SFG1305

Government of Sierra Leone
Ministry of Health and Sanitation

Infection Control and National HealthCare Waste Management Plan

"Keep Sierra Leone Clean. Play Your Role for Change"

JUNE 2015

Government of Sierra Leone Ministry of Health and Sanitation

Infection Control and Healthcare Waste Management strategic Plan

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Foreword

Improving the health of the nation is one of the key priorities of our Government. Formulation further and launch of this Integrated National Waste Management Strategic Plan (2012-2016) for development of our country's waste management is a major achievement. Considerable effort is required in properly managing healthcare waste, municipal solid waste, liquid waste and industrial waste in Sierra Leone. This strategic plan is thus in line with the government's need to attain the Millennium Development Goals, for which six out of eight goals are being addressed. Proper waste management will minimize transmission of water borne diseases (diarrhea, cholera, etc.) and malaria (by destroying habitats for mosquitoes) and increase environmental sustainability in Sierra Leone.

Despite improvement in health care facilities, women continue to die at childbirth due to malaria, too many children die of easily preventable diseases such as malaria and diarrhoea, for which cost effective interventions exist. Sadly, much remains to be done with regard to tackling ill health related to poverty and environmental mismanagement.

The INWMSP provides the framework that will guide the efforts of the Ministry of Health and Sanitation (MoHS) and its partners over the next five years in attaining the health related MDGs. It reflects the Ministry's fundamental belief that waste management and sanitation is a measure of human health and poverty. While we are striving to make sure that health services are made available, accessible and affordable to all people without discrimination, this plan will ensure that waste management services become accessible to all Sierra Leoneans. The Plan further reflects the belief that waste management fundamentally affects individual productivity (in business facilities, households, in health and industrial facilities) and is therefore a critical input for long-term development of the country.

The strategies contained in the Plan focus especially on the needs of health workers, community members in cities and towns, household members, industrial workers, etc. For these vulnerable groups, ill health due to poor waste management is not only a personal tragedy but also an economic burden that reinforces poverty nationally. Whilst laying emphasis on these beneficiaries, the Plan concomitantly emphasises strengthening of the entire waste management system as a key strategy to enhancing efficiency and effectiveness in provision of quality services that will ultimately improve health outcomes.

Bearing in mind the aforementioned, the plan is developed around strengthening of six key pillars of the health system, namely: (1) leadership and governance, (2) service delivery, (3) human resources for waste management, (4) waste management equipment and technologies, (5) waste management financing, and (6) waste management information systems. Our priorities are to improve waste management with the aim of progressively moving towards universal coverage, reducing the burden of communicable diseases and improving the quality of services provided by retaining highly qualified and motivated staff in an enabling environment through training.

From the very outset, the government of Sierra Leone has recognized that environmental health problems in the country are huge in magnitude and complex in nature. We are also aware that solving these multi-faceted problems of the health sector requires time and the

concerted efforts of the government, the private sector, non-governmental organizations, multilateral and bilateral development partners, and above all the public at large. Therefore, harmonizing the efforts of all stakeholders has been one of the most important agenda items during preparation of the National Integrated Waste Management Strategic Plan.

At this point, when we are nearing 2015, and as we start the implementation of this strategic plan before the MDGs target year, I would like to assure all development partners, and my colleagues in the health sector, that the Ministry of Health and Sanitation is ready and committed to continue playing the leading role in working hard to achieve what we have targeted in this plan.

For the implementation of this plan, the Ministry depends on the continued dedication of its entire staff and those of its partner organizations. The Ministry's goals for system-wide improvement require sustained provision of public funds as well as financial and technical assistance from development partners within the framework of the PRSPII.

This Plan ushers in a new beginning towards a direction that the Ministry hopes will result in a sector-wide approach to managing and coordinating our individual and collective interventions in waste management. We welcome the support of our national and international development partners and gratefully acknowledge their contribution towards the development of our waste management system.

Finally, I would like to appreciate and thank all institutions and individuals who have been involved in the preparation of this valuable document. I also would like to thank all development partners for their valuable contributions and comments during the preparation of the strategic document and above all for their endorsement as a common guiding reference for our operations for the coming five years.

Minister of Health and Sanitation

Acknowledgements

This first Integrated National Waste Management Strategic Plan (INWMSP) is a product of a long and complex process of intensive consultations, teamwork on specific assignments, detailed studies and information gathering. The process involved service providers, civil society groups, community members, the private sector, development partners and other stakeholders.

The Ministry is very grateful to everyone who contributed to the successful development of this strategic plan. Special thanks go to the members of the Technical Working Group (TWG) that was tasked to write this document, using the health systems strengthening approach based on the 6 pillars of the health system. These building blocks were brought together and synthesised into the INWMSP.

Most important has been the concerted effort to involve all directorates, programs and other units within MoHS to ensure understanding and ownership of the plan. The Top Management Team (TMT) of the Ministry spearheaded the coordination and finalisation of this document.

The Government appreciates the financial and technical support given by the World Health Organisation (WHO) for the development of this plan. WHO and all our partners have been helpful and encouraging in this attempt to chart a new course for Sierra Leone's health sector.

Finally, the Ministry expresses its appreciation to all other individuals and institutions who continue to contribute towards improving the environmental health of the people of Sierra Leone. We hope that together we can achieve our Millennium Development Goals.

Chief Medical Officer

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Abbreviations

APCD	Air Pollution Control Device
BACT	Best Available Control Technology
BOD	Biological Oxygen Demand
CE	Combustion Efficiency
COD	Chemical Oxygen Demand
CSSD	Central Sterile Supply Departments
EHD	Environmental Health Division
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
HCW	Healthcare Waste
HCWM	Healthcare Waste Management
HF	Health Facility
HIV	Human Immunodeficiency Virus
IMSWM	Integrated Municipal Solid Waste Management
INWMP	Integrated National Waste Management Policy
ISO	International Standards Organization
LCA	Life Cycle Assessment
LDO	Light Diesel Oil
LLWAC	Local Liquid Waste Advisory Committee
LSWAC	Local Solid Waste Advisory Committee
LWM	Liquid Waste Management
LWMPs	Liquid Waste Management Plans
MoHS	Ministry of Health and Sanitation
MSW	Municipal Solid Waste
NGOs	Non-Governmental Organizations
NSIs	Needle Stick Injuries
OH&S	Occupational Health and Safety
PPE	Personal Protective Equipment
SLI	Starting Light Ignition
SOPs	Standard Operating Procedures
TLWAC	Technical Liquid Waste Advisory Committee
VOC	Volatile Organic Compound
WC	Water Closet
WMP	Waste Management Plan

CHAPTER 1: Background

1.1 Introduction to Sierra Leone

Sierra Leone has a population density of approximately 6 million of which urban population is 40% and 60% rural population respectively. The Life Expectancy is 48% with Adult Literacy 42%.The country has a natural increase rate of 2.3%, with children 0-14 years representing about 45% of the population. The crude birth and death rates are 45 and 22 per 1000 population, respectively. The total fertility rate, estimated at 6.3 per woman, is amongst the highest in the world. However, life expectancy at birth is estimated at 49.4 years, and is associated with the high child and maternal mortality rates, as well as, the heavy burden of communicable and non-communicable diseases in the country. The underlying predisposing factors are pervasive poverty; high level of illiteracy, especially among females; limited access to safe drinking water and adequate sanitation; poor feeding and hygienic practices; overcrowded housing; and limited access to high quality healthcare services.

Sierra Leone is politically a constitutional democratic country, with a 124 seat parliament uniquely fixed with the 169 chiefdoms. The country gained independence from Britain on 27 April 1961 and became a Republic on 19 April 1971. Between 1961 and 1990, the country witnessed steady development of constitutional democracy, rule of law and transparent governance of national institutions, the basis for enduring health and socio-economic development. The civil war which lasted from 1991 to 2002, destroyed basic health infrastructure and displaced health personnel, compromising healthcare at all levels in the country.

In 1991, within the period of war era, the country resuscitated effective democratic practice, and has gone through 4 successful presidential and two parliamentary elections in March 1996, 14 May 2002, 28 July 2007 and 17 November 2012 in which transition effect in 2007 from Dr. Amed Tejan Kabba to Dr. Earnest Bai Koroma respectively.

With the support of the United Nations and developmental partners, Sierra Leone commenced the rebuilding of governance infrastructure, beginning with the disarmament and demobilization of excombatants in February 2002.

Sierra Leone ranks as the least developed country in the world, based on its 2007 Human Development Report ranking of 158th out of 177 countries. The country is extremely re-source-poor, with a GDP per capita (PPP) of US$ 700; it ranked 102 out of 108 countries in the Human Poverty Report, with Human Poverty Index (HPI) of 51.I72 and Huger Index which is very high. And nearly half of the working age population engages in subsistence agriculture.

However, progress is being made, especially in creating an enabling environment for socioeconomic development. In response to these socioeconomic challenges, the government of Sierra Leone has developed the Sierra Leone Vision 2025 and the Sierra Leone Poverty Reduction Strategy (PRS) that guides the government's efforts towards

improving the current socioeconomic situation. Inter-country collaboration is carried out through the Mano River Union (MRU) as well as the Economic Community of West African States (ECOWAS). In 2012, the economy witnessed an overall impressive performance with real GDP growth estimated from 3.8% to 15.2%. Growth was driven by a revitalized, Iron Ore, bauxite and rutile mining sector, coupled with sustained agricultural output and service delivery.[2]The other economic and social variables are shown by table 2.1.

Following the identification of the country's health and development challenges in 2008, the national response was directed in the following areas:

1) Improving social-economic development, including the health service.
2) Identification of the burden of communicable diseases (malaria, HIV/AIDS, TB and Leprosy, Tropical diseases, etc.).
3) Identification of the burden of childhood and maternal diseases.

The health system's response (aimed at improving access to quality promotion, preventive, curative and rehabilitative services), is currently improving. However, in its response, poor waste management which creates a suitable environment for malaria and water borne diseases was not identified as a key problem that needed special response.

1.2 The Country (post-conflict situation) in the Healthcare Sector

The ten-year old conflict (1991 to 2001) was accompanied by a deterioration of the health status of the majority of Sierra Leoneans. The Human Development Report, July 2000, estimates a life expectancy of 37.9 years. The healthcare delivery system is divided into National, District and Chiefdom levels. The epidemiological picture is characterized by a high prevalence of communicable disease like malaria, respiratory tract and skin infections. There is an explosion of sexually transmitted infections, and emerging epidemic of HIV/AIDS.

According to MoHS sources, over half the healthcare facilities country-wide were not functioning by the year 2000 due to a variety of reasons that included damaged infrastructure, lack of staff, lack of drugs and medical supplies.

1.3 Current Health Profile in Sierra Leone

From 2002 to-date, Sierra Leone Government has had ambition Policies and programmes to addressing poverty including Free Health Care Initiative, decentralization, transparency, accountability, water, Environmental Health and sanitation, Malaria Control programme, HIV/AIDs, Leprosy and Tuberculosis Control Programmes, Neglected tropical Disease(NTDs) as a critical measures in addressing the disease burden in the country.

In 2012, the country had cholera outbreak which led to the loss of more than 500 lives nationwide.

On the 24th of May 2014, the Director of Disease control declared an outbreak of the world worst deadly and notorious Ebola virus of hemorrhagic genus in Sierra Leone which geometrically spread in the entire country.

In June 2014, Ebola outbreak Guinea and Liberia, the closest neighboring countries crossed the boundary to Sierra Leone from the eastern part of Sierra Leone, of which its negative effect on all sector of the society is a new history. With the rapid Ebola Epidemiology in July 2014, the government structured Emergency Operation Center(EOC) to supervised and coordinate the Sub-operational units such as Surveillance, Burial, Contact Tracing, Spray Team and Social Mobilization Teams on the Ebola Response. In August 2014, Emergency Operation Center was transformed to National Emergency Response Committee (NERC) with its District Emergency Response Committee (DERC) to supervise and coordinate the Ebola Response at district levels.

1.4 Ebola Epidemic, Infectious and Health Care Waste Management in Sierra Leone

During the 20th century, a new breed of Ebola virus is among the 30 new infectious diseases emerged. It appeared for the first in Democratic Republic of Congo (DRC) and Sudan1976, Cote d'Ivoire in 1994 and1995, Liberia in 1995 and DRC again 1995 respectively.

On the 24th of May 2014, the Director of Disease control declared an outbreak of the world worst deadly and notorious Ebola virus of hemorrhagic genus in Sierra Leone which spreading geometrically almost in the entire country with its epidemiological bearing from the South of Guinea. The disease has caused thousands of deaths, stigmatized society and undermined the beneath development of every sector of Sierra Leone. Infectious and healthcare wastes are generated in basically health care institutions including hospitals, health centers, mortuaries and laboratories as well as communities, especially in during epidemic of infectious diseases.

1.5 Current Distribution of Health Facilities in Sierra Leone

According to the data presented by the National Health Sector Strategic Plan (NHSSP 2010-2015), the distribution of health facilities in the country is highly concentrated in Western Area. In Freetown, for example, the largest number of health facilities is mainly government owned, although the contribution of the private sector, mission and NGOs has been recognized, especially in the urban areas, as shown in Figures 2.1 and 2.2.

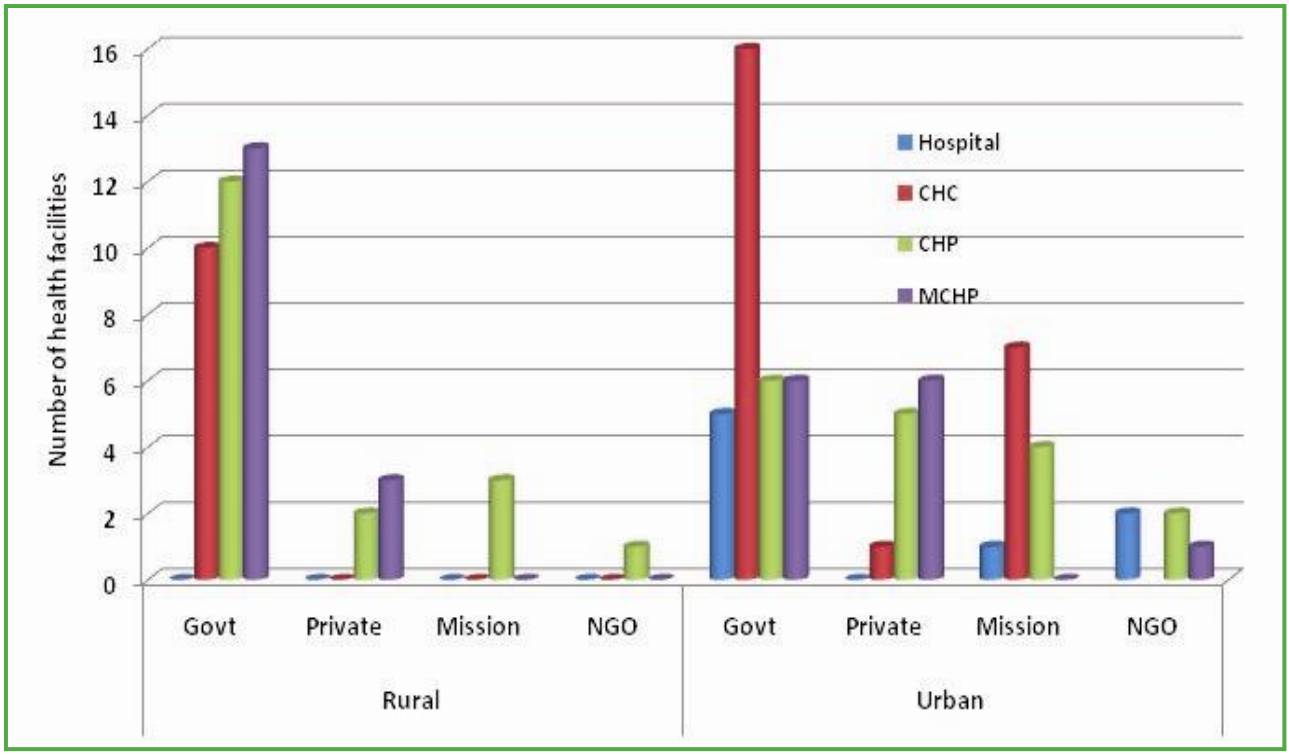
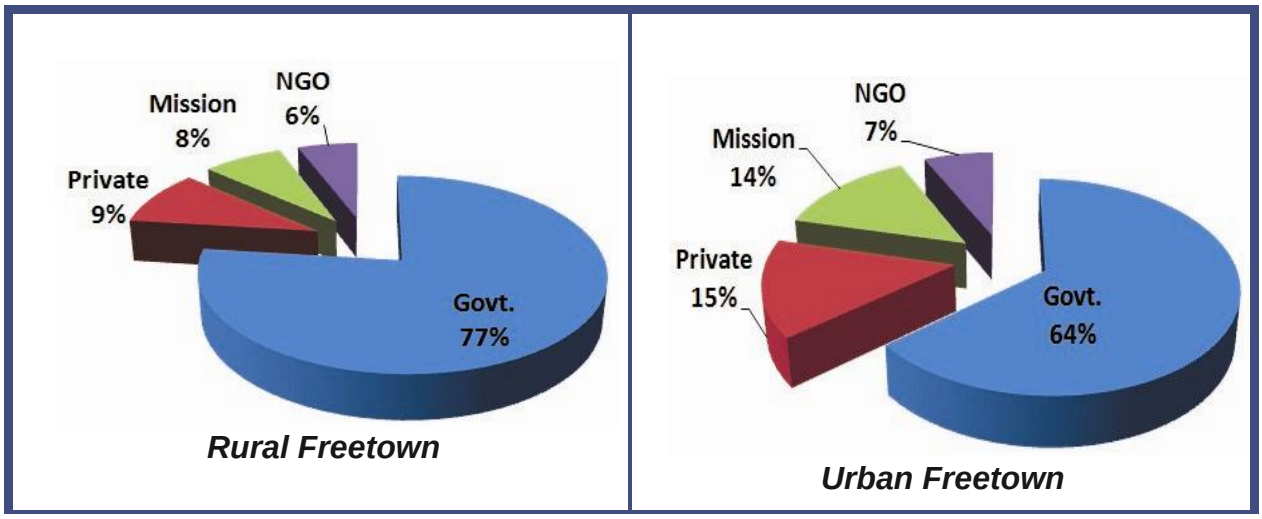


Figure 2.1 Number of health facilities in Freetown rural and urban areas by numbers (NHSSP, 2101-2015)



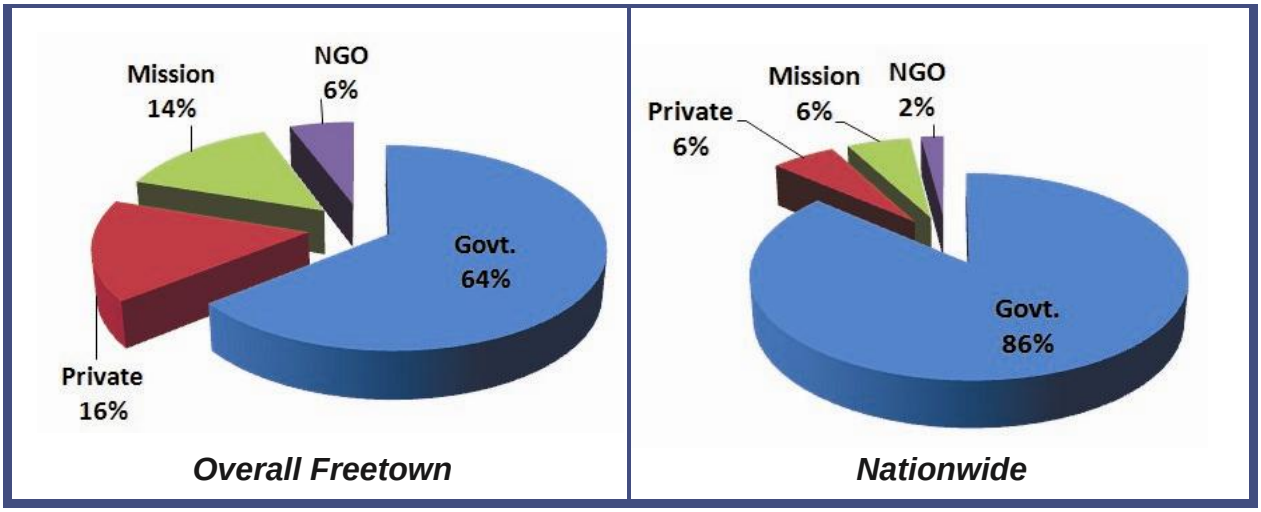


Figure 2.2 Distribution of health facilities in Freetown (rural and urban areas) and nationwide by ownership

Based on this analysis, it can be summarized that:

1) Nationwide, the hospitals in Sierra Leone owned by the government comprise 68.2% while those owned by private, mission and NGOs comprise 31.8%.
2) For the clinics, however, only 9.9% are government owned while the rest (90%) are owned by the private, mission and NGOs.
3) All CHPs and MCHPs are government owned in Sierra Leone.
4) Most of the private, mission and NGO owned HFs are concentrated in the Western area, especially in urban Freetown.
5) The government of Sierra Leone has taken a leading role in locating health facilities in rural areas of Freetown (77%) and also nationwide (86%)
6) The role of the private sector should be encouraged. It has contributed to the establishment of health facilities and health service delivery in Sierra Leone, being second to government in all scenarios.

CHAPTER TWO: Situation Analysis

2.1 Issues in Healthcare Waste Management

The health sector is grossly underdeveloped. Improving the health status of Sierra Leoneans is one of the biggest challenges facing the Government. In order to improve access to quality healthcare for all, the Government has embarked on construction of peripheral health units (PHUs), and rehabilitation and construction of secondary hospitals in the districts. Adequate healthcare waste management in these planned projects would be prerequisites for standard operations.

The key findings can be summarized as:

1) Healthcare waste management practices depend on the level of health facility, ownership of the facility and location of the health facility.
2) The technical and administrative skills in healthcare waste management are low in the health facilities, leading to poor practices.
3) Inadequate training for health workers on healthcare waste management is one of the causes of poor practices.
4) Lack of guidelines and standard operating procedures on healthcare waste management causes poor practices.
5) The infrastructure for healthcare waste management is very weak (waste collection, transportation, sterilization equipment and chemicals, treatment facilities, etc.) due to lack of prioritizing, planning and budgeting, which eventually lead to poor practices.
6) The critical problems on healthcare waste management are lack of funds to build infrastructure, lack of supplies (PPE, waste collection bags, sharps waste containers, etc.), and insufficient staff and time dedicated to healthcare waste management.
7) In the area of treatment and disposal, the critical problems are lack of PPE, standard operating procedures (SOPs), appropriate treatment and disposal technologies (poor incinerator designs), waste transportation facilities and land areas for burying waste where applicable.
8) No systematic planning of the medical waste system; Organizational responsibilities are not clear.
9) Treatment of infectious waste through incineration, or by disinfection (including autoclaving) is a problematic area in Sierra Leone. In the case of incineration this may be done within the hospital premises or in a centralised facility. An incinerator is difficult and expensive to maintain, so it should be located in a hospital only when the hospital is large or where it provides services to other nearby hospitals. Otherwise, a centralised incinerator that provides services to hospitals in one region or city is more appropriate. In the case of disinfection, residues from these processes should still be treated as special wastes, unless a detailed bacteriological analysis is carried out.

There is a clear correlation between the low knowledge of Healthcare staff and the current inadequate management of Healthcare waste. One of the potential risks created by healthcare waste is occupational infections among healthcare staff by blood borne pathogens. It is noteworthy that all health facilities in Sierra Leone operate within substantial budgetary constraints. All of the Healthcare facilities lack adequate physical infrastructure, medical equipment and trained (and paid) staff. Against this backdrop, it is understandable that the limited resources available are not generally directed toward waste management. Improved healthcare services and addressing the disease burden will further increase the inherent public health risks associated with poor HCWM, adding a greater financial burden to society.

2.2 Environmental Issues related to the health sector

2.2.1 Infectious Waste

Medical waste is the waste generated during the process of patient care and its quantities in cities have been ranging from 1.5 to 2% of the municipal solid wastes. Though the quantity is relatively small, it can pose grave risks if not managed properly. All the infectious medical waste generated (body parts, organs, tissues, blood and body fluids, cotton, bandage and plaster casts from infected and contaminated areas along with used needles, syringes and other sharps) is very essential to be properly collected, segregated, stored, transported, treated and disposed in safe manner to prevent spread of infection. Failing to do this might lead to spread of hazardous infections such as HIV, Hepatitis and other viral or bacterial infections, which pose huge risk to the health of the public, patients, medical professionals and contribute to environmental degradation. Improper occupational practices and unsafe handling of infectious waste potentially expose health care workers, waste handlers, patients and the community to infection and injuries. Open and uncontrolled slow burning of mixed waste which includes plastic waste produces emissions, such as dioxins and furans, which can be potentially hazardous and carcinogenic.

2.2.2 Wastewater from HCFs

Health-care wastewater is any water that has been adversely affected in quality during the provision of healthcare services. It is mainly liquid waste, containing some solids produced by staff and patients or during health-care-related processes, including cooking, cleaning and laundry. A large part of the wastewater from health-care facilities is of a similar quality to domestic wastewater and poses the same risks but smaller proportions of wastewater generated. HCFs poses a higher risk than domestic wastewater depending on the service level and tasks of the health-care facility. The wastewater might contain chemicals, pharmaceuticals and contagious biological agents, and might even contain radioisotopes which are highly contagious and may lead to contamination of groundwater in absence of watertight and efficient sewers.

2.2.3 Clean water and sanitation

Provision of good health services requires maintenance of clean and hygienic healthcare facilities, with adequate supply of clean, potable water and proper systems for sanitation and cleanliness. Prevention of vector borne diseases and infections from poor quality food

and water is essential for reducing the rate of Hospital associated infections. Proper solid waste management is also essential to prevent spread of diseases and infections to patients, healthcare providers and general community

2.2.4 Mercury Waste

In health care facilities, products containing mercury include thermometers, sphygmomanometers, esophageal, Abbott & Cantor tubes and dental amalgams. Mercury is classified as a hazardous substance that cause serious health impacts and can be fatal if inhaled and harmful if absorbed through the skin. Around 80% of the inhaled mercury vapour is absorbed into the blood through the lungs, the nervous, digestive, respiratory and immune systems and kidneys and the lungs. Adverse health effects from mercury exposure can be tremors, impaired vision and hearing, paralysis, insomnia, emotional instability, developmental deficits during fetal development, and developmental delays during childhood.

2.2.5Construction related issues and Waste

The Government of Sierra Leone has developed an Environmental and Social Management Framework, which details issues going beyond medical waste management, such as construction related impacts of project activities. The ESMF details mitigation measures which need to be put in place. UNOPS will be assisting the Government in implementing these aspects of the project.

2.3 Ebola and Medical Waste Management

Sierra Leone is amongst the worst affected West African countries by the Ebola virus disease. The disease was detected in rural Guinea in February 2014, and spread to Sierra Leone in May 2014. Since then, more than 8,000 Sierra Leoneans have been infected, and more than 4,000 have died of the disease including mostly women and children. It is especially worrying that a good proportion of doctors, nurses, and other health personnel are among the fatalities. Children have been orphaned by the disease; schools have remained closed since the beginning of the academic year in September 2014, but are expected to re-open by 14Th April, 2015. Over two-thirds of those infected are in the economically active age group. Furthermore, the epidemic has crowded out effective response to other diseases in the national healthcare system, and as a result, non-Ebola related illnesses have added to the toll of deaths and suffering.

The disease has caused unprecedented social and humanitarian damage, accompanied by severe economic consequences. It has remarkably decreased the impressive gains made in economic growth over the years, badly affecting farmers, traders, tourism, investors and a range of other economic agents. Key economic activities, including agriculture, mining, manufacturing, construction, trade and commerce, transport, and tourism, have been disrupted, and this has hiked the rate of national unemployment.

The disease has also compounded the perennial problems encounter by the government in managing waste and other sanitation issues. This sector had suffered inadequate and ageing infrastructure, and man power. Efforts by the government to deal with the waste

problems have been reversed by the current epidemic. To tackle waste problems, the Ministry of Health developed an integrated waste management Strategic Response Plan from October 2012 to 2017 to be implemented by the Ministry of Health and Sanitation as a product of a long and complex process of intensive consultations, teamwork on specific assignments, detailed studies and information gathering, which did not entail plans for Ebola and other emerging Medical issues. Therefore, it was prerogative that this document has been updated to comply with the International standards of Ebola and medical waste management.

2.4 Legislation and institutional Framework

Sierra Leone has an Integrated Waste Management Plan, which comprises a strategic management structure for all forms of waste generated in the country. With regard to Health Care waste management, the vision, mission and goal are derived from the National Health Policy and are aimed at Ouagadougou Declaration and the MDGs. The mission is to contribute to socio-economic development by promoting waste management and ensuring access to quality services by the population of Sierra Leone through effectively functioning national waste management systems for all identified waste categories: Infectious and healthcare waste, municipal solid waste, liquid waste and industrial waste.

The objective is to minimize the impact of communicable diseases related to poor waste management (water borne diseases, airborne diseases, and vector transmitted diseases), reduce mothers and children's mortality and minimize poverty by involving the private sector, and to attain a healthy environment for Sierra Leone.

The legislations affecting waste management and sanitation in Sierra Leone comprise the following:

a) The Environmental Protection Act (2008): An Act (amended in 2010) which empowers the Minister of Lands, Country Planning and the Environment to make regulations and guidelines which protect the environment. This act created and empowered the Environment Protection agency which has the overall mandate of setting and monitoring environmental standards.

b) Local Government Act (2004): An Act which enables the establishment of nineteen local councils and provides for decentralisation and devolution of functions, powers and services to local councils. The Act devolves the water supply and sanitation responsibilities to District and Town Councils.

c) Public Health Act 1996 and the 2004 Addendum: An Act which vests the responsibility for environmental sanitation in the Ministry of Health.

d) **Integrated National Waste Management Policy** (INWMP) and Integrated National Waste Management Strategic Plan (INWMSP) (2011) serve as a common guiding reference for the implementation of the "Libreville Declaration on health and environment". Among other issues, the Declaration emphasizes the implementation of 11 priority interventions which include strengthening the waste management system as a strategy for efficiency and effectiveness in the provision of quality services for improved health outcomes.

- Integrated Vector Management Policy, 2010.

e) Integrated Vector Control and Management (IVM) ultimate goal is to attain the millennium development goals and objective set by the Abuja Declaration. The National strategic plan aims to reduce morbidity and mortality related to malaria by 50%; onchocerciasis, schistosomiasis and STH by 80%.

f) Harmonised Pesticide Policy, 2013

g) National Integrated Waste Management Strategy 2013

h) Situation Analysis and Needs Assessment 2012 (SANA) on Environment and Health Report.

i) National Environmental Health Policy – 2000;

Currently, the National Environmental Health Policy (2000) and the Public Health Ordinance 1960 are under review

The National Environmental Health and Sanitation Policy of Sierra Leone is the Government's strategic response to the need to urgently improve the well being of the people, enhance the odds of Sierra Leone meeting its Millennium Development Goals, and reduce the Le 273 billion lost annually to poor environmental health and sanitation services delivery. (Information on legislation)

g) The Persons with Disability Act, 2011establishs the National Commission for Persons with Disability, to prohibit discrimination against persons with disability, achieve equalization of opportunities for persons with disability and to provide for other related matters.

h) The Right to Access Information Act, 2013 provided for the disclosure of information held by public authorities or by persons providing services for them and to provide for other related matters.

Actors	Potential field of intervention
Technical services of the Government (MoHS)	inform the local and national authorities facilitate co-ordination of HCWM plan activities supply technical expertise develop guidelines for HCWM develop M&E tools execute control and monitoring of activities train the health staff/supervisors monitoring and evaluation of HCWM

City councils/district governments	participate in the mobilization of populations ensure HCW are properly disposed in their landfill participate in training, monitoring and evaluation
Public health facilities / Private health facilities	participate in training activities, supply staff with security equipment, elaborate internal plans and guidelines HCWM allocate financial resources for HCWM ensure HCW management plan is implemented
Private operators	invest in HCWM (e.g., treatment, transport, disposal) operate as sub-contractors (City Assemblies / District Government Health Facilities)
NGOs and CBOs	inform, educate and make population aware participate in / offer training activities
EPA	To ensure the safety and protection of the environment.
Ministry of Works	Provide Infrastructural development
Min. of Lands, Housing, Country Planning and the Environment	Provide primary disposal sites and landfill sites

2.5 Policy and Specific Objective for IHCWM

The national policy on IHCWM is aimed at providing a framework of healthcare waste management strategies to assist in the day to day and long term management of healthcare wastes in the health facilities by implementing the following essential strategies:

- Waste management committees, plans and waste audits
- Waste minimization, avoidance, segregation, recycling and re-use
- Waste container labelling and waste containment
- Proper healthcare waste handling, storage and transport
- Correct healthcare waste treatment and disposal.

Adherence to established environmental standards should be observed in all waste management and sanitation development activities. Protection of the environment by an appropriate legal mechanism shall be applied, including, when necessary, prosecution of

individuals and institutions which provide inadequate services that impact negatively on the environment. Sierra Leone is also a signatory to several international agreements on environmental practices and policies.

CHAPTER THREE: Medical Waste Management Plan (MWMP)

3.1 Introduction

Hospital Waste disposal is a multifaceted activity in which different stages as given below are highly interdependent both technically as well as organizationally. The key steps to ensure safe management of biomedical waste from cradle to grave are as follows;

1. Generation
2. Segregation
3. Collection within the hospital
4. Treatment within the hospital
5. Storage
6. Transportation
7. Measurement and Monitoring
8. End treatment
9. Disposal

3.2 Proposed functioning of the Health care waste management system:

Every hospital in a district both private and public hospitals will follow the national rules and guidelines issues by MOHS. Each hospital will collect their waste from various collection spots (Departments) according to the categorization and will store them in the storage rooms in their premises.

3.3 Method of Health Care Waste collection, treatment and final disposal

A detailed table giving the type of waste, location, colour coding, in situ treatment, transportation, end treatment and disposal is given below:

S. No.	Type of Waste	Location	Color coding	Segregation	Institution Treatment	Storage	Transportation	End Treatment
1	Human tissue, body parts and placenta	OT, Labour room, Wards	. **Infectious Clinical Waste Hazardous** Poses a known or potential risk of infection including anatomical waste, Human tissue, body parts and placenta	To be collected in yellow plastic bags kept in tight lid buckets	-	Storage site	Transported by waste collection covered vehicle	Incinerator
2	Cotton, gauze dressing, Pop's soiled with blood, pus and other human discharges. unsoiled dressing, gauze and cotton	All wards, OT, Labour rooms, Lab, ICU, Acute wards, Isolation wards	. **Infectious Clinical Waste Hazardous** Poses a known or potential risk of infection including anatomical waste, diagnostic specimens, regent or test vials	bucket lined with yellow plastic liners	-	Storage site	Transported by waste collection covered vehicle	Autoclave
	All types of plastics i.e. plastic syringes, I.V. lines, I.V. bottles, bags	All wards and departments	**Infectious Clinical Waste Hazardous** Poses a known or potential risk of infection including anatomical waste, diagnostic specimens, regent or test vials	buckets lined with yellow plastic liner	5% Hypo chlorite solution for 30 minutes	Storage site	Transported by waste collection vehicle	Autoclave shredding

S. No.	Type of Waste	Location	Color coding	Segregation	Institution Treatment	Storage	Transportation	End Treatment
3.	Discarded medicines and Cytotoxic drugs and heavy chemicals	Stores	Hormone and cancer treatment medicinal waste must be separated from other medicinal waste	bucket lined with yellow plastic liners,	-	Storage site	Sent by waste collection covered vehicle	Deep burial
4.	Soiled linen of patients	OT, Labour room, ICU, Isolation ward, Acute wards	**Offensive/non infectious waste Non Hazardous** Healthcare waste which is classed as non infectious, including nappy, incontinence, sanitary waste and other waste produced from human hygiene	1 drum with 1% Hypo chlorite solution	1% Hypochlorite solution for 30 minutes	--	Laundry vehicle	Washed in laundry
5.	Organic waste	All wards and departments	**Infectious Clinical Waste Hazardous** Poses a known or potential risk of infection including chemical reaction	black bucket lined with plastic liners	-	---	Transported by Municipal vehicle	No treatment required
6.	Needles, blades and Vials	All wards departments All wards departments	**Infectious Clinical Waste Hazardous** Potentially infectious waste, autoclave and laboratory waste	mutilation by needle destroyer then put in sharps container with hypo chlorite solution 1%	1% hypochlorite for 30 minutes	Storage site	Transported by vehicle	Auto clave

S. No.	Type of Waste	Location	Color coding	Segregation	Institution Treatment	Storage	Transportation	End Treatment
	Broken glass, bottles, tubes, Vials, Petri dishes	All wards departments All wards departments	Infectious Clinical Waste Hazardous Potentially infectious waste, autoclave and laboratory waste	Put in yellow/black bag/jar with hypo chlorite solution 1%	1% hypochlorite for 30 minutes	Storage site	Transported by vehicle	Auto clave
7.	Toxic drugs and expired drugs	Kept at medical stores after collection from department	Controlled drugs must be denatured to render them safe and without value and then disposed of with other nonhazardous waste medicines.	Kept in secured box in medical stores, then put in yellow bags	-	Storage site	Transported by vehicle	No treatment requi
8.	Microbiology and other pathological waste	Labs	Infectious Clinical Waste Hazardous Poses a known or potential risk of infection including anatomical waste, diagnostic specimens, regent or test vials	Tight lid bucket	5% Hypochlorite solution for 30 minutes &discarded in drainage	--	--	-

S. No.	Type of Waste	Location	Color coding	Segregation	Institution Treatment	Storage	Transportation	End Treatment
9	Liquid waste from wards, Department and autopsy room	All wards/ Autopsy rooms	Infectious Clinical Waste Hazardous Poses a known or potential risk of infection including diagnostic specimens, regent or test vials and liquid waste	-	5% Hypo chlorite for 30 minutes &discarded in drainage	-	--	-
12	Broken thermometers and sphygmomanometer	All wards/ Departments	Infectious Clinical Waste Hazardous Poses a known or potential risk of injure including radioactive waste	Glass bottle with water	-	Storage site	Transported by vehicle	Deep burial-
13	Chemicals used in disinfection	All wards and departments	Infectious Clinical Waste Hazardous Poses a known or potential risk of infection including chemical reaction	-	5% Hypo chlorite for 30 minutes &discarded in drainage	-	-	-
14	Heavy chemicals containers/ aero containers	OT, Surgery Depts., other Depts.	Infectious Clinical Waste Hazardous Poses a known or potential risk of infection including chemical reaction	collection point	5% Hypo Chlorite for 30 minutes	Storage site	Transported by vehicle	Mutilated in shredd

S. No.	Type of Waste	Location	Color coding	Segregation	Institution Treatment	Storage	Transportation	End Treatment
15	Discarded expired infected blood or its products.	Blood bank	. **Infectious Clinical Waste Hazardous** Poses a known or potential risk of infection including blood tissue products waste	Tight Lid bucket with 5%hypo chlorite solution	5% hypo chlorite solution for 30 minutes and liquid discarded in main drainage	---		Incinerator

Waste Type Classification Color Coding Description

Infectious Clinical Waste Hazardous

Poses a known or potential risk of infection including anatomical waste, diagnostic specimens, regent or test vials.

Infectious Clinical Waste Hazardous

Potentially infectious waste, autoclave and laboratory waste.

Offensive/non infectious waste Non Hazardous

Healthcare waste which is classed as non infectious, including nappy, incontinence, sanitary waste and other waste produced from human hygiene.

Pharmaceutical waste Non Hazardous

Includes expired, unused, contaminated and spilt pharmaceutical drugs, products and vaccines. Including bottles, boxes or vials with residues. Also including products contaminated from the use of handling pharmaceuticals including gloves, masks, connecting tubes, syringe bodies and drug vials.*

Cytotoxic and Cytostatic drugs Hazardous

Hormone and cancer treatment medicinal waste must be separated from other medicinal waste as they are classed as hazardous. Located list can be found in BNF or NIOSH list of medicines. Failure to segregate from non-hazardous medicines will mean that the waste must be treated as hazardous and incur associated hazardous waste charges

Controlled drugs Non Hazardous

Controlled drugs must be denatured to render them safe and without value and then disposed of with other nonhazardous waste medicines.

Infectious Clinical Waste Hazardous

Poses a known or potential risk of infection including anatomical waste, Human tissue, body parts and placenta

3.4 Water Supply and Sanitation System

The authorities will ensure that drinking water at those facilities which have open wells and bore wells is potable & to be free from arsenic and fluoride. The chlorination of water in storage tanks will be ensured by the municipalities and the hospital will check the presence of chlorine from the water supplied in the wards and departments and a report submitted to municipality every month or as and when required. Checking of residual chlorine at the delivery line or the OHT shall be automated.

3.5 Occupational health and safety

The hospital management will ensure a meticulously planned work system as this is of primary importance to avoid infections. Good occupational health and safety measures require:

- proper training
- personal protective clothing
- necessary equipment and infrastructural upgrades

- effective occupational health programmes including immunization (against hepatitis B) and post exposure prophylaxis along with medical surveillance

3.6 Maintenance of Records

Authorized person, i.e., environmental health officer will maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal and/or any form of handling of bio-medical waste in accordance with this rules and any guidelines issued. All records will be subject to inspection and verification by the prescribed authority at any time.

3.7Accident Reporting

When any accident occurs at any institution or facility or any other site where bio-medical waste is handled or during transportation of such waste, the authorized person, i.e., hospital superintendent/ chief medical officer will report the accident and action will be taken as required like effective occupational health programmes including immunization (against hepatitis B) and post exposure prophylaxis along with medical surveillance.

3.8 Capacity Building and IEC

The starting point for any improvements in the HCW sector is the awareness on how to solve problems and the knowledge on how to solve the problem. For the improvement of healthcare waste management (HCWM) processes all relevant national authorities as well as waste generators should be involved in a comprehensive capacity building and training program. At least one person in a healthcare facility should be fully trained to be able to implement a safe management system and to undertake proper measures in case of incidents or crisis.

The training issues should become an integral part of all planned activities to put in place the national policy and guideline for HCWM and to ensure sustainability and introduce continuous professional development. The capacity building system on healthcare waste considers the training needs of different types of healthcare facilities and is based on the internationally recommended “Healthcare Waste Officer (HWO)” & “Healthcare Waste Inspector (HWI)” principle

The aim of the capacity building system shall be to educate trainees capable of planning, setting up and operating a sufficient management system in their respective hospitals. This shall include the training of colleagues in HCW, the implementation of occupational exposure response system and the monitoring and supervision of all activities related to healthcare waste. In addition HCW inspectors shall be trained in supervising HCW management systems to strengthen the monitoring system.

A. Behaviour change communications and training focused on improving waste segregation practices at the point of waste generation among key health workers -- nurses, certified midwives, physician assistants, environmental health officers, vaccinators, laboratory technicians, morgue attendants, doctors, students in clinical training and traditional trained midwives and patients and their families. Prevention and management of needle stick injury will also be included;

B. Behaviour change communication and training focused on improving waste collection, storage, transportation, treatment and disposal practices among those whose jobs require them to oversee or handle medical waste (including hospital and clinic cleaning and grounds-keeping staff, public sanitation workers and incinerator operators). Prevention and management of needle stick injury will also be included;

C. Advocacy and training approaches focused on improving the policy environment for Healthcare waste management and strengthening support for HCWM planning, supervision of HCWM practices and adequate procurement of HCWM equipment and supplies among health facility directors/managers/supervisor, student nurse supervisors, Officers in Charge, MOH&SW and municipal policy makers and County Health Officers; and

Public awareness, training and advocacy activities will not be successful if they are not accompanied by the basic equipment to allow proper Healthcare waste management to occur. At every level, there is an inadequate supply of waste bins, personal protective equipment, sharps boxes, waste transportation and waste disposal equipment. With only a few exceptions, there is currently no capacity to effectively dispose of infectious waste. Public awareness activities will not be effective unless the equipment and commodities needed to support simple, yet effective, Healthcare waste management practices are in place. Therefore it is recommended to include a public awareness program not in the short-term planning but in the mid-term planning.

Training activities should be led by the EHSD technical staff of the MoHS with the help of the consultant. At district level, management of training activities should be assigned to the District Health Management Team. The specific training activities will be done in the 1st year of the programe.. The training on EMF may be integrated with social framework and other related training program for cost effectiveness. The objectives of the training under the EMF are to:

- support representatives and leaders of community groups and associations to prioritize their needs, and to identify, prepare, implement and manage the environmental aspects of their subprojects;
- ensure that field level staff have the capacity to assist in preparing subproject proposals, and to appraise, approve and supervise the implementation of subprojects; and
- strengthen the capacity of the local sponsors/NGOs and other stakeholders which may be involved in the public participation in preparing and implementation of subprojects.

National Consultants with the help of EHSD will train trainers in health facilities and in the other institutions (City/town councils, NGOs, etc.). Trained key staff should then train their employees.

Preparation and dissemination of training courses on ESMF would be done by the consultant with the supervision of EHO, the EHSD could prepare the TOR and do the control and supervision at national level while District Management teams, and the help of a national staff assume the monitoring at local level. In other words:

1. The EHSD prepares the Terms of Reference for developing the training programs, and does the control and supervision at national level;
2. Health training institutes or national consultants having acquired a large experience in ESMF will prepare the training courses;
3. In each district, a training workshop will be held and will be conducted by national facilitators, under the supervision of district management teams. The latter must prepare periodic reports to be sent to the central level (EHSD);
4. In each health facility, the supervising staff trained in the district workshops will ensure the training of medical and paramedical staff, cleaners, supporting staff, under their supervision. The heads of the health establishments must supervise this work and prepare periodic evaluation reports.

Training will involve training of trainers (ToT) followed by actual training for Environmental Health and Sanitation Directorate (EHSD) staff and Nurses involved in integrated solid waste management (ISWM) and Ebola and medical waste management (EMWM), and staff and private company managers involved in EMWM. The focus of this sub-component is to promote the development of training programes for government officials involved in EMWM. The programme seeks to provide authorities at the national and district level with methodology and background on Integrated solid waste management and Ebola and medical waste management issues. It also aims at encouraging individual and collective civil actions that ultimately lead to minimisation of the impacts of EMW and SW in the environment and human health in Sierra Leone. It will be performed mainly through the preparation and dissemination of training information and the organization of workshops, seminars, group discussion and public audiences. These activities will be targeted at specific audiences such as public servants, members of the private sector, NGOs, academics, students, professionals, civil organizations, media personnel, civil society and community leaders to encourage exchanges of information and collaborations

Training:	**Training of Trainers in Health Care waste Management**
Date/Time:	
Responsible:	**Ministry of Health and Sanitation**

TRAINING PLAN:

No.	Type Of Training	Responsible Person	Level
1	**Trainers of Trainee**	**DEHS**	**National**
2	Training of CHCs and Hospital Staff	TOT	District
3	Rollout Of Training of other Health and Non-Health Staff	CHCs and Hospital Staff Representative	Health Facility Level

Objectives:	Minimization of the effect of HCW in the Environment
Material needed:	**Stationeries**
Logistical requirements:	Venue, transportation, refreshment

Budget for Training

	Item	unit	unit type	unit	unit type	unit cost (SLL)	total cost per month (SLL)	total cost per year(SLL)	total cost (SLL)	Total cost ($)
	Trainers of Trainee @ National Staff	1	Training	8	Staff	4,000,000	4,000,000.00	4,000,000.00	4,000,000.00	784.31
	Training of CHCs and Hospital Staff	1	Training	44	staff	54,000,000	54,000,000.00	54,000,000.00	54,000,000.00	10,588.24

	Rollout of Training to Other PHU Staff	1	Training	55	Other PHU Staff	5,500,000.00	5,500,000.00	5,500,000.00	5,500,000.00	1,078.43
	Develop training programmes and training materials	2	materials	100	set	200,000.00	6,000,000.00	72,000,000.00	78,200,000.00	15,333.33
						SLL 63,700,000.00	**SLL 69,500,000.00**	**SLL 135,500,000.00**	**SLL 141,700,000.00**	**$ 27,784.31**

1. POPULATION AWARENESS

The Health Education Unit of the MoHS will lead the activities intended to increase the awareness of the general public about the risks associated with ESMF. At local level, District Management Teams will do the supervision of such activities.

These activities like social mobilization

will be done during a specific time frame of the program, through district animations, radio and television messages, posters, etc., and will further be done as follows:

- The Health Education Unit of the MoHS will elaborate, with the help of the EHSD, the content of these messages;
- The televised messages will be disseminated by the National Station;

- The radio messages will be disseminated by the local radio stations, in English and local languages, under the supervision of district management teams. Private companies (printing enterprises) will make posters to be used in the health facilities;

3.9 Review of integrated National Waste Management Strategy and the integrated National Waste Management Policy framework in Sierra Leone to fit international best practices

Activities:

- Enforcement of existing laws relative to General waste, Toxic Medical and Ebola waste should be Strengthen
- Identification and management of General, Toxic, Medical and Ebola Waste-contaminated sites should be created and managed
- Develop guidelines and standards for the treatment systems and disposal of Ebola and Medical waste
- Finalize and print Ebola and Medical waste technology options guidelines
- Improvement in landfill waste management handling
- Train Health workers and service providers on the use of guidelines and technology options
- Develop Ebola waste management system in Sierra Leone
- Training of trainers workshop for NGO partners, other partners and district staff on Ebola and Waste management
- Support and monitor implementation in Ebola and medical waste management
- Monitoring and surveillance of health status relevant to potential impacts of Medical and Ebola waste
- Final disposal: Environmental and public health issues will be given due consideration while choosing the final disposal of HCW.
- Finance: Adopt duty-of-care as well as polluter-pay-principle for the whole life cycle of the Healthcare Waste.

3.10Institutional Responsibilities

Ministry of Health and Sanitation is responsible for ensuring that Environmental Health Directorate acts as the leading body to over-see the waste management activities and be responsible for developing waste management and sanitation strategies.

The MoHS works with the Ministries of Internal Affairs, Local Government and Rural Development which are responsible for leading the implementation of the sanitation and hygiene strategies, together with the Ministry responsible for water (Policy and planning section) to ensure that integrated water, sanitation and hygiene education/promotion programmes are implemented by Local Councils and urban and rural communities, in accordance with the Policy objectives.

In addition, the Ministry of Health's responsibilities with respect to sanitation are:

a) Overall coordination of waste management and sanitation activities at national level. The Ministry of Health, through its Department of Environmental Health, shall take the lead in the promotion of waste management, sanitation and hygiene programmes, in close cooperation with the Ministries responsible for Water, Local Governments, Education, and other key stakeholders, including donor organisations, Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSO).

b) Provision of technical advisory services on setting minimum standards and levels of service related to waste management and sanitation.

c) Solicitation of funds for waste management and sanitation projects.

d) Development of criteria for allocation of national funds that will ensure optimal utilisation of funds obtained in the form of grants or loans for waste management and sanitation improvement programmes.

e) Preparation of waste management and sanitation guidelines.

f) Promoting of and advocating for waste management and sanitation improvement programmes at national level.

g) Monitoring and evaluation of waste management sanitation activities nationwide.

The key intervention areas under the appropriate leadership and management of the MoHS will provide the operational dimensions of the policy objectives. This integrated approach aims at bringing all waste management programs including Infectious and Health care Waste Management Plan and partners together, so as to enhance synergy and complementarities, thus improving efficiency and effectiveness of waste management services delivery. The strategic plan provides a comprehensive list of services to be offered, namely: the community level, the municipal level, district levels and in the health facilities.

The institutional framework for the provision of Environmental Health and Sanitation and hygiene services in Sierra Leone involves a number of government ministries, departments and agencies (MDAs). The overall responsibility for the protection of public health through the provision and promotion of adequate sanitation and hygiene falls under the Ministry of Health and Sanitation (MoHS).

However, other key players in the sector include; Local Council, Ministry of Education and Ministry of Local Government and Rural development. There are also other non-governmental actors which are, as well involved in the provision of sanitation and hygiene services. These include – UN organizations like; UNICEF, development partners such as the international NGOs like; Plan International, World Vision, Oxfam, Concern Worldwide, GOAL, DFID and a wide range of national NGOs and FBOs.

This multiple involvement by ministries and departments at times create role conflicts due to overlap of activities. However the Ministry of Health and Sanitation has the overall mandate to coordinate sanitation activities and is in the process of reviewing the Environmental Health and Sanitation Policy so as to define the roles and responsibilities of the Ministries, Departments and Agencies (MDAs).

Implementation of waste management activities has been devolved to the Local Councils with most of the activities being implemented by various stakeholders at operational level. The Ministry of Health and Sanitation has the responsibility of capacity building, developing policies, guidelines and standards, monitoring and evaluation. MoHS has an essential role in ensuring supervision of waste management facilitators and private sector suppliers of sanitation products and services.

The assistance to strengthen Environmental Health and Sanitation operations will be channelled directly to MoHS in view of the fact that Environmental Health and Sanitation Division under MoHS will be responsible for direct implementation.

CHAPTER FOUR: Health Care Waste Management during Health Emergencies (Ebola Virus Disease – EVD)

4.1 Introduction

One of the major tasks faced by the Ministry of Health Incident Management System during the Ebola Virus Disease (EVD) emergency is minimizing contamination/infection rates among healthcare workers particularly during handling waste generated from the treatment activities of patients with suspected, probable and confirmed Ebola as well as personnel handling human remains of victims of the EVD.

Special attention is placed on waste generated from Ebola Treatment facilities including Ebola Treatment Units and Community Care Centers (CCCs) as well as in households of EVD victims who are undergoing home-based treatment. These wastes should be separated into the following categories:

1. Waste Stream II:
2. Waste Stream III

The box below provides additional guidance on handling waste during health emergency

Guidance

The approach to solid waste management is to reduce the risks and costs associated with handling and transportation by on-site disposal and burning. The area designated for solid waste management should have controlled access to prevent entry by animals, untrained personnel or children.

All solid waste produced from the Ebola Treatment Units is potentially contaminated and must be securely collected, transported and disposed using different methods. No material or waste should leave patients room or isolation/Care Centres and Units without spraying with or submersing in 0.5% chlorine solution. All Ebola treatment Units should have a separate waste management and disposal facility for both suspected cases and non-suspected cases.

Biological waste material such as placenta and biopsy samples are to be contained in sealed, leak-proof cadaver bags (or double bags to ensure that there is no leakage as per WHO recommendation) and either buried or burned. If burned, complete burning must be assured.

PERSONAL PROTECTIVE EQUIPMENT

Proper use of PPE (personal protective equipment) is extremely important when dealing with an Ebola outbreak. PPE includes:

- Correctly sized gloves (non-sterile examination gloves) when entering the patient care area.[1]Consider changing gloves if heavily soiled with blood or any body fluids while providing care to the same patient (perform careful hand hygiene immediately after removal). Always change gloves and perform hand hygiene immediately after removal, when moving from one patient to another while caring for patients in the same room. Consider double gloving when the quality of gloves appears to be poor (e.g., if holes and tears form rapidly during use).
- A disposable, impermeable gown to cover clothing and exposed skin.

[1]WHO (World Health Organization). 2009. Hand Hygiene Posters. Geneva, available from: http://www.who.int/gpsc/5may/tools/workplace_reminders/en/

- A medical mask and eye protection (eye visor, goggles or face shield) to prevent splashes to the nose, mouth and eyes.
- Closed, puncture and fluid resistant shoes (e.g. rubber boots) to avoid contamination with blood or other body fluids or accidents with misplaced, contaminated sharp objects. If boots are not available, overshoes should be used but these must be removed while still wearing gloves and with caution to avoid hand contamination.[2]

Some important guidelines to consider when using PPE are the following:

- When undertaking any strenuous activity (e.g. carrying a patient) or tasks in which contact with blood and body fluids is anticipated (e.g., the patient has symptoms like diarrhoea, bleeding or vomiting and/or the environment could be contaminated with blood or body fluids), in addition to the above-mentioned PPE also use double gloving, and wear a waterproof apron over the gown if for any reasons your gown is non-impermeable, and disposable overshoes and leg coverings, if boots are not available.
- Avoid aerosol-generating procedures if possible. Wear a respirator (FFP2 or EN certified equivalent or US NIOSH-certified N95), if any procedures that stimulate coughing or promote the generation of aerosols (e.g., aerosolized or nebulized medication administration, diagnostic sputum induction, bronchoscopy, airway suctioning, endotracheal intubation, positive pressure ventilation via face mask) are planned to be performed.[3]
- Before exiting the isolation room/area, carefully remove and dispose of PPE (including boots) into waste containers and perform hand hygiene.
- When removing PPE, be careful to avoid any contact between the soiled items (e.g. gloves, gowns) and any area of the face (i.e. eyes, nose or mouth) or non-intact skin.
- Do not recycle any single-use disposable PPE. However, if the decontamination of goggles and visors is necessary, it is essential that these items should be cleaned with water (± detergent) to remove any organic matter and then immersed fully in a 0.5% chlorine solution or a solution containing 5000 ppm (parts per million) available free chlorine for a minimum of 30 minutes (preferably overnight) for decontamination. After decontamination, they should be thoroughly rinsed with water (to remove irritating hypochlorite residues and salt deposits) before re-use. The wipes used for the initial cleaning should be treated as infectious waste; the disinfectant can be safely poured down a sink or drain.[4]

GENERAL ENVIRONMENTAL CLEANING AND MANAGEMENT OF LINEN

Personal Protective Equipment Required

- Wear heavy duty/rubber gloves, impermeable gown and closed shoes (e.g. boots) when cleaning the environment and handling infectious waste.
- In addition, wear facial protection (mask and goggle or face shield) and overshoes if boots are unavailable, When undertaking cleaning activities with increased risk of splashes or in which contact with blood and body fluids is anticipated (e.g., cleaning surfaces heavily soiled with vomit or blood or cleaning areas closer than 1 meter/3 feet from a patient with symptoms like diarrhoea, bleeding or vomiting, etc.).

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[2]WHO (World Health Organization). September 2014. Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings, with Ebola Focus. Available at http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1.

[3]CDC (Centers for Disease Control and Prevention) Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals. Atlanta, GA;

Available from: http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-controlrecommendations.Html.

[4]Hoffman PN, Bradley C, Ayliffe GAJ, Health Protection Agency (Great Britain). Disinfection in Healthcare. 3rd ed. Malden, Mass: Blackwell Pub.; 2004.

Cleaning Process

- Environmental surfaces or objects contaminated with blood, other body fluids, secretions or excretions should be cleaned and disinfected as soon as possible using standard hospital detergents/disinfectants (e.g. a 0.5% chlorine solution or a solution containing 5 000 ppm available free chlorine).[5] Application of disinfectants should be preceded by cleaning to prevent inactivation of disinfectants by organic matter.
- If locally prepared, prepare cleaning and disinfectant solutions every day. Change cleaning solutions and refresh equipment frequently while being used during the day, as they will quickly become contaminated (follow your hospital protocols if available).
- Clean floors and horizontal work surfaces at least once a day with clean water and detergent. Cleaning with a moistened cloth helps to avoid contaminating the air and other surfaces with air-borne particles. Allow surfaces to dry naturally before using them again.
- Dry sweeping with a broom should never be done. Rags holding dust should not be shaken out and surfaces should not be cleaned with dry rags.
- Cleaning should always be carried out from "clean" areas to "dirty" areas, in order to avoid contaminant transfer.
- Do not spray (i.e. fog) occupied or unoccupied clinical areas with disinfectant. This is a potentially dangerous practice that has no proven disease control benefit.[6]

Management of Linen

- Linen that has been used on patients can be heavily contaminated with body fluids (e.g. blood, vomit) and splashes may result during handling. When handling soiled linen from patients, use gloves, impermeable gown, closed shoes (e.g., boots) and facial protection (mask and goggle or face shield).
- Soiled linen should be placed in clearly-labelled, leak-proof bags or buckets at the site of use and the container surfaces should be disinfected (using an effective disinfectant) before removal from the isolation room/area. If there is any solid excrement such as faeces or vomit, scrape off carefully using a flat firm object and flush it down the toilet or in the sluice before linen is placed in its container. If the linen is transported out of the patient room/area for this procedure it should be put in a separate container – it should never be carried against the body.
- Linen should be then transported directly to the laundry area in its container and laundered promptly with water and detergent.
- For low-temperature laundering, wash linen with detergent and water, rinse and then soak in 0.05% chlorine solution (a solution containing 500 ppm available free chlorine) for approximately 30 minutes. Linen should then be dried according to routine standards and procedures.
- Washing contaminated linen by hand should be discouraged. However, if washing machines are not available or power is not ensured, take the soiled linen out of the container and empty it into a large drum container of hot water and soap. Soak the linen in this drum and make sure it is totally covered with water. Use a stick to stir; then throw out the water and refill the drum with clean water and add chlorine 0.1% (a solution containing 1 000 ppm available free chlorine) and allow to soak for 10–15 minutes. Remove the linen and then rinse in clean water. Remove excess water and spread out to dry. Avoid as much splashing as possible.
- If safe cleaning and disinfection of heavily soiled linen is not possible or reliable, it may be prudent to burn the linen to avoid any unnecessary risks to individuals handling these items.[7]

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[5]WHO best practices for injections and related procedures toolkit. World Health Organization, Geneva,
2010; Available from: http://www.who.int/injection_safety/toolbox/9789241599252/en/

[6]WHO (World Health Organization). September 2014. Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings, with Ebola Focus. Available at
http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1.

[7]Ibid.

INJECTION SAFETY AND MANAGEMENT OF SHARPS

- Each patient should have exclusively dedicated injection and parenteral medication equipment which should be disposed of at the point of care. Syringes, needles or similar equipment should never be reused.
- Limit the use of needles and other sharp objects as much as possible.
- Limit the use of phlebotomy and laboratory testing to the minimum necessary for essential diagnostic evaluation and patient care.[8]
- If the use of sharp objects cannot be avoided, ensure the following precautions are observed[9]:
  - Never replace the cap on a used needle.
  - Never direct the point of a used needle towards any part of the body.
  - Do not remove used needles from disposable syringes by hand, and do not bend, break or otherwise manipulate used needles by hand.
  - Dispose of all sharps (including syringes, needles, scalpel blades, cannulas and other sharp objects) in appropriate, puncture-resistant/leak-proof sealed disposable containers designed for sharp medical waste collection before incineration.
- Ensure that puncture-resistant containers for sharps objects are placed as close as possible to the immediate area where the objects are being used ('point of use') to limit the distance between use and disposal, and ensure the containers remain upright at all times. If the sharps container is far, never carry sharps in your hand but place them all in a kidney dish or similar to carry to the sharps container.
- Ensure that the puncture-resistant containers are securely sealed with a lid and replaced when 3/4 full.
- Ensure the containers are placed in an area that is not easily accessible by visitors, particularly children (e.g. containers should not be placed on floors, or on the lower shelves of trolleys in areas where children might gain access).

It is essential to ensure that total incineration has taken place. Caution is also required when handling flammable material and when wearing gloves due to the risk of burn injuries if gloves are ignited. Sharps not fully burnt should be buried in designated waste pits and covered with a layer of soil 10 – 15 cm deep.

All used disposable Personal Protective Equipment (PPE), non-sharps and other infectious medical waste need to be collected in leak-proof hazard waste bags and placed in covered waste bins. Bins should never be carried against the body (e.g. on the shoulder). Pouring 0.5% chlorine solution on top of the waste bags prior to being securely sealed as pre-treatment disinfection is recommended. The procedure can create back-splash, so care should be taken to protect the eyes. Pre-treated contaminated medical waste can be transported for incineration.

Although incineration may be used during outbreaks of infections such as Ebola, pits may also be used for final disposal.

- Waste should be placed in a designated pit of appropriate depth (e.g. 2 meters or about 7 feet) and filled to a depth of 1–1.5 m (or about 3–5 feet). After each waste load, the waste should be covered with a layer of soil 10 –15 cm deep.
- An incinerator may be used for short periods during an outbreak to destroy solid waste. However, it is essential to ensure that total incineration has taken place. Caution is also required when handling flammable material and when wearing gloves due to the risk of burn injuries if gloves are ignited.
- Placenta and anatomical samples should be buried in a separate pit.
- The area designated for the final treatment and disposal of waste should have controlled

[8]Hoffman PN, Bradley C, Ayliffe GAJ, Health Protection Agency (Great Britain). Disinfection in Healthcare. 3rd ed. Malden, Mass: Blackwell Pub.; 2004.

[9]WHO (World Health Organization) How to safely collect blood samples from persons suspected to be infected with highly infectious blood-borne pathogens (e.g. Ebola).

access to prevent entry by animals, untrained personnel or children.
- Waste, such as faeces, urine and vomit, and liquid waste from washing, can be disposed of in the sanitarysewer or pit latrine.[10]

All other waste generated in the Centres (i.e. gloves, masks, surgical gowns) should be collected and contained in waste bags and cover bins.
When designing solid waste management pits for an Ebola Treatment Unit, it is important to consider the type of waste generated, wind direction, distance to Centre/Unit, type of geology and topography, distance to water source, availability and suitability of site and number of patient, staff and waste management technicians required.

4.2 Incineration and liquid waste areas

Direct, unprotected contact during disposal of infectious waste can result in accidental transmission of EVD. For this reason, all contaminated waste produced in the care of the EVD patient must be disposed of safely. All non-reusable items should be destroyed so they cannot be used again. The place for sitting incinerators should be well demarcated (50-70 m^2 estimates). Incinerators should have capacity to burn waste 1000kg in one time. All waste from an isolation room should be treated with caution and the appropriate Personal Protective Equipment (PPE) must be worn during handling and disposal. All waste generated during the cleaning and decontamination of reusable equipment that comes into contact with an Ebola infected patient should be treated as infectious waste.

Liquid waste, including patient excreta and from washing, can be disposed of in an isolated latrine or toilet set aside for EVD cases. No further treatment is necessary.

An incinerator may be used for short periods during an outbreak to destroy solid waste. However, it is essential to ensure that total incineration has taken place. As previously stated above, caution is also required when handling flammable material and when wearing gloves due to the risk of burn injuries if gloves are ignited.[11]A safe and inexpensive disposal system can be made by using an incinerator or a pit for burning.

- Select Staff to supervise waste disposal and burning
- Training and Supervise Staff to Carry out Waste Disposal
- Select Site for Burning EVD Contaminated Waste
- Use Incinerator to burn EVD Contaminated Waste
- Take Steps to ensure Security of Burning Site

[10]WHO (World Health Organization). September 2014. Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings, with Ebola Focus. Available at http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1.

[11] Ibid.

4.3 Non-Patient Care Activities (For Suspected or Confirmed Patients with Hemorrhagic Fever)

4.3.1 Diagnostic Laboratory Activities

- For procedures to safely collect blood or other samples from persons suspected or confirmed to be infected, follow the instructions provided by WHO.[12]
- All laboratory sample processing must take place under a safety cabinet or at least a fume cabinet with exhaust ventilation. Do not carry out any procedure on the open bench.
- Activities such as micro-pipetting and centrifugation can mechanically generate fine aerosols that might pose a risk of transmission of infection through inhalation as well as the risk of direct exposure.
- Laboratory personnel handling potential hemorrhagic fever (HF) clinical specimens should wear closed shoes with overshoes or boots, gloves, a disposable, impermeable gown, eye protection or face shields, and particulate respirators (e.g., FFP2, or EN certified equivalent, or US NIOSH-certified N95), or powered air purifying respirators (PAPR), performing centrifugation or undertaking any other procedure that may generate aerosols.
- When removing PPE, avoid any contact between the soiled items (e.g. gloves, gowns) and any area of the face (i.e. eyes, nose or mouth).
- Do not hang up the apron or gown for reuse. Discard immediately.
- Perform hand hygiene immediately after the removal of PPE used during specimen handling and after any contact with potentially contaminated surfaces even when PPE is worn.
- Place specimens in clearly-labeled, non-glass, leak-proof containers and deliver directly to designated specimen handling areas.
- Disinfect all external surfaces of specimen containers thoroughly (using an effective disinfectant) prior to transport.

4.4 Ebola Virus Disease (EVD) Body Management Consideration

Improperly handling Ebola Virus Disease (EVD) victims corpses at any point of the process can lead to more human or long term environmental hazards. The activity of disposing of human remains resulting from the Ebola Virus Disease (EVD) Epidemic is crucial and consists of two major procedures:

- How the bodies (EVD victims remains) are handled from the point of death/pick up
- How the corpse/body are disposed of at the point of burial

4.5 Handling of EVD corpses:

The handling of EVD corpses shall follow strict protocols developed by the Incident Management System (IMS) within the Ministry of Health and Social Welfare. Personnel involved with burial activities will have to undergo thorough training in line with existing protocols. The use of Personal protective equipment (PPE) must be strictly adhered to by such personnel. Table 1, shows minimum PPE requirements for burial teams.

[12]Hoffman PN, Bradley C, Ayliffe GAJ, Health Protection Agency (Great Britain). Disinfection in Healthcare. 3rd ed. Malden, Mass: Blackwell Pub.; 2004.

4.6 Post-Mortem Examinations

- The coordinator and/or the infection prevention and control staff should be consulted for any decision making on post-mortem examinations.
- Post-mortem examination of HF patient remains should be limited to essential evaluations only and should be performed by trained personnel.
- Personnel examining remains should wear eye protection, mask, double gloves, disposable, impermeable gowns, and closed shoes or boots.
- In addition, personnel performing autopsies of known or suspected HF patients should wear a particulate respirator (e.g., FFP2, or EN certified equivalent, or US NIOSH-certified N95) or a PAPR.
- When removing PPE, avoid any contact between soiled gloves or equipment and the face (i.e. eyes, nose or mouth).
- Hand hygiene should be performed immediately following the removal of PPE.
- Place specimens in clearly-labelled, non-glass, leak-proof containers and deliver directly to designated specimen handling areas.
- All external surfaces of specimen containers should be thoroughly disinfected (using an effective disinfectant) prior to transport.
- Tissue or body fluids for disposal should be carefully placed in clearly marked, sealed containers for incineration.[13]

4.7 Site Selection for Burial of EVD Victims

The following procedures should be followed in selecting sites for EVD victims. Where suitable, such sites should undergo environmental and social impact assessment. However, due to the emergency, the following should be considered when selecting site for burial of EVD victims:

- Ideally an area of at least 1500m^3per ten thousand population
- Burial site should be determined through consultation with the affected community and local authorities and relevant stakeholders
- Soil conditions, water level and available space must be considered in the selection of burial sites
- Burial sites must be located in dry highland terrains
- Plot of land should be no less than fifty (50) meters from the surface water bodies
- Land identification should be two hundred fifty (250) meters to any type of wetland
- Water table at burial sites should be at least four (4) meters below the surface
- Depth of the grave should be at least two (2) meters below the surface
- The burial site should be located not less than five hundred (500) meters from the habitable areas.
- The use of the cemetery should be carefully managed. Where there are different religious groups within the affected population it may be necessary to provide separate burial areas.
- Community should be involved in identifying suitable sites taking into consideration water sources, cultural and traditional shrines.

4.8 Transportation of EVD Corpse

- Prepare bodies of EVD patients by packaging in requisite body bags in line with existing protocol

[13]WHO (World Health Organization). September 2014. Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings, with Ebola Focus. Available at http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1.

- Transport body safely to burial site using protocol below
- Disinfect the vehicle after transporting bodies
- PPE is not required for individuals driving or riding a vehicle to collect human remains, provided that drivers or riders will not be handling a dead body of a suspected or confirmed case of HF

4.9 Burial of Human Remains

- The coordinator and/or the infection prevention and control staff should be consulted for any decision making on movement and burial of human remains.
- For this topic, see also the WHO "Interim manual - Ebola and Marburg virus disease epidemics: preparedness, alert, control, and evaluation".[14] And the Ministry of Health Standard Operating Procedure on Safe Burials for Ebola Victims.
- The handling of human remains should be kept to a minimum. The following recommendations should be adhered to in principle, but may need some adaptation to take account of cultural and religious concerns:

  - Wear PPE (impermeable gown, mask, eye protection and double gloves) and rubber boots or closed puncture or fluid resistant shoes and overshoes to handle the dead body of a suspected or confirmed case of HF. Plug the natural orifices. Place the body in a double bag, wipe over the surface of each body bag with a suitable disinfectant (e.g., 0.5% chlorine solution) and seal and label with the indication of highly infectious material. Immediately move the body to the mortuary.

  - PPE should be put on at the site of collection of human remains, worn during the process of collection and placement in body bags, and should be removed immediately after. Hand hygiene should be performed immediately following the removal of PPE.

  - Remains should not be sprayed, washed or embalmed. Any practice of washing the remains in preparation for "clean burials" should be discouraged.

  - Only trained personnel should handle remains during the outbreak.

  - After wrapping in sealed, leak-proof material, human remains should be placed inside a coffin if possible, and buried promptly.[15]

[14]WHO (World Health Organization).2014. Interim manual - Ebola and Marburg virus disease epidemics: preparedness, alert, control, and evaluation, Geneva, Available from: http://www.who.int/csr/disease/ebola/manual_EVD/en/

[15]WHO (World Health Organization). September 2014. Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings, with Ebola Focus. Available at http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1.

Table 1: Materials for safe disposal of EVD bodies

Item Category	Product Description	Unit
WATSAN	Body Bags (L)	piece
WATSAN	Body Bags (S)	piece
WATSAN	Chlorine Powder	Kg
WATSAN	Plastic Bucket w/ faucet	piece
Disposable PPE	PPE Suit - Hooded Coverall	piece
Disposable PPE	PPE Suit - Coverall (no hood)	piece

Table 2: Summary table for implementation of IPC best practices during direct patient care and related activities

What?	***How?***	***Who is responsible***
Create isolation rooms or arears	• Identify single rooms and prioritise these for patients with known or suspected Ebola Virus.	• Coordinator or infection prevention and control (IPC) staff to identify arears/rooms for patient placement.
Restrict all non-essential staff from HF patients care rooms/arears	• Ensure that clinical and nonclinical personnel are assigned exclusively to patients care areas and that members of staff do not freely between these arears during the outbreak. • Cohort staff between areas with suspected and those with confirm heamorrhagic fever (HF) patients. • Use signage to alert restrictions of staff • Maintain a log of people entering the room	• Coordinator and or IPC staff
Limit the number of patients allowed access to the patient.	• Use signage and other communications to alert restrictions of visitors. Make simple messages understandable for the public but also be careful to avoid stigmatization.	• Coordinator and/or IPC staff • Involve patient of community representatives, if available • Health workers to adhere to recommendations and report to the coordinator when they are not followed.

Ensure that all staff and visitors correctly use and remove recommended personal protective equipment (PPE).	• Ensure the equipment is always available and promptly at the isolation rooms/areas entry. • Provide staff and visitors with instructions on the use and correct removal of PPE through training and reminder posters.	• Coordinator and/or IPC staff • Involve patients or community representatives if available. • Health workers to adhere to recommendations and report to the coordinator when they are followed. • Another staff member should be assigned to supervise the sequence of putting on and removing PPE by his/her colleague.
Ensure that all staff and visitors perform hand hygiene according to the above recommendations. These hand hygiene actions should be performed when recommended even if PPE is worn	• Provide staff and visitors with instructions on the importance of hand hygiene best practices through training and reminder posters. • Ensure continuous availability of alcohol-based hand-rub and soap. Water and single-use towels at the isolation room/areas entry and at the point of care.	• Coordinator and/or IPC staff. • Involve patient or community representation, if available. • Health workers to adhere to recommendations and report to the coordinator when they are not followed.
Limit the use of needles and other sharp objects as much as possible. If this cannot be avoided see instructions in the text.	• Provide staff and carers with instructions on the essential use of needles and sharps through training and reminder posters. • Ensure the equipment is available to do this.	• Health workers to adhere to recommendations.
Dispose of needles and other sharp objects safely.	• Provide staff and carers with instructions on the safe disposal of sharps through training and reminder posters. • Ensure the equipment is available to do this.	• Health workers to adhere to recommendations and report to the coordinator when they are not followed.
Create system of safe management of waste and linen.	• Provide staff and visitors/carers with instructions on the safe management and disposal of waste and linen through training and reminder posters. • Ensure the equipment is available to do this.	• Health workers to adhere to recommendations and report to coordinator when they are not followed.
Limit the use of phlebotomy and laboratory testing to minimum necessary for essential diagnostic evaluation and patient	• Provide staff with training and visual instructions on the need for essential phlebotomy and laboratory testing.	• Health workers to adhere to recommendations.

care.		
Only take a patient out of their room/care area if they are free of virus, or for essential life saving tests.	• Provide staff with training and visual instructions on the appropriate times to take the patient from their care area and on precautions to take.	• Health workers to adhere to recommendations and report to the coordinator when they are not followed.
Undertake cleaning of the environment and patient care equipment safety following recommendations in the text.	• Provide staff and visitors/carers with instructions on cleaning through training and reminder posters. • Ensure the equipment is available to undertake recommended cleaning.	• Health workers to adhere to recommendations and report to the coordinator when they are not followed.

Source: Adopted from WHO Interim Infection Prevention and control Guidance for Care of Patients with suspected or confirmed Filavirus Haemorrhagic Fever in Health Care Settings with focus on Ebola

CHAPTER FIVE: MWMP –Monitoring and Evaluation

5.1 MWMP-Monitoring and Evaluation

Monitoring and evaluation activities within the prescribed HCWM system is important, as it allows the collection of necessary information on the progress and extent of implementation of the suggested management system in the Healthcare institution both in the public and in the private sector.

The PIU will be responsible for monitoring and evaluation. The team will select a sub-group from among themselves and committed stakeholders. The team may:

1. Draft the duties, responsibilities and competencies required of the monitoring and evaluation (M&E) team.

2. Identify potential members of the team, taking into consideration the structures and systems for M&E that are mandated or are currently in place.

3. Orient the team for M&E work.

The M&E team will prepare evaluation plans using the following guidelines:

1. Design and adopt an M&E tool: drafting, validating and adopting.

2. Conduct quarterly assessments of project implementation and results.

3. Conduct annual assessments of overall plan implementation and achievements of the plan objectives.

4. Preparation of reports: quarterly, annual, reports for council, staff and public.

Action	**Who** • **Does it.** • **Oversees it.**	**Approves it**	**When**
Monitoring and Evaluation: • Identifying the monitoring team. • Prepare an evaluation plan. • Implementation of the evaluation plan.	• Directorate of Environmental Health (PIU) • Planning team or monitoring team appointed by the PIU	Ministry of Health and sanitation (Minister and CMO)	
National Supervision on the Construction of triage, hand pump and Rehabilitation of Hospital and CHC	PIU/other partners	CMO	

National Supervision for the construction of incinerators	PIU/other partners	CMO	
Supervise and review environmental and social safeguard documents	PIU/EPA	CMO	
Evaluate the implementation and outcome of safeguard measures	PIU/World bank/external audit	CMO/worldbank	

At the local level, it is recommended that the district management teams ensure regular programme oversight and provide monthly monitoring reports, while the six-monthly follow up will be realized by EHSD.

5.2 Monitoring program and Indicators

It is important to include means to monitor the implementation of the Strategy and to monitor the actual implementation and effectiveness of the strategy in terms of achieving the desired results.

Firstly, a number of milestones and indicators have to be established so that there is a common agreement on how improvements should be determined. Milestones can be the various activities within the Action Plans, and a success criteria can be the timely and successfully implementation of an activity. Indicators can be physical as well as non-physical parameters that can be measured.

Before implementation of actual HCWM systems as part of this program, information on the present practices of HCWM in each HCF will be collected and recorded. A specific format shall be developed to capture all information pertaining to HCWM and shall be circulated along with the HCWM guidelines to all HCF's. The HCFs will be required to fill in the form and send the same back to the MoHS who will evaluate it and present it to the Healthcare Waste Management Committee (HCWMC).This would provide a clear picture of the quantity of HCW generated in each HCF as well as about the way the HCW is managed.

HCF's will be required to report on HCWM on an annual basis. Such information will be compared with the previously reported data to assess the improvement.

5.3 Waste Management Indicators

The development of the health care waste management can among others be determined through measuring the following indicators:

1. Equipment installation and use (incinerators /autoclaves /shredders...)
2. Implementation of Healthcare Waste Management Plans
3. Information on amounts of infectious HCW generated and treated
4. Quantities of waste, divided in various fractions (general waste and hazardous waste)

5. Infectious materials
6. Consumption of equipment and materials (e.g. waste collection bags)
7. Compliance with legislation
8. Training
9. Documentation and Reporting

The quantity of waste is an important parameter in healthcare waste management. However, it is important that the weight of the various fractions–hazardous waste and non-risk waste–are measured and compared. An improved waste segregation should result in a lower ratio of risk waste in relation to non-risk waste.

However, it is very important to combine this with visual investigation of the non- risk waste to ensure that staff is not so eager to reduce the quantities of risk waste that they drop e.g. infectious materials in the non-risk fraction. Another factor to determine the state of the healthcare waste management system is to measure the number of waste collection equipment distributed at the Healthcare facility and e.g. the number waste collection bags used. However, it is a sensible indicator because a high use of waste collection bags does not necessarily lead to a more efficient waste collection; it may just as well indicate “wasteful” use of waste collection bags. However, in the beginning where the use of waste bags in many HCF’s are absent the total use of waste bags may indicate a more efficient, safer and cleaner collection of the waste.

5.4 Occupational Health and Safety Indicators

The following two indicators could be used to determine the impact on the state of the occupational health and safety:

1. Number of needle stick injuries
2. Number of staff trained in proper accident response

The number of needle stick injuries indicated how well informed and thorough the staff is handling used needles. It also indicated how well the health care facility is supplied with appropriately designed equipment to handle the sharps, e.g. sharps containers. A success criterion is to reduce the needle stick injuries to null.

Another indicator is the number of staff trained in proper accident response, which is an essential step in the whole handling of the waste. However, this is an indirect indicator as the training need not necessarily lead to reduced accidents rates. It might even result in higher rates of reported accidents as staff follow correct proceedings.

5.5 Environmental Indicators

One of the overall goals of improved HCWM is to reduce the impact on the environment and at least meet the standards. This can among others be done through measuring the following indicators regularly:

1. Temperature and Emission parameters from incinerators (particulate matter/dust,HCl,SO2,NOx,Pb,Cd and Hg)
2. Parameters for quality of the incineration process (e.g. the organic matter in ashes)
3. Selected parameters in the wastewater (BOD, COD etc.).

5.6 Monitoring and Evaluation Procedure

One element of a monitoring program can be regular audits where independent parties investigate which milestones have been reached and measure the various indicators. Indicators are described in the following section. For each audit the present state - determined by the indicators – is compared with previous states. If that is not the case, measures must be taken to strengthen the activities.

Monitoring and evaluation will be focused on routine tracking of program implementation parameters. Monitoring of these activities can take two forms:

1. Monitoring of “Internal” activities

a. By the Healthcare institution and

B. By environmental health inspectors for the parameters relating to procedures inside of the Healthcare institution.

2. Monitoring of “External” activities

a. By inspectors for environmental protection, for the parameters relating to procedures outside of the Healthcare institution.

Internal monitoring and control of activities within the healthcare institution itself is the responsibility of the person in charge of HCWM. It should be stressed, however, that all healthcare workers and paramedical staff take part in operational activities, on a daily basis, as part of the regular duties.

In addition to the person in charge, internal monitoring of activities relating to HCWM is within the scope of the responsibility of the nosocomial infection prevention and control committee, as well as the healthcare Waste committee (if one of these has already been formed).

Lasting improvement and sustainable healthcare waste management systems will require a change of behavior and a higher public awareness on the risks by healthcare waste. This will not be reached overnight but will need comprehensive planning and a longer time period for implementation.

A. Behavior change communications and training focused on improving waste segregation practices at the point of waste generation among key health workers--nurses, certified midwives, physician assistants, environmental health officers, vaccinators, laboratory technicians, morgue attendants, doctors, students in clinical training and traditional trained midwives and patients and their families. Prevention and management of needle stick injury will also be included;

B. Behavior change communication and training focused on improving waste collection, storage, transportation, treatment and disposal practices among those whose jobs require them to oversee or handle medical waste (including hospital and clinic cleaning and grounds-keeping staff, public sanitation workers and incinerator operators). Prevention and management of needle stick injury will also be included;

C. Advocacy and training approaches focused on improving the policy environment for Healthcare waste

management and strengthening support for HCWM planning, supervision of HCWM practices and adequate procurement of HCWM equipment and supplies among health facility directors/managers/supervisor, student nurse supervisors, Officers in Charge.

Public awareness, training and advocacy activities will not be successful if they are not accompanied by the basic equipment to allow proper Healthcare waste management to occur. At every level, there is an inadequate supply of waste bins, personal protective equipment, sharps boxes, waste transportation and waste disposal equipment. With only a few exceptions, there is currently no capacity to effectively dispose of infectious waste. Public awareness activities will not be effective unless the equipment and commodities needed to support simple, yet effective, Healthcare waste management practices are in place. Therefore it is recommended to include a public awareness program not in the short-term planning but in the mid-term planning.

5.7 External Audit

An independent audit will be undertaken by year 3 to determine quality of implementation of the HCWM plan. This will include procurement of consumables, training and IEC and general occupational safety and waste management practices. The Terms of reference for hiring an external firm will be developed in consultation with the World Bank.

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Objectives	Strategies	Unit	Quantity	Unit cost (USD)	Total (USD)
Improve the institutional and legal framework for HCWM	Set up a structure for co - ordination and follow up of the HCWM plan; develop regulations and guidelines for HCWM	Man/day	60	200	12,000
	Printing costs for documents	#	2000	4	8,000
	Subtotal				**20,000**
Improve HCWM in health facilities	Supply the health facilities with materials and equipment for HCWM	Various			
	Boxes for syringes	#	1000	15	15,000
	Containers in healthcare rooms	#	1000	15	15,000
	Boots for waste handlers/cleaners	#	2,000	20	40,000
	Masks for waste handlers	#	10,000	2	20,000
	Heavy duty gloves for waste handlers	#	2,000	10	20,000
	incinerators operating cost	#	32	50,000	600,000
	Bags and bins	#	1000	15	15,000
	Treatment and disposal	#	60	1500	90,000
	Sub total				**1,085,000**
	Grand total				**1,105,000**

Timetable for IHCWM Implementation

	2015				2016				2017				2018				2019			
Objectives	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Designate focal point for responsibility of implementation of HCWM plan																				
Development of training plan																				
Undertake Needs assessment to determine procurement requirements																				
Develop Capacity building and IEC plan																				
Determine policy updating requirement and plan for how to do this																				
Develop monitoring tools																				
Establish a coordination mechanism with other agencies and stakeholders (Environment etc)																				

Develop procurement plan																				
Hire consultants to Implement training																				
Roll out of training program																				
Monitoring and reporting																				
External independent audit																				