



REPUBLIC OF SIERRA LEONE

**ENVIRONMENT AND SOCIAL MANAGEMENT
FRAMEWORK AND HEALTHCARE WASTE
MANAGEMENT PLAN**

HEALTH SECTOR DEVELOPMENT SYSTEM STRENGTHEN PROJECT

January 2016

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ACRONYMS

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

MSWM 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

1. Introduction

1.1. Project background

Prior to the Ebola epidemic, the health sector already faced many critical foundational challenges. These included: (i) chronic imbalances between the high level of health expenditures and the country's poor health outcomes; (ii) insufficient access to health services resulting from poorly equipped health facilities and uneven distribution of inadequate numbers of health personnel; (iii) weak capacity for effective implementation, coordination, monitoring and evaluation of policies and projects; and (iv) an inadequate surveillance and emergency preparedness capacity.

Despite Sierra Leone's significant health expenditures, health outcomes are worse than in countries with comparable socio-economic characteristics. From 2004 through 2012, total health expenditure as a percent of GDP ranged between 14 percent and 16 percent; and per capita spending on health increased from US\$69 (2010) to US\$82 (2011) to US\$96 (2012). Overall, however, Government expenditures represent only 6.8 percent of total health expenditures (THE), while donor financing accounts for 24.4 percent and Non-Governmental Organization (NGO) funding for 7.2 percent. The bulk of health spending, despite the introduction of the Free Health Care Initiative (FHCI) in 2010, is out-of-pocket (OOP) and accounts for 61.6 percent of financing. In addition to the inadequate amounts of public funding, the timeliness of its release is problematic.

Sierra Leone's maternal and child health outcomes remain among the world's worst: (i) maternal mortality is estimated at 1,165 per 100,000 live births; (ii) infant mortality is estimated at 92 per 1,000 live births; and (iii) under-five mortality is estimated at 156 per 1,000 live births. These results are far from the Millennium Development Goals (MDG) of 450 per 100,000 live births, 50 per 1,000 live births, and 95 per 1,000 live births, respectively expected by the end of 2015.

The maternal mortality ratio (MMR) steadily declined through 2008 but has remained stable since. The most recent Demographic Health Surveys (DHS) show MMR at 857 per 100,000 live births (2008) and 1,165 per 100,000 live births (2013), but the increase is not statistically significant. Other reproductive health indicators have improved over the 2008-2013 period: (i) the proportion of pregnant women seeking antenatal care reached 97 percent in 2013; (ii) institutional delivery and delivery by trained health workers increased from 42.4 percent to 59.7 percent; and (iii) fertility rates among adolescents (15 to 19 years old), while high, have declined slightly from 149 per 1,000 women to 125 per 1,000 women. Contraceptive prevalence remains very low at 16 percent.

Among children aged 6 to 59 months, malaria is the most common cause of illness and death, with a prevalence of 43 percent (48 percent in rural areas and 28 percent in urban areas). Chronic

malnutrition (stunting) is widespread, varying between 35 to 45 percent of children under five and showing no signs of improvement between 2000 and 2010; over the same period, acute malnutrition has declined very slowly from 11.5 percent to 9 percent of children under five. Other main causes of illness and death in children are acute respiratory infections and diarrhea. In 2013, 68 percent of children aged 12-23 months have received all of the recommended vaccinations and only 4 percent of the children did not receive any type of vaccination.

Access to drinking water is a serious concern, especially in rural areas (where less than half of all households have access to improved source of drinking water) and during the dry season. The country has failed to implement a functioning waste management system, and only 10 percent of households use an individual improved toilet facility.

Physical and financial access to primary health care is limited, despite the Government's Free Health Care Initiative. The DHS 2013 found that 38 percent of women interviewed (over 50 percent in rural areas) had issues with distance and transportation, and 67 percent stated that cost was a serious problem. Service readiness is generally low, as most facilities lack the trained staff and equipment required to provide those services they are supposed to deliver. End-users also complained of the quality of services (staff absenteeism and attitudes, drug stock-outs, illegal fees, etc.). However, Sierra Leone lacks effective structures allowing patients to channel their complaints and grievances about the health care system.

Health human resources are particularly limited. The overall ratio of skilled workers to population is 2/10,000 compared to the WHO minimum of 23/10,000, and these ratios are even lower for certain essential cadres: Medical Doctors 0.2/10,000, Nurses 1.8/10,000 and midwives 0.2/10,000. This scarcity of service providers has been further exacerbated by the exodus of health workers abroad and (more recently) the loss of staff to Ebola, with infections among health care workers resulting in 221 deaths, including 11 specialized physicians. Health human resource planning and management is challenging: (i) workforce requirements and recruitment involve not only MoHS, but the Ministry of Finance and the Civil Service Commission; (ii) training requires collaboration between MoHS and the Ministry of Education (which manages the institutions (along with the private sector); and (iii) staff deployment remains centralized, despite the orientations of the Decentralization Act.

According to the current legislation, responsibilities for delivering public health services are shared. At central level, the Ministry of Health and Sanitation (MoHS) is responsible for overall strategic direction, resource mobilization, and monitoring and evaluation of health services. At District level, the District Health Management Team (DHMT) represents MoHS and, with Local Council oversight, is responsible for planning, managing, monitoring and supervising all health programs in the district. At the community level, Local Councils are responsible for primary health service delivery. In practice,

however, the decentralization process has only been partial, and Local Councils have little capacity to fulfill their functions, which are being carried out by MoHS. As devolution of sectorial staff was never implemented (e.g., health personnel are still recruited and managed by MoHS), Local Councils have no direct control over the staff responsible for health service delivery and the DHMT, which tends to report directly to its parent ministry.

At the conclusion of the Ebola epidemic, Sierra Leone's already weak health system is confronting four important problems. First, though 96 percent of primary health units remained open during the epidemic, community confidence in the health sector declined, negatively affecting utilization, with drops of 23 percent in institutional deliveries, 21 percent in children receiving basic immunization (penta3), and 39 percent in children treated for malaria. Second, increased expenditures for the Ebola response have reduced the resources available for the health sector to deal with other normally treatable conditions leading to increases in malaria, measles and other vaccine preventable diseases. Third, as reported recently in a Bank Working Paper, the loss of health care workers is expected to have a significant impact on future non-Ebola mortality: after Ebola is eliminated, the Bank review estimates that maternal mortality could increase by 74 percent in Sierra Leone unless key doctors, nurses, and midwives are immediately hired.

Fourth, because Ebola is thought to be present in animal reservoirs in West Africa, the epidemic's conclusion does not mean that Sierra Leone will see no more cases. Consequently, various sources emphasize the need now to address potential public health emergencies to ensure that systems and resources are in place to respond effectively to future outbreaks, including Ebola, and to help Sierra Leone to become compliant with the IHR.

1.2. Project description

To date, the Bank-financed EERP has provided support to Sierra Leone's Post Ebola Recovery; project restructuring is currently underway to: (i) modify the PDO from response and mitigation to support the countries' urgent post-Ebola health recovery efforts; and (ii) extend the project closing date to September 30, 2017. The restructuring of EERP coincides with the preparation of HSDSSP, which is designed to contribute to the flagship programs proposed by the Health Sector Recovery Plan; the PDO responds specifically to the second Presidential priority for the health sector, the need to improve maternal and child health outcomes.

As conceived, EERP and HSDSSP will: (i) share a common programmatic framework; (ii) provide complementary financial inputs; and (iii) use the same fiduciary arrangements. Other implementation synergies with different development partners, and particularly with the proposed Regional Disease Surveillance Project (REDISSE), may also be possible.

Component 1: Health Service Delivery

Component 1 will contribute to improving service delivery and restoring the confidence of the project beneficiaries in the provision of public sector health care services. Two sub-components are planned: (i) to strengthen community-level service delivery; and (ii) to enhance facility-level services and ensure emergency transport, especially for pregnant women, from communities and PHUs to the District Hospitals.

Sub-Component 1: Community-level service delivery. Drawing on the contributions of Community Health Workers (CHWs) to the national response to the Ebola outbreak, MoHS has recognized their importance as key players for: (i) improving community access to basic health care and information for mothers and children; and (ii) acting as change agents for increased community engagement and ownership of health service delivery. Community-level initiatives will be carried out under the project including: (i) the CHW Program; and (ii) the Environmental Health and Expanded Sanitary Inspection Compliance, Monitoring and Enforcement (ESICOME) Program.

Sub-Component 2: Facility-level service strengthening. Based on the need to establish high quality health services at the PHU and District Hospital (DH) levels and to ensure emergency transport from the PHU to the DH when necessary, the project will finance measures to strengthen PHUs and DHs' ability to deliver quality high impact services (especially for maternal and child health conditions) and to organize emergency transport through the establishment of a national ambulance service.

Component 2: Health System Support

Component 2 will contribute to the development of longer-term efforts to address the issues of health human resources and sector management and coordination. Three sub-components are planned to: (i) initiate the development of critical cadres of health human resources to strengthen service delivery at the PHU and district hospital level; (ii) improve the oversight and management performance of MoHS at central and district levels; and (iii) ensure effective project management and M&E.

Sub-Component 1: Health human resource development. Development of two complementary cadres of staff for deployment to PHUs and DHs is planned: (i) specialists in the areas of obstetrics/gynecology, pediatrics, surgery, and family and internal medicine; and (ii) physicians assistants and other cadres including (nurses, midwives, etc.) with skills to enhance service delivery by: (i) improving quality at primary, secondary, and tertiary levels; and (ii) increasing efficiency (particularly at hospital level) by enabling task shifting to occur within the PHU and DH teams.

Sub-Component 2: Sector coordination and management. Project interventions will support the central and district level activities.

- (i) Support to MoHS Directorates. In conjunction with EERP, HSDSSP will provide complementary financing to support the offices of: (i) the Chief Medical Officer

- (CMO) through support for the Health Systems Strengthening (HSS) Hub initially and other technical assistance consultancies subsequently; and (ii) the Planning and Information Directorate.
- (ii) Support to the DHMT. As the district level structure of the MOHS, District Health Management Teams (DHMTs) are the primary implementers of the Basic Package of Essential Health Services and the National Health Sector Strategic Plan. The DHMT strengthening initiative will include regular monitoring of the district's health situation (including the non-profit/faith based and private facilities) and weekly district meetings to review key health outputs, assess indicators of service utilization and quality, and inform decision-making on solutions to enhance health facility performance.
 - (iii) Service Level Agreement (SLA). SLAs are intended to improve coordination and accountability of donor supported efforts at the district level. EERP would provide program and salary support for the first two years of the project; HSDSSP will thereafter finance: (i) routine supervision costs; (ii) semi-annual consultations with IPs and development partners; and (iii) publication of quarterly updates.

Sub-Component 3: Project management and Monitoring and Evaluation. To enhance the organization and management of MoHS, the Bank (through RCHP 2 and EERP) and other development partners (Global Fund and GAVI) have supported the establishment of the Integrated Health Project Administration Unit (IHPAU), which is intended to provide oversight of all externally financed projects with a view to improving their planning, implementation and monitoring. From 2016, financing of the IHPAU will be shared across key donors, including GFATM and GAVI. EERP will finance the bulk of the sub-component activities during the two years, and HSDSSP will finance them thereafter, along with any specialized surveys or data collection and analysis needed to track implementation progress and achievement of the PDO.

Component 3: Contingent Emergency Response

The objective of this component is to improve the Government's response capacity in the event of an emergency, following the procedures governed by OP/BP 8.00 (Rapid Response to Crisis and Emergencies). Sierra Leone has just been declared Ebola free and for the past eighteen months has been responding to the EVD epidemic which devastated the country in terms of its impact on human, social and economic development. The country is in a phase of enhanced surveillance to quickly detect any resurgent cases and prevent further spread. There is a moderate to high probability that during the life of this project, another outbreak of EVD or other major epidemic may occur which could have adverse social and economic impact. This would result in a request from the country to the Bank to support mitigation, response, and recovery in the district(s) affected by such an epidemic. In anticipation of this, an emergency component is proposed.

1.3. Project goals and objectives

The Project Development Objective (PDO) of the Health Service Delivery and System Support Project is to increase the utilization and improve the quality of essential maternal and child health services in selected districts.

The PDO will be achieved by: (i) developing initiatives to strengthen the organization and delivery of health services at the district and community levels; (ii) increasing the numbers and improving the quality of essential health cadres; and (iii) enhancing the Ministry's capacity to plan, coordinate, and monitor interventions in the health sector. Combined with a restructured EERP, HSDSSP comprises both an evolving response to the past effects of the epidemic and complementary investments in the future development of Sierra Leone's health sector.

Project Beneficiaries

At the community and district levels, the principal beneficiaries will be pregnant women and children less than twelve months of age. Pregnant women, in particular, will benefit from the combined interventions of: (i) antenatal care and detection (at community and PHU levels); (ii) assisted delivery and postnatal care at PHU and District Hospital levels; and (iii) if necessary, emergency transport from communities/PHUs to District or Regional Hospitals.

Project support will be national in scope, except for the Community Health Worker (CHW) program, which will be limited to four districts (three initially financed through EERP and a fourth financed by HSDSSP in year two).

Cumulatively, approximately one million women and 800 thousand children will have access to improved health services, of which 30 percent in the project's selected districts will benefit from the full range (from community to regional hospital) of services.

Among essential health personnel, cadres at all levels will benefit from project support. The Ministry's capacity to plan, coordinate, and monitor interventions in the health sector will be enhanced. Support will be provided to seven central-level directorates and all fourteen DHMTs. The seven directorates are as follows: Primary Health Care; Reproductive and Child Health; Training; Hospital and Laboratory Services; Health Systems, Policy Planning and Information; Environmental Health and Sanitation; and Financial Resources.

1.4. Objectives of the ESMF

The objective of this Environmental and Social Management Framework (ESMF) is to ensure that adverse environmental and social impacts are avoided or appropriately mitigated and compensated

for. The ESMF is based on the World Bank's environmental and social safeguard policies as well as EPA and MOHS policies. A key principle is to prevent and mitigate any harm to the environment and to people by incorporating environmental and social concerns as an intrinsic part of project cycle management. Environmental and social issues will be tracked during all stages of the sub-project cycle to ensure that supported activities comply with the policies and guidelines laid out in the ESMF.

The projects components are to be designed and implemented by integrating the national policies, guidelines, codes of practice and procedures proposed in this ESMF. The objectives are to ensure that the activities undertaken in the project:

- (i) Enhance positive environmental outcomes;
- (ii) Prevent negative environmental impacts;
- (iii) Identify and mitigate with appropriate measures, the adverse impacts that might arise;
- (iv) Obtain EIA licenses from EPA SL; and
- (v) Ensure compliance with the World Bank's environmental safeguards policies.

The ESMF also provides an overview of relevant World Bank and MOHS policies and describes the planning process concerning environmental and social issues, including for screening, preparation, implementation, and monitoring of sub-projects.

1.5. Justification for the ESMF

Since the exact locations and types of civil works is not known, the project has developed an Environment and Social Management Framework which provides overall guidance on environmental screening and management for various sub-projects. The ESMF contains useful information on the procedures for environmental and social screening for sub-projects, potential environmental and social impacts; measures for addressing the negative impacts, recommended environmental and social rules for contractors.

1.6. Approach and methodology for the ESMF preparation

The aim of the ESMF is to establish procedures for initial screening of the negative impacts which would require attention, prior to site-specific project implementation. Key specific objectives for the assessment are:

- (i) To assess the main potential environmental and social impacts of the planned and future project activities.
- (ii) To recommend environmental and social screening process for project sites and sub-project activities.
- (iii) To review environmental policies of Government for project implementation and relevant World Bank Operational Policies to be triggered by the project.
- (iv) To develop an environmental management plan for addressing negative impacts during sub-project implementation.
- (v) To recommend appropriate further environmental work, including preparation of the site-specific ESIAs/ESMPs for sub-projects.

- (vi) To recommend appropriate capacity building for environmental planning and monitoring in the project activities.

The ESMF outlines an environmental and social screening process, focusing on the following steps:

- (i) completion of the Environmental and Social Screening Form (ESSF);
- (ii) carrying out the appropriate level of environmental work;
- (iii) review and clearance of the screening results;
- (iv) preparation of EIA reports, where this may be necessary and;
- (v) Preparation of Environmental Management Plan

Environmental and Social Screening should be undertaken for each of the proposed sub-project in order to ascertain specific environmental and social impacts. Environmental and social management plans will be prepared to identify, assess and mitigate, as appropriate, all potential negative impacts.

This ESMF also includes a Environmental and Medical Waste Management Plan (EMWMP). The intent of an EMWMP is to recommend feasible and cost-effective measures to prevent or reduce significant adverse impacts to acceptable levels.

2. Legal, regulation and administrative framework

2.1. Sectoral policies and strategies

The project will support the completion of the Environmental Health Policy and Strategy. Other policies and strategic framework include:

Integrated National Waste Management Policy and Integrated National Waste Management Strategic Plan

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.

2.2. Legal framework

The Environmental Protection Agency Act, 2008

The Act was signed as a legal document in September 2008 and amended in July 2010. Following the enactment of this Act, a National Environment Protection Board was established within the Environment protection Agency. The Board facilitates coordination, cooperation and collaboration among

Government Ministries, local authorities and other governmental agencies, in all areas relating to environmental protection. The Agency, subject to the Act, also coordinates environmentally related activities and acts as the focal point of national and international environmental matters, relating to Sierra Leone.

The act Empowers a separate environmental protection Agency with the overall mandate of setting and monitoring environmental standards.

In compliance with the third schedule of the EPA Act, 2008 and EIA is required to contain a true statement and description of the following:

- (i) Location of the project and its surroundings;□
- (ii) Principle, concept, and purpose of the project;
- (i) Description of the possible impacts on the ecosystem and its locality;
- (ii) Direct or indirect effects the project is likely to have on the environment;
- (iii) Social, economic, and cultural effects that the project is likely to have on people and society
- (iv) Consultation with the communities, interested parties, and Government Ministries
- (i) Actions or measures taken to avoid , prevent, change, mitigate, or remedy the likely effect on people and society;
- (ii) Any alternatives to the project;
- (iii) Natural resources and the localities to be used in the project;
- (iv) Plans for decommissioning the project; and
- (v) Other information for proper review of the potential environmental impact of the project.

The second schedule of this Act, gives several factors for determining whether a potential project requires the preparation of an EIA. These factors are given below as stated in the schedule.

- (i) The impact on the community
- (ii) The location of the project
- (iii) Whether the project transforms the locality
- (iv) Whether the project has, or is likely to have, a substantial impact on the ecosystem.
- (v) Whether the project results in the diminution of the aesthetic, recreational, scientific, historical, cultural or other environmental quality of the locality.
- (vi) Whether the project endangers any species of flora or fauna or the habitat of the flora and fauna of the locality.
- (vii) The scale of the project.
- (viii) The extent of degradation of the environment.
- (ix) Whether the project will result in an increased demand for natural resources in the locality.
- (x) The cumulative impact of the project together with other activities or projects on the environment.
- (xi) The contents of the EIA.

Local Government and Administration

The enactment of the Local Government Act in 2004, paved the way for the establishment of local government councils that replaced the appointed local councils or management committees, which are accountable and answerable to the local communities.

The Local District and or Town Council is the highest political authority in the locality, with legislative and executive powers, and responsible for promoting the development of the locality and the welfare of the people in the locality with the resources at its disposal (The Local Government Act 2004). The local council is responsible among other things, for the mobilization of human and material resources necessary for overall development and welfare of the people of the locality; promoting and supporting productive activity and social development; initiating and maintaining programmes for the development of basic infrastructure and provide works and services; initiate, draw up and execute development plans for the locality; oversee Chiefdom Councils in the performance of functions delegated to them by the local councils; determine the rates of local taxes and approved the annual budgets of Chiefdom Councils and oversees the implementation of such budgets. The local council is also responsible for the formation of committees.

Public Health Act, 1960

The Public Health Act (1960) Consistent with the current legislation, Local Councils (and other local level structures) section 121 gives a clear mandate for implementation of premises inspection, and provide strategic direction and back up support to enable council to perform their roles effectively. