite Solution.

9.8.1 Incinerator control method

Proper design and operation of incinerators should achieve desired temperatures, waste residence times inside the furnace, and other conditions necessary to destroy pathogens, minimize emissions, avoid clinker formation and slagging of the ash (in the primary chamber), avoid refractory damage destruction, and minimize fuel consumption. Good Combustion Practice (GCP) elements also should be followed to control dioxin and furan emissions.

If existing on-site incinerators are used, mitigation measures will be taken to control emissions to air in line with [WBG EHS guidelines for healthcare facilities](#) and [WHO Safe management of wastes from health-care activities](#).

The good practices include:

- Waste reduction and segregation to minimize quantities of waste to be incinerated

- Siting incinerators away from patient wards, residential areas or where food is grown
- A clearly described method of operation to achieve the desired combustion conditions and emissions; for example, appropriate start-up and cool-down procedures, achievement and maintenance of a minimum temperature before waste is burned, use of appropriate loading/charging rates (both fuel and waste) to maintain appropriate temperatures, proper disposal of ash and equipment to safeguard workers
- Periodic maintenance to replace or repair defective components
- Improved training for operators and management including the availability of an operating and maintenance manual, visible management oversight, and regular maintenance schedules
- Ensure provision of well sited ash pits to properly dispose of contaminated ash from incineration
- The incinerator housing should have adequate water supply and provision of sanitation facilities (toilets and wash areas) for use by the staff and
- Installed incinerators should be compliant with the Environmental standards; national regulations as well as the World Bank Group EHS guidelines.

Caution

Due diligence of an existing incinerator will be conducted to examine its technical adequacy, process capacity, performance record, and operator's capacity. In case any gaps are discovered, corrective measures should be recommended. Health and safety provisions should be made available at the incinerator's facilities including fire extinguishers, sand buckets, first aid kits.

Waste Disposal: Final disposal of the non-hazardous healthcare waste and residues or by-products from the treatment of waste will be disposed of in the following ways among others;

- Burial in pits: Infectious waste pits, placenta pits, ash pits.
- Sterilized and shredded microwaved or autoclaved waste can be channelled to waste reprocessing facilities or be disposed of through the municipal waste stream to the landfills.

Please note that incineration is not a disposal method because the ash residue has to be disposed either in a protected ash pit or municipal landfill.

9.9 Liquid Waste Generated Treatment and Disposal

Liquid contaminated waste (e.g. pathological sample, blood, faeces, urine, other body fluids and contaminated fluid) from healthcare facilities requires special handling, as it may pose risks to healthcare workers who contact or handle the waste. Typically, a system of sewer pipes linked to form a sewerage system should collect waste water from around a facility and carry it below ground to a central location for treatment at selected HCFs. The treatment plant should be located at a facility, and waste water collected from laboratory by pipe system and passed into different units of liquid waste treatment units in line with [WHO Water, sanitation, hygiene and waste management for COVID-19 technical guidance](#). All infectious waste generated from healthcare facilities (including sample packaging materials, culture materials, petri dishes, PPE and associated process wastes) should leave the facility only after decontamination using the autoclave or after being chemically sterilized.

9.10 Managing Blood / Body fluid Exposure

Persons including HCWs with percutaneous or muco-cutaneous exposure to blood, body fluids, secretions, or excretions from a patient with suspected or confirmed COVID-19 infectious disease, should immediately and safely stop any current tasks, and leave the patient care area.

Safely take off PPE according to the steps in the procedure room.

- Treat affected exposed area:
- wash the affected skin surfaces or the percutaneous injury site with soap and water
- Irrigate mucous membranes (e.g. conjunctiva) with copious amounts of water or an eyewash solution, and not with chlorine solutions or other disinfectants.

Immediately report the incident to the chief of unit, IPC focal point (following hospital exposure procedure) as soon as the HCF staff exit the unit.

Exposed persons should be medically evaluated for:

- COVID-19 infectious disease (ID) (of isolated patient)
- other potential exposures (e.g., HIV, HBV, HCV) if sharp/needle-stick injury

Exposed persons must receive follow-up care, including:

- fever monitoring, twice daily period of recording symptoms will depend on the ID, and
- Counselling and psychological support.

Immediate consultation with an expert in infectious diseases for any exposed person who develops fever, symptoms after exposure.

If fever appears and other symptoms, isolate HCF staff, and follow procedure for ID suspected until a negative diagnosis is confirmed, Or

People suspected of having infected should be cared for/isolated, and the same recommendations outlined in this document must be applied until a negative diagnosis is confirmed.

Conduct contact tracing and follow-up of family, friends, co-workers and other patients, who may have been exposed to ID or COVID 19 virus through close contact with the infected HCW/ staff.

10.0 Emergency Preparedness and Response (EPR)

The purpose of this section is to provide emergency response for the healthcare facilities (vaccination centers, hospitals, PoE, isolation & quarantine centres and laboratories) with regard to the potential threat associated with both novel pathogens identified (COVID-19) and other non-COVID - 19 risks that could affect Health Care Facility operations (including risks to workers and patients and on operation of waste treatment and disposal options) in line with the requirements of ESS4. Emergency incidents occurring in an HCF may include spillage, occupational exposure to infectious materials or radiation, accidental releases of infectious or hazardous substances to the environment, medical equipment failure, and fire. These emergency events are likely to seriously affect medical workers, communities, the HCF's operation and the environment.

Most of the selected HCF (Covid-19 vaccination centers, PoE, isolation / quarantine areas and the laboratories) have been in operational offering community health care services and handling infectious diseases but there is no such event has occurred; the probability of negative event is very low.

10.1 Emergency Response Plan for Waste Treatment Facility

In the event that an emergency situation occurs in which the activities at the waste treatment facility poses a threat to the public's health as well as environmental contamination, the following need to be addressed immediately:

- Identify the cause of emergency,
- Call for the external support from the Country Emergency Department.
- Notifying the workers and surrounding residents to take necessary protective measures according to the nature of the incident;
- Liaise with the county disaster department to organize the evacuation of the residents to safety, and determining the means of evacuation according to the weather and geographical conditions and the population density;
- Set up the emergency shelter outside the safety boundary of the incident site;
- The responsible entity in the emergency environmental incidents should take immediate actions to control or cut-off the source of pollution, taking all possible measures to control the situation, in order to prevent the secondary pollution and the derivative incidents;
- The field rescue team should be organized immediately if necessary, to reduce the casualty and property loss; and
- Individuals in the contaminated area should be evacuated to safety, and irrelevant individuals should be barred from the area.

10.2 Termination of emergency

The emergency for the situations above that meet the following requirement is qualified to be terminated:

- 1) The scene of incident has been under control, and the conditions for the incident to occur are removed.
- 2) The leakage or release of pollution source has been limited within a stipulated scope.
- 3) The hazard caused by the incident has been thoroughly removed and cannot cause any new incident.
- 4) It is not necessary to continue to adopt professional emergency disposals at the incident site.

5) Necessary measures have been taken for protecting the public from any secondary danger.

NB: If the existing waste disposal facility has the Emergency Response Plan, the plan will be updated to meet the minimum requirement for handling potential infectious healthcare waste and the workers trained on the emergency response plan of the HCF.

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11.0 Institutional Arrangement and Capacity Building

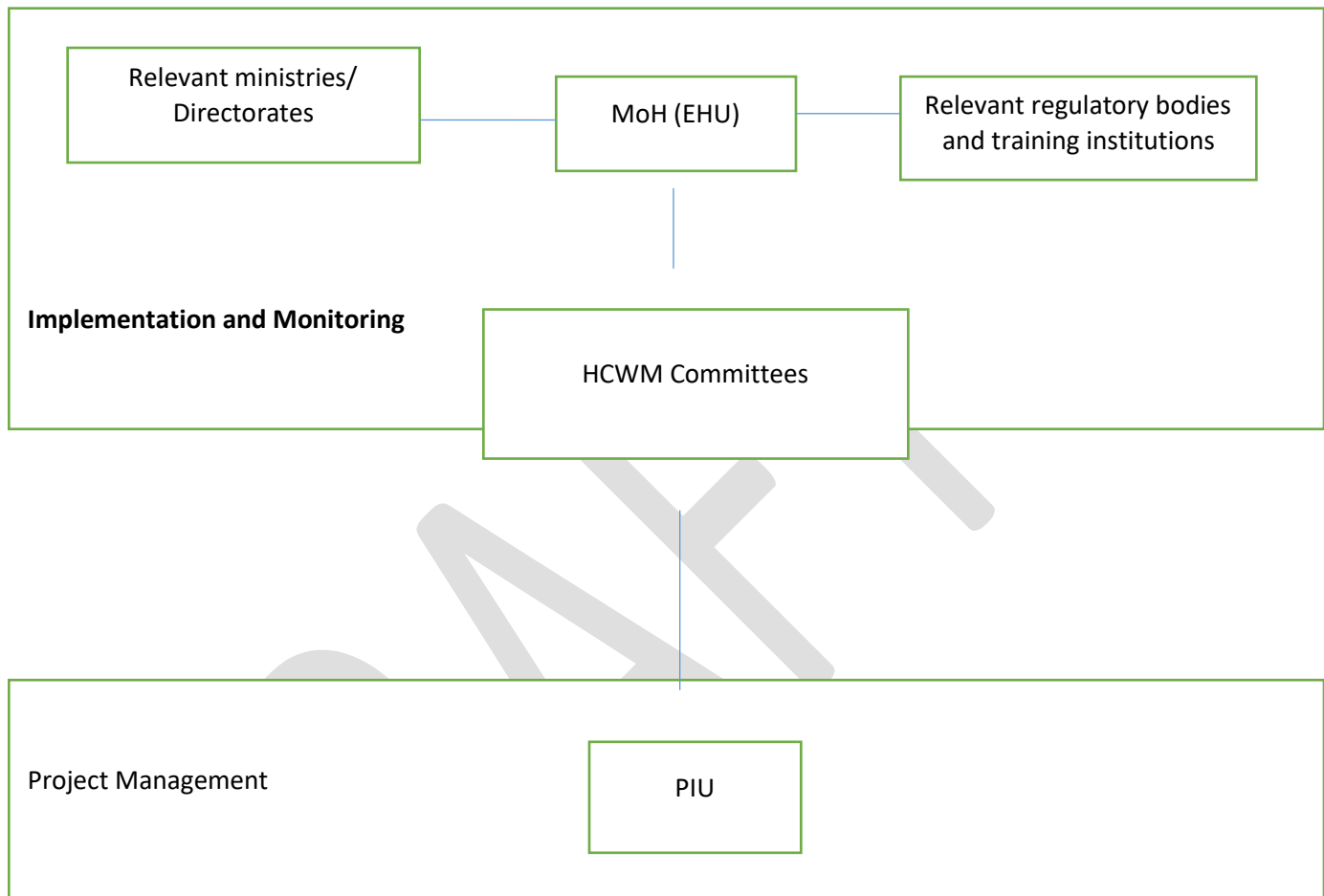


Figure 4 Institutional arrangement and reporting lines

The MoH is the main implementing agency for the Project and will designate a Medical Waste Management Specialist as part of the team to oversee the implementation of the project activities and ensure compliance with ICWMP as a safeguard instrument and World Bank ESF requirements.

The ICWMP will be disseminated and implemented by the PIU with support from the Directorate of Preventive Health Services (EHU), healthcare facilities, quarantine, isolation and treatment centers implementing components of this project.

At the National level institutional responsibility for implementation of safeguard instruments will rest with the PIU. The PIU has environment safeguards officer who will support the project implementation and monitoring of project activities as well as adherence to the environment and social due diligence requirements.

Capacity on the content and application of the ICWMP will be built at all levels and be applied to all country, national referral facilities and referral laboratories targeted by the Project. The respective project beneficiary facilities will be required to prepare site specific ICWMP following the template provided in [Annex I](#) and will be responsible for day to day supervision on implementation of the mitigation measures as discussed extensively in table

Monitoring and reporting of activities by the PMT will be continuous to ensure adherence to set specifications and safety to people and the environment. The Bank will provide project implementation support and would base environmental supervision on the Environment and Social Commitment Plan and other safeguard instruments developed to support the environment and social due diligence for activities financed under the project.

Part of improving HCW management involves clarifying who is responsible for what functions and identifying the fields of competencies of each institutional actor involved in this process. The roles and responsibilities for the different stakeholders as indicated by Ministry of Health Malawi Health Care Waste Management Guidelines, shall include;

INSTITUTION NAME	ROLE
Ministry of Health (MoH)	<ul style="list-style-type: none"> • Formulation of Policy and guidelines, dissemination, implementation and review. • Defining goals, objectives, strategies, interventions and quality assurance mechanisms of HCWM. • Guiding and monitoring implementation of the HCWM • Providing technical expertise , guidance and coordination of the plan • Creating awareness and Providing in-service training of health staff

	<ul style="list-style-type: none"> •Establishing HCWM database for monitoring and evaluation (M&E) • Providing technical support to faith-based and private facilities to ensure effective implementation of HCWM programs • Enforcing law and regulation in HCWM within public, CHAM and private health facilities in collaboration with relevant institutions • Advocacy for resource mobilization including human resources and awareness and integrating HCWM in training curricula
Ministry/department responsible for Water Development and Irrigation	<ul style="list-style-type: none"> •Provision of safe water sources that facilitate HCWM
Malawi Bureau of Standards	<ul style="list-style-type: none"> •Developing standards related to HCWM •Monitoring compliance of standards in collaboration with regulatory authorities.
Ministry responsible for Local Government and Rural Development	<ul style="list-style-type: none"> •Implementation of HCWM •Formulation of by-laws on HCWM
Regulatory Bodies (MCM, NMCM, PMRA, MBS)	<ul style="list-style-type: none"> •Integrating HCWM in their routine inspections of health facilities •Providing input in curriculum development for HCWM by health institutions in Malawi •Enforcing law and regulation in HCWM practices in all health facilities •Mobilising resources for routine inspection of health facilities. •Inspection of health facilities to ensure compliance with HCWM guidelines and standards

	<ul style="list-style-type: none"> • Advocacy for good HCWM practices and implementation of standards
Environmental Affairs Department	<ul style="list-style-type: none"> •Facilitate the EIA and ESMP approval process on health facility development projects •Integrating HCWM in the environmental waste management guidelines. •Monitoring compliance/enforcement of environmental laws and regulations in health facilities including issuance of licences for waste handling ,transportation and storage
Health Training Institutions (Tertiary Institutions)	<ul style="list-style-type: none"> • Developing and incorporating HCWM curriculum in collaboration with EH Department. • Conducting pre-service and in-service training for health workers in HCWM.
Health facilities	<ul style="list-style-type: none"> • participate in HCWM training activities • supply staff with PPEs • Implement HCWM guidelines • allocate financial resources for HCWM • Implement HCW management plan • Compliance with the set standards and regulations.
Multilateral and Bilateral Agencies	<ul style="list-style-type: none"> • Provision of technical and financial assistance for HCWM • Participate in inter-agency activities concerning HCWM
Local Authorities	<ul style="list-style-type: none"> • Create awareness on HCWM • Implement HCWM with emphasis on proper land filling

	<ul style="list-style-type: none"> • participate in training, monitoring and evaluation • Integrating HCWM in the Council's by-laws • Implementing HCWM with emphasis on proper landfill • Enforcement of by-laws
Non-Governmental Organisations in the Health Sector	<ul style="list-style-type: none"> • Mobilising financial resources for HCWM. • Advocating for proper treatment and disposal of HCW. • Sensitise communities
National HCWM Multi-sectoral Co-ordinating Committee	<ul style="list-style-type: none"> • Developing HCWM plan • Evaluating Health care Waste Management • Mobilising financial resources for HCWM. • Reviewing HCWM policy. • Receiving reports from HCWM Desk Officer on overall performance of HCWM. • Approving appropriate HCWM technologies • Allocating resources for procuring and installation of appropriate technologies in HCWM.
District HCWM Committee	<ul style="list-style-type: none"> • Developing HCWM plan • Preparing annual budget for HCWM • Allocating financial and human resources for HCWM

	<ul style="list-style-type: none"> • Procuring and distributing HCWM equipment and supplies to health facilities • Supervising HCWM practices in the district including CHAM and the private health facilities. • Establishing HCWM database for monitoring and evaluation (M&E), reviewing, reporting and feedback • Collecting and compiling information on HCWM including HCW related injuries and contamination. • Reprimand health workers who do not follow HCWM guidelines • Train health workers and auxiliary staff in HCWM. <input type="checkbox"/> Advocate and conduct IEC activities for HCWM.
Health centres HCWM Committee.	<ul style="list-style-type: none"> • The HCMT shall work as the Health centre HCWM committee. The health centres shall include those belonging to MOH&P, CHAM, MLG Developing HCWM plan • Preparing annual budget for HCWM • Allocating financial and human resources for HCWM • Procuring and distributing HCWM equipment and supplies to health facilities • Supervising HCWM practices in the district including CHAM and the private health facilities. • Establishing HCWM database for monitoring and evaluation (M&E), reviewing, reporting and feedback • Collecting and compiling information on HCWM including HCW related injuries and contamination.

	<ul style="list-style-type: none"> • Discipline health workers who do not follow HCWM guidelines • Train health workers and auxiliary staff in HCWM. • Advocate and conduct IEC activities for HCWM
<p>District, Town, Municipal and City Councils</p> <p>The Department of Environmental Health under the Directorate of Preventive Health Services for the Ministry of Health is responsible for coordinating implementation of the HCWM policy.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Identifying, recording and reporting any presence of infectious waste and sharps from health care facilities and the community at disposal site or landfills. <input type="checkbox"/> Advocating for proper treatment and disposal of HCW within the Assemblies. <input type="checkbox"/> Collecting and safely disposing treated HCW and general waste. <input type="checkbox"/> Integrating HCWM in the Assembly by-laws. <input type="checkbox"/> Enforcing by-laws

11.1 Health facilities

12.0 Staffing and Capacity Building

Effective infection control and waste management will have both professional and support staffs that are required for the continuous and proper operation of the respective facilities. The HCFs will employ or designate on a full-time or on surge basis necessary personnel, which will be determined based on the workload in line. Therefore, besides the critical other health workers for the respective facility, the infection control, waste management team will comprise:

- Medical Waste Management officer
- IPC Coordinator

- Electrical technician
- Well trained security staff
- Cleaners
- Waste handlers
- Incinerator Operator
- Medical waste autoclave or microwave operator

However, it should be noted that all healthy staff, will be responsible for the wastes they produce in their various activities and ensure that appropriate standard precautions are adhered to.

12.1 Head of Healthcare facilities

Head of Hospital (Medical superintendents /health facility in-charge/ Healthcare Administrator) do supervise the everyday operations of healthcare facilities. They focus on improving the quality of patient care by ensuring the facilities are well-staffed, finance well-managed and general management of the facility. Some of the specific roles include:

- Establish a waste-management team to oversee the preparation of specific HCF ICWMP and monitor its implementation,
- Ensuring adequate financial resources allocated to fully implement specific ICWMP,
- Designate a waste-management officer to supervise and implement the ICWMP in the HCF
- Obtain and be familiar with national waste management policies and set regular (e.g. annual) review dates for the facility HCWM policy.
- Ensure adequate training for staff and designate the staff responsible for coordinating and implementing training courses on OHS, IPC, Healthcare waste management and emergency response procedures,
- Provide measures in place to prevent health-care waste from causing environmental pollution or adverse effects on human health.
- Ensure health care waste management system in the HCF is managed according to the national regulations through; ensuring that health-care waste is adequately segregated and safely packed, especially in the case of sharps which should be packed in puncture-proof

containers; and ensure that bags or containers of health-care waste are handled only by those officially licensed to transport and/or dispose of such waste.

12.2 Departmental Managers

The departmental managers should:

- Develop a facility HCWM plan (goal, budget, personnel, roles, supervision, training, reporting). Allocate adequate financial and human resources to implement the plan including up to final disposal.
- Ensure adequate supply of safety boxes, bins, bin liners, and PPE.
- Create a climate of support for needle stick injury reporting.
- Develop a protocol for management of needle-stick injury.
- Advocate for health worker safety.
- Provide supportive supervision in HCWM.

12.3 Waste Management Officer

There should be a designated a country waste management officer in charge of country waste management; to map out and document all health care facilities in the county indicating waste management gaps, recommend actions as well implementations of the actions.

The Principle Environmental Health Officer (PEHO) will be responsible for monitoring of the healthcare waste management system in the country. It is therefore essential that the PEHO has direct access to the implementing facilities and reports. He or she is responsible for the national waste management officers stationed in health facilities and work in close liaison with other heads in the Preventive Health Services Directorate in the country.

At service level, the Waste Management Officer based at the facilities should:

- Ensure the day-to-day operation and monitoring of the waste-management system
- Supervise waste handlers and waste management staff
- Liaise with the department heads to make sure that their staff are carrying out waste-related tasks properly

- Ensure availability of waste management equipment
- Monitor performance indicators and ensure reports are brought to the committee.
- Manage healthcare waste management budget
- Organize staff training and information.
- Document, report and review any reported incidents concerning the handling of health-care waste in liaison with the infection-control department.
- Liaise with the Supplies Department to ensure that an appropriate range of coded bags and containers for health-care waste, protective clothing, and collection trolleys are available at all times
- Be responsible for coordinating maintenance and repair of waste treatment facilities; and
- Develop maintenance standards for waste management equipment. It is normal that most equipment requires preventive maintenance especially the incinerator, autoclave, or the microwave.

12.4 Procurement Officer Responsibilities

- Liaise with the Environment Expert / officer to ensure a continuous supply of the healthcare waste management commodities (plastic bags and containers of the right quality, spare parts for onsite health-care waste-treatment equipment).
- Procurement of waste collection service providers if necessary Investigate the possibility of purchasing environmentally friendly products e.g.:
 - PVC-free products
 - Mercury free equipment
 - Recycled materials
 - LEDS

12.5 Hospital Engineer / Maintenance Officer

- Installing and maintaining waste-storage facilities and handling equipment.
- Accountable for adequate operation and maintenance of any on-site waste treatment equipment

12.6 Responsible for ensuring that the staff operating on-site waste-treatment facilities are trained in their operation and maintenance. Waste Handlers

Waste handlers have principal duties and responsibilities: the waste handler is responsible for collecting, segregating, labelling, temporal storage, transporting, infectious waste and other medical waste in accordance with relevant healthcare facilities, Isolation / quarantine areas, and blood transfusion centres approve procedures and regulatory requirements. Specific roles include:

- Collects, separates, contains, labels, and transports solid waste, medical waste & recyclable goods from generation points to specified collection location and incinerator
- Tracking and maintaining records of wastes generated from each health facilities/quarantine/isolation centres and laboratories
- Empties, relines, & cleans solid & medical waste containers according to procedures
- Segregates waste for containment prior to transporting off-site for incineration,
- Separates, contains, seals, labels, weighs, & stores high-risk infectious (red bag) waste to be incinerated
- Cleans and disinfects medical waste carts
- Maintains waste area facility in a clean and orderly condition; sweeps and cleans area at the end of each shift
- Assures safe working conditions at all times as designated by the SOP; utilizes safety equipment and/or protective equipment as directed (i.e. safety gloves and eye protection), follows defined safety procedures, and
- Follow waste management procedure during waste handling transportation, storage, treatment, and disposal including infection control.
- Keep waste records and produce monthly waste management reports

12.7 Incinerator Operator

An incinerator operator is a skilled attendant assigned the duties of ensuring that the waste has been properly treated through incineration and the ash properly disposed. The operator should always be provided with the minimum required personal protective equipment (PPE) and ensure appropriate use, the equipment is maintained and kept clean. The PPE should be properly

maintained, kept clean and not taken home; it must remain at the health facility to avoid possible spread of infection to the community. The incinerator operator should:

1. Follow the incinerator operations procedure.
2. Use protective equipment when handling waste.
3. Ensure an adequate supply of fuel is available.
4. Record the weight and type of waste received.
5. Follow the regular maintenance schedule for incinerator operation.

The operator should at minimum have the following PPEs for use:

- i. Gloves: Always wear gloves when handling health care waste.
- ii. Boots: Safety boots or leather shoes provide extra protection to the feet from injury by sharps or heavy items that may accidentally fall. Boots must be kept clean.
- iii. Overalls: Overalls should be worn at all times.
- iv. Aprons: Heat-resistant aprons should be worn when operating the incinerator.
- v. Goggles: Clear, heat-resistant goggles can protect the eyes from accidental splashes or other injury.
- vi. Nose and Mouth respirators / mask (N95), and
- vii. Helmet: Helmets protect the head from injury and should be worn at all times during the incineration process.

12.8 Laboratory Manager

The laboratory manager is responsible for ensuring appropriate laboratory techniques, safety procedures, and hazards associated with handling biohazards and associated wastes are appropriately implemented. Responsibilities of the Laboratory Manager in regard to health care waste include:

- Accept direct responsibility for the health and safety of those working with bio-hazardous materials and/or select agents and toxins associated with COVID 19,
- Adhere to approved emergency plans for handling accidental spills and personnel contamination,
- Ensure compliance by laboratory personnel with relevant regulations, guidelines, and policies,

- Ensure all appropriate personal protective equipment is provided and used. Ensure proper training, including refresher training, and instruction for laboratory personnel in safe practices and protocols, including, at a minimum, training in aseptic techniques and characteristics of the material(s) used.
- Tracking and maintaining records of wastes generated from laboratory.
- Ensuring that individuals working in the facility are experienced and proficient in handling the biological agents at the appropriate level of containment.
- Ensure compliance by waste handler, waste water treatment and incinerator personnel with relevant regulations, guidelines, and policies of infection control and waste management.
- Ensuring that all the relevant staff including; waste handler, waste water treatment plant and incinerator personnel are adequately trained in waste management and risk management in waste water treatment plant and incinerator facility respectively.

12.9 Healthcare Facility cleaners

Under the supervision of the facility waste management and environmental / IPC officer, these individuals perform different washing and cleaning activities within and outside the main Quarantine, Isolation and Treatment centers and Laboratories these includes

- Cleans laboratory equipment, such as glassware, metal instruments, sinks, tables, and test panels, using solvents, brushes, and rags:
- Mixes water and detergents or acids in container to prepare cleaning solution according to specifications.
- Washes, rinses, and dries glassware and instruments, using water, acetone bath, and cloth or hot-air drier.
- Scrubs walls, floors, shelves, tables, and sinks, using cleaning solution and brush.
- May sterilize glassware and instruments, using autoclave.
- The HCF cleaners should be provided with the minimum required PPE (medical mask, gown, heavy duty gloves, boots or closed shoes) according to the WHO guidelines on Covid-19 Personal Protective Equipment (PPE) for Healthcare Workers

13.0 Plan for mitigation of associated risks

The plan for mitigation of risks associated for the HCFs, Labs, PoE, Isolation and Quarantine, Waste disposal facilities will operate within the confines of the Infection Control and Waste Management Plan and seek ways and means to operationalize the action plan. Each entity will be required to prepare, receive approval, and implement a specific ICWMP for their facility/operation. This specific plan should be based upon their specific characteristics and conditions and meet the requirements stated in this ICWMP. The Infection Control and Waste Management Plan (ICWMP) identifies specific tasks to be executed and assigns responsibility for waste collection to specific departments or agencies.

For the plan to be effectively implemented, the beneficiary facilities (referral hospitals, referral laboratories and healthcare facilities, quarantine, isolation and treatment centres) will develop site specific ICWMP standardized plans based on its existing needs and set-up. The plan should design a mitigation strategy for potential risk associated with; laboratory activities, medical equipment and supplies, infection prevention and control healthcare waste collection, handling, storage, transportation, treatment, and disposal. The potential risks include among others the following:

- Improper health care waste collection, storage and segregation that have a potential risk to health care facility professionals/ health workers, society and environment,
- Risks of increased disease transmission from poor waste treatment & disposal systems,
- Air pollution due to utilization of poor quality of incinerator technology,
- Environmental pollution due to poor ICWM practices,
- Risk of disease transmission to waste scavengers and neighbouring communities,
- Shortage of equipment and supplies on ICWM and PPE and
- Poor management systems for infection control and emergency response in case of any incidents/accidents on site.

The PIU in collaboration with relevant MoH departments will provide tailored training to HCF's in the different aspects related to the management of healthcare waste. This training will be in line with the World Bank Group's EHS Guidelines, current WHO Guidelines and WHO Framework. Furthermore, the project needs to have a budget to support supervision and mentorship visits of

the HCFs. Through these mentorship visits, the MoH will ensure that guidelines and SOPs for healthcare waste management are being adhered to and necessary equipment shall be provided by the MoH. It is the intention of GoM and its development partners that HCF observe the set guidelines and SOPs for healthcare waste management during health care services are supported accordingly. The main risks are described in this section together with mitigation measures that have been taken from existing operation guidelines established by the MoH for the HCF to be implementing the project.

13.1 Weak compliance with the precaution measures for infection prevention and control.

Weak compliance with the precaution measures in all service points may spread infections to the health workers and clients.

Mitigation Measures: The PMT and HCF will ensure the following:

- i. Health facilities should establish and apply Standard Precautions including:
 - a. Hand Hygiene (HH);
 - b. Respiratory hygiene/cough etiquette.
 - c. Use of personal protective equipment (PPE);
 - d. Handling of patient care equipment, and soiled linen;
 - e. Environmental cleaning;
 - f. Prevention of needle-stick/sharp injuries; and
 - g. Appropriate Health Care Waste Management.
- ii. Health facilities should establish and apply Transmission based precautions (contact, droplet, and airborne precautions) as well as specific procedures for managing clients at the HCF.
- iii. Establishment of Standard precautions and Transmission based precautions should be in line with National guidelines for IPC in healthcare facilities and take into account guidance from WHO and/or CDC on infection control; supplied with clean water, soap, and disinfectant.

14.0 Monitoring Plan for the ICWMP Implementation

To be able to assess the effectiveness of the ICWMP, monitoring indicators for the project activities should be provided in the ICWMP. The monitoring institutions proposed in the ICWMP should use the monitoring indicators, to determine progress made, in implementing the mitigation for the negative impacts. The Project is expected to set aside funds that will help them in the implementation of all ICWM activities. The ICWMP shall also assist in developing Standard Operating Procedures and Waste Management Plans for laboratories based on a quick situation assessment and facilitate the review and updating of existing documentation on health-care waste management plans under this project.

During the operation period, the infection control and waste management issues will be monitored by the Ministry of Health through QMD, EHU and the PIU. The Covid-19 project, through QMD has introduced a tool for monitoring medical waste management in the country which has been configured in DHISII, remaining with orientation of health care workers to start reporting.

All the facilities should do quarterly reporting on waste segregation and collection, waste storage, waste transportation and waste treatment and disposal. Monitoring will verify if predicted impacts have occurred and check that mitigation actions recommended in the ICWMP are implemented and their effectiveness. Monitoring will also identify any unforeseen impacts that might arise from project implementation. Monitoring will be undertaken by experts from Ministry of Health (QMD and EHU) Environment & Laboratory experts. Monitoring will be done through site inspection, staff interviews and review of reports received.

Monitoring will consist of checking to see if the proposed measures are being adequately implemented. It is required to follow-up on decisions made to intervene in various activities of infection prevention and control and medical waste management to minimize risks to people and the environment. To ensure that objectives of the ICWMP are achieved, the implementation of the plan shall be monitored on a regular basis internally through the following ministries including the Ministry of Health (MoH), whereas the external bodies will be World Bank. These institutions will determine their respective monitoring tools and will work jointly within the monitoring and evaluation mechanism of the project.

Table 4 presents a summary of the key parameters to be monitored under the project

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Table 4 Summary of key parameters to be monitored

<i>Monitoring parameter</i>	Indicator	Methods	Frequency	Responsibility for Implementation
Waste segregation and collection	Number of HCFs (supported by the project) with colour coded and labelled HCW Receptacles	<ul style="list-style-type: none"> • Physical verification • Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs practicing waste segregation	<ul style="list-style-type: none"> • Rapid Assessments, • Supervision Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number of HCWs trained in HCW segregation and collection	<ul style="list-style-type: none"> • Routine data 	Monthly	Heads of HCF/ Institution , PIU
	Number of HCFs with standard PPE for HCW segregation and collection	<ul style="list-style-type: none"> • HCWM Rapid Assessment Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with national standard guidelines on HCW segregation and collection	<ul style="list-style-type: none"> • Rapid Assessment Reports 	Monthly	Heads of HCF/ Institution, PIU
Waste Storage	Number HCFs with designated temporary storage facilities for HCW	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number of HCFs with temporary storage facility which is inaccessible to unauthorized persons and animals	<ul style="list-style-type: none"> • -Rapid Assessments • Routine reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with designated temporary storage facilities for HCW	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with designated temporary storage facilities for HCW	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with standard storage containers	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number of HCFs with standard PPE for HCW storage personnel	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
Waste Transportation	Number of HCFs with standard PPEs for transporting HCW	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with standard equipment for transporting HCW	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs aware of risks associated with improper handling of HCW	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs catchment population aware of health risks of HCW	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number of HCFs trained in HCW transportation	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with standard PPEs for HCW transportation	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with standard equipment for HCW transportation	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with national standard guidelines on HCW transportation	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
Waste Treatment and Disposal	Number of HCFs with standard treatment equipment for HCW	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number of HCFs with standard treatment plant/facilities for HCW	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with standard guidelines for HCW treatment	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of H/Ws trained in HCW treatment and disposal	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with standard PPEs for treatment and disposal.	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number HCFs with standard equipment for HCW treatment	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number HCFs with standard equipment for HCW disposal	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with national standard guidelines on HCW treatment and disposal	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with designated supervisor to man incinerators and disposal facilities	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number of HCFs with standard treatment equipment for HCW	<ul style="list-style-type: none"> • - Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with designated supervisor to man incinerators and disposal facilities	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
Health care waste related accidents and spillages	Number of health institutions with annual emergency response plan for HCW related accidents and spillages	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number of HCFs using national standard PPEs for preventing accidents and spillages	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs reporting on HCW related accidents and injuries	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HWs treated after HCW related spillages following IP standard guidelines	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number of H/Ws vaccinated against Hepatitis B	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
	Number of HCFs with national standard guidelines on accidents and spillages	<ul style="list-style-type: none"> • Assessment reports • Distribution report 	Monthly	Heads of HCF/ Institution, PIU
	Number of H/Ws trained in Accident and spillage management	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
Infection Prevention and Control	Number of HCFs able to follow standard precautions namely e.g hand hygiene	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU

	Number of health facilities performing environmental cleaning according to standards	<ul style="list-style-type: none"> • Rapid Assessments • Routine Reports 	Monthly	Heads of HCF/ Institution, PIU
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14.1 Frequency for monitoring and Review

The monitoring frequency for ICWMP will be undertaken on quarterly basis during the operation phase. World Bank will as well do periodic implementation support mission biannually.

15.0 Reporting System

Currently, there is no common in-country monitoring and reporting tool for the infectious waste management. Quarterly monitoring reports of ICWMP would be compiled by IPC focal which will be reported in the DHISII by the HMIS officer at the facility.

As part of its focus to strengthen healthcare system in the country, the project will stimulate the need to establish and institutionalize in country infectious waste management monitoring system.

Table 5 Infection Control and Waste Management Baseline Mitigation Measures for HCF

SN	Activities and potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget (MK)
1	Waste Generation in HCF				
1.1	In emergency situations, all waste from clients arriving at HCF should be classified as potentially infectious to minimize the transmission of infection.	Wastes generated at the HCF should be segregated on generation and placed in the appropriate bin as per the segregation rules.	Patients, Health Care Waste Workers (HCWWs)	On Generation	HCF Operational Budget
1.2	Direct exposure of HCF workers and HCWWs to infectious and biohazard waste from the source leading to risks of exposure to Covid-19 and other conditions	All HCF workers involved in Covid-19 and emergency health care services must follow all standard precautions of infections which are; Hand hygiene, respiratory hygiene/ cough etiquette, use of personal protective equipment (PPE), environmental cleaning, prevention of needlestick injuries, and appropriate health care waste management.	MoH; HCF Management	At all times within HCF	HCF Operational Budget

SN	Activities and potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget (MK)
1.3	Looking at waste minimization, reuse, and recycling where possible and in the long term within the HCF. This will facilitate in the reduction of waste that needs to be handled, especially in smaller HCFs, more in the longer term.	Facilities should consider practices and procedures to minimize waste generation, without sacrificing patient hygiene and safety considerations.	MoH; HCF Management	At all times within HCF	HCF Operational Budget
		Source reduction by purchasing and supplying materials that are less wasteful and/or generate less medical waste.			
		Stock management through frequent auditing; use of the oldest stock first and checking the expiry date of products during receiving and issuing of commodities.			
		Encouraging the use of recyclable products. Using materials that can be reused both off-site and on-site.			
		Enforcing rigorous and careful segregation of the infectious waste at source helps to minimize the quantities of infectious waste generated.			

SN	Activities and potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget (MK)
		Training of relevant staff on waste minimization and benefits especially the medical staff to make changes towards less wasteful clinical practices.			
2	Segregation and Storage Before Collection				
2.1	<i>All Infectious Waste/Biohazardous Waste</i> generated from COVID-19 health care related activities will be placed under this category.	<p>All waste indicated here should be placed in red biohazard bags, labelled, “Biohazardous Waste” or with the international biohazard symbol and the word, “Biohazard”.</p> <p>Full red bags must be tied so that leakage or expulsion of contents does not occur and should be contained in a rigid container.</p> <p>A strong, leak-proof plastic bag or container capable of being autoclaved should be used</p> <p>The container can be of any (preferred to be red) colour with a tight-fitting lid and labelled “Biohazard,” readable from any lateral direction.</p>	Health Care Workers (HCWs); HCWWs	On Generation	HCF Operational Budget

SN	Activities and potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget (MK)
		Staff should use impermeable bags and hard standing containers			
		Containers must have handles and be easy to clean			
		Staff should ensure the use of easy to clean surfaces for storage and placement of containers containing HCW			
		Management and staff should ensure the availability of water supply for convenient cleanliness and hygiene of storage surfaces.			
		Storage areas, containers, or bags should not be readily accessible to non-staff or animals.			
		Staff must ensure that the maximum storage time of infectious wastes is 48 hours in the cool dry season and 24 hours in the hot dry season.			
		All storage sites should be enclosed to ensure that they are not accessible to the public and livestock and in areas not at risk of flooding.			

SN	Activities and potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget (MK)
2.2	Sharps Waste: Patient care and clinical support areas generate sharps that are infectious and can spread disease and cause minor injuries to HCWs unless properly handled.	Used sharps should be placed into the appropriate sharp’s container immediately after use- containers must be puncture-proof.	HCWs; HCWWs	On Generation	HCF Operational Budget
All sharps are disposed of in either a labelled sharps container or a pharmaceutical/chemo sharps container.					
Containers should be labelled “SHARPS WASTE” or “BIOHAZARD,” with the international biohazard symbol					
¾ full sharps containers must be collected regularly and replaced with empty containers					
As per WHO guidance, they should be marked INCINERATION ONLY” so that they can be visible from any lateral direction.					
Pharmaceutical waste, including empty vials and syringes, is placed into a sharp’s container or					

SN	Activities and potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget (MK)
		chemo container at the point of generation, stored in a utility room.			
2.4	General Waste generated	General healthcare waste such as food waste should be disposed of accordingly	HCWs; HCWWs	On Generation	HCF Operational Budget
		General waste will be collected via a separate stream from all health care waste and should not be mixed under any circumstances.			
3	Transport of HCW Within HCFs for Storage or Direct Final Treatment				
3.1	Onsite transport of waste from point of generation to storage needs to be managed in a planned manner to avoid environmental risks associated with cross-contamination with general	Waste transportation should take place during less busy times whenever possible. Set routes should be used to prevent exposure to staff and patients and to minimize the passage of loaded carts through patient care and other clean areas.	HCWs; HCWWs	On Generation	HCF Operational Budget
		Depending on the design of the HCF, the internal transport of waste should use separate floors, stairways, or elevators as far as possible. Regular			

SN	Activities and potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget (MK)
	waste, accidental spillage, and exposure of HCWs and patients	transport routes and collection times should be fixed and reliable.			
		Associated staff should wear adequate personal protective equipment, gloves, strong and closed shoes, overalls, and masks.			
		Health-care waste can be bulky and heavy and should be transported using wheeled trolleys or carts that are not used for any other purpose.			
		Waste, especially hazardous waste, should never be transported by hand due to the risk of accident or injury from infectious material or incorrectly disposed sharps that may protrude from a container.			
		All waste bag seals should be in place and intact at the end of transportation.			
3.2	Routing of the infected waste in HCFs should be	Separate hazardous and non-hazardous routes should be planned and used.	HCWs; HCWWs	On Generation	

SN	Activities and potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget (MK)
	maintained to minimize risks of exposure and accidents during operating hours.	A specific routing plan should be developed based on the layout of the HCF.			HCF Operational Budget
		Special covered trolleys should be used in transporting HCWs.			
4	Occupational Health and Safety Management for Health Care Waste Workers				
4.1	Management of exposure to infectious waste from Covid-19 vaccination centres or other forms of toxic health care waste, chemicals, and partaking in risky activities during the health care waste management cycle to workers involved in Health Care Waste Management.	Adequate awareness and training should be provided.	HCWs; HCWWs	On Generation	HCF Operational Budget
		Only trained personnel should be allowed to operate machinery such as autoclaves and incinerators as these reduce the risk of operational injuries.			
		Provide appropriate PPE to waste handlers			

SN	Activities and potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget (MK)
4.2	Reporting accidents and incidents	All health care management staff at the HCFs should be trained in emergency response and made aware of the correct procedure for prompt reporting.	HCWs; HCWWs	On Generation	HCF Operational Budget
		Accidents or incidents, including spillages, damaged containers, inappropriate segregation, and any incidents involving sharps, should be reported to the designated person.			
		The cause of the accident or incident should be investigated by a designated person or another responsible officer, who should also take action to prevent a recurrence.			

16.0 Capacity Building and Training

Capacity building and training is mainly structured around four key areas, focusing on required Infectious Control Waste Management baseline mitigation measures at all levels of the beneficial healthcare. The focus will be but not limited to:

1. Infection prevention and control measures,
2. Standard precautions,
3. Infectious HCW management procedures,
4. Training on emergency preparedness and response

The targeted audience for the ICWMP is all healthcare workers (hospitals, isolation, quarantine, PoE and laboratories) waste handlers, local communities near the healthcare facility and personnel from private sector operators of the waste transportation and disposal service providers. The MoH's training activities shall be oriented towards the quality of healthcare services and prevention of infections.

Whilst it is necessary to reinforce the knowledge of medical professionals in these sectors, it is also important to improve their practices in infection prevention and control as well as on HCW handling and management. Training should also involve private operators and technicians active in maintenance work, cleaning, and the management of solid wastes. Promotion of the appropriate handling and disposal of medical waste is important for community health, and every member of the community should have the right to be informed about potential health hazards. The objectives of training on health-care waste and infection control are as follows:

- a. To prevent exposure to infectious diseases, health-care waste and related health hazards; this exposure may be voluntary or accidental, because of unsafe disposal methods.
- b. To create awareness and foster responsibility among hospital patients and visitors to healthcare establishments regarding hygiene and health-care waste management.
- c. To inform the public about the risks related to health-care waste, focusing on people living or working near, or visiting, health-care establishments and scavengers on waste dumps.

It is necessary to develop awareness-raising programs for populations providing healthcare, as well as people using recycled objects or living in proximity of garbage dumps as well, as garbage collectors.

There is a need to educate the public in general about community health and safety on the risks associated with improper management of HCWM and the use of recycled objects. Public education will include developing and broadcasting monthly televised messages destined for the public on the dangers linked to infectious HCW; developing and broadcasting weekly radio messages, notably in English and Kiswahili; initiating a poster campaign in healthcare structures directed towards visitors, and patient caretakers; making information and awareness raising banners; and holding monthly neighbourhood public information sessions. Particular attention will be towards leaving no one behind including those not able to access such common communication channels.

It is imperative to train administrative personnel, doctors, nurses, public health officers, lab personnel, phlebotomists, cleaners and waste handlers at national and county level, managerial staff of the technical departments, and waste handlers (orderlies, cleaning personnel and other hospital workers, municipal garbage collectors).

In order to implement the ICWMP, all relevant parties in the MoH would be trained to be aware of good practices and procedures of infection control and waste management that are stipulated under this plan. The technical support and capacity building training plan is shown on table 5.

Table 5 Training Plan and Budget for Staff and Support Staff

Capacity Needs	Target Participants	Cost (USD)
Training on Infection control and waste management procedures and the roles and tasks for all actors from cradle to grave	<ul style="list-style-type: none"> Professionals and non-professional staff working in the HCF (hospitals, PoE, Blood Centers, isolation and quarantine areas, and in the Laboratories. Cleaners, morgue attendants waste transporters and handlers, incinerator operators, liquid waste 	40,000

	<p>treatment facility operators and other staff of the laboratories.</p> <ul style="list-style-type: none"> • Staff for waste reporters service providers 	
Training on Environment, Health and Safety, emergency preparedness and response	<ul style="list-style-type: none"> • Professionals and non-professional staff working in the HCF (hospitals, PoE, Blood Centers, isolation and quarantine areas and in the Laboratories, • Cleaners, waste transporters and handlers, incinerator operators, liquid waste treatment facility operators and other staff of the laboratories. 	20,000
Training on biosafety and biosecurity	<ul style="list-style-type: none"> • Professionals working in the Laboratory Staffs • Cleaners, waste transporters and handlers, incinerator operators, liquid waste treatment facility operators and other staff of the laboratories. 	20,000
Community health and safety in relation to hygiene and other standard precautions for infectious disease (i.e. COVID 19).	<ul style="list-style-type: none"> • Community members and community health workers within the HCF zone of influence. 	20,000
Training of HCF on proper implementation of their specific ICWMP and ESMP during operations	<ul style="list-style-type: none"> • Professionals working in the Laboratory, HCF, Isolation, quarantine and treatment Centre, blood services. 	60,000
Training of the medical waste handlers on their HCF specific ICWMP during operations;	<ul style="list-style-type: none"> • Professionals working in the Laboratory, HCF, Isolation and treatment Centre, blood services. 	20,000

Total		180,000
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6.0 Annex I: Infection Control and Waste Management Plan (ICWMP) Template

1. Introduction

1.1 Describe the project context and components- Described however content should be reduced and summarised .

1.2 Describe the targeted healthcare facility (HCF): The description is not clear and indicates the facilities are not known however information on the TB or COVID- project could help make a description of the health care facilities and assess the waste management equipment available in these sites .

- Type: E.g. general hospital, clinics, inpatient/outpatient facility, medical laboratory, quarantine or isolation centers;
- *Special type of HCF in response to COVID-19: E.g. existing assets may be acquired to hold yet-to-confirm cases for medical observation or isolation;*
- Functions and requirement for the level infection control, e.g. biosafety levels;
- Location and associated facilities, including access, water supply, power supply;
- Capacity: beds

1.3 Describe the design requirements of the HCF, which may include specifications for general design and safety, separation of wards, heating, ventilation and air conditioning (HVAC), autoclave, and waste management facilities. The facilities are existing and building works not anticipated

2. Infection Control and Waste Management

2.1 Overview of infection control and waste management in the HCF

- Type, source and volume of healthcare waste (HCW) generated in the HCF, including solid, liquid and air emissions (if significant). This has not been described . The waste management information from the previous projects could help assess the volume of wastes and sources
- Classify and quantify the HCW (infectious waste, pathological waste, sharps, liquid and non-hazardous) following WBG [EHS Guidelines](#) for Healthcare Facilities and pertaining

GIIP. This has been classified in general terms without specifying the specific wastes to be generated as a result of the project and the anticipated volume as a result of the new project .

- *Given the infectious nature of the novel coronavirus, some wastes that are traditionally classified as non-hazardous may be considered hazardous. It's likely the volume of waste will increase considerably given the number of admitted patients during COVID-19 outbreak. Special attention should be given to the identification, classification and quantification of the healthcare wastes.*
- Describe the healthcare waste management system in the HCF, including material delivery, waste generation, handling, disinfection and sterilization, collection, storage, transport, and disposal and treatment works- This has been described in general terms and some measures indicated would not apply to the HCFs and not realistic. The plan should be clear on how HCF wastes will be handled from the source to final disposal highlighting measures that will work for the HCFs. For example if there are no disposal sites for the district for other hazardous wastes , how will these be disposed ,what will be the alternative disposal measures proposed .
- Provide a flow chart of waste streams in the HCF if available-
- Describe applicable performance levels and/or standards- describe applicable standards and licence requirements for waste management
- Describe institutional arrangement, roles and responsibilities in the HCF for infection control and waste management. These have been described but important to indicate how the institutions will coordinate to effectively manage wastes.

2.2 Management Measures

- Waste minimization, reuse and recycling: HCF should consider practices and procedures to minimize waste generation, without sacrificing patient hygiene and safety considerations. The procedures and practices should consider what has been working for the previous project and provide solutions for the waste management challenges which were faced .

- Delivery and storage of specimen, samples, reagents, pharmaceuticals and medical supplies: HCF should adopt practice and procedures to minimize risks associated with delivering, receiving and storage of hazardous medical goods. Hampered
- Waste segregation, packaging, color coding and labeling: HCF should strictly conduct waste segregation at the point of generation. Internationally adopted method for packaging, color coding and labeling the wastes should be followed.
- Onsite collection and transport: HCF should adopt practices and procedures to timely remove properly packaged and labelled wastes using designated trolleys/carts and routes. Disinfection of pertaining tools and spaces should be routinely conducted. Hygiene and safety of involved supporting medical workers such as cleaners should be ensured. The plan should be clear on transportation of wastes .
- Waste storage: A HCF should have multiple waste storage areas designed for different types of wastes. Their functions and sizes are determined at design stage. Proper maintenance and disinfection of the storage areas should be carried out. Existing reports suggest that during the COVID-19 outbreak, infectious wastes should be removed from HCF's storage area for disposal within 24 hours. The plan should indicate what storage facilities are available or what would be anticipated as temporary storage areas
- Onsite waste treatment and disposal (e.g. an incinerator): Many HCFs have their own waste incineration facilities installed onsite. Due diligence of an existing incinerator should be conducted to examine its technical adequacy, process capacity, performance record, and operator's capacity. In case any gaps are discovered, corrective measures should be recommended. For new HCF financed by the project, waste disposal facilities should be integrated into the overall design and ESIA developed. Good design, operational practices and internationally adopted emission standards for healthcare waste incinerators can be found in pertaining EHS Guidelines and GIIP.
- Transportation and disposal at offsite waste management facilities: Not all HCF has adequate or well-performed incinerator onsite. Not all healthcare wastes are suitable for incineration. An onsite incinerator produces residuals after incineration. Hence offsite waste disposal facilities provided by local government or the private sector are probably needed. These offsite waste management facilities may include incinerators, hazardous wastes

landfill. In the same vein, due diligence of such external waste management facilities should be conducted to examine its technical adequacy, process capacity, performance record, and operator's capacity. In case any gaps are discovered, corrective measures should be recommended and agreed with the government or the private sector operators. How will wastes be transported to an offsite disposal site ? This should be clear in the plan

- Wastewater treatment: HCF wastewater is related to hazardous waste management practices. Proper waste segregation and handling as discussed above should be conducted to minimize entry of solid waste into the waste water stream. In case waste water is discharged into municipal sewer sewerage system, the HCF should ensure that waste water effluent comply with all applicable permits and standards, and the municipal waste water treatment plant (WWTP) is capable of handling the type of effluent discharged. In cases where municipal sewage system is not in place, HCF should build and properly operate on site primary and secondary waste water treatment works, including disinfection. Residuals of the on site waste water treatment works, such as sludge, should be properly disposed of as well. There're also cases where HCF waste water is transported by trucks to a municipal waste water treatment plant for treatment. Requirements on safe transportation, due diligence of WWTP in terms of its capacity and performance should be conducted. The plan has not explained how waste water will be treated on site following previous experience. Explain any need to discharge waste water and the requirements for discharge. Indicate that WWTP would not be available on the HCFs due to the nature of the facilities .

3. Emergency Preparedness and Response

Emergency incidents occurring in a HCF may include spillage, occupational exposure to infectious materials or radiation, accidental releases of infectious or hazardous substances to the environment, medical equipment failure, failure of solid waste and wastewater treatment facilities, and fire. These emergency events are likely to seriously affect medical workers, communities, the HCF's operation and the environment.

Thus, an Emergency Response Plan (ERP) that is commensurate with the risk levels is recommended to be developed. The key elements of an ERP are defined in ESS 4 Community Health and Safety (para. 21).

4. Institutional Arrangement and Capacity Building

A clearly defined institutional arrangement, roles and responsibilities should be included. A training plan with recurring training programs should be developed. The following aspects are recommended:

- Define roles and responsibilities along each link of the chain along the cradle-to-grave infection control and waste management process;
- Ensure adequate and qualified staff are in place, including those in charge of infection control and biosafety and waste management facility operation.
- Stress the chief of a HCF takes overall responsibility for infection control and waste management;
- Involve all relevant departments in a HCF, and build an intra-departmental team to manage, coordinate and regularly review issues and performance;
- Establish an information management system to track and record the waste streams in HCF; and
- Capacity building and training should involve medical workers, waste management workers and cleaners. Third-party waste management service providers should be provided with relevant training as well.

5. Monitoring and Reporting

Many HCFs in developing countries face the challenge of inadequate monitoring and records of healthcare waste streams. HCF should establish an information management system to track and record the waste streams from the point of generation, segregation, packaging, temporary storage, transport carts/vehicles, to treatment facilities. The HCF is encouraged to develop an IT based information management system should their technical and financial capacity allow.

As discussed above, the HCF chief takes overall responsibility, leads an intra-departmental team and regularly reviews issues and performance of the infection control and waste management practices in the HCF. Internal reporting and filing systems should be in place.

Externally, reporting should be conducted as per government and World Bank requirements.
The plan should include reporting responsibilities

References

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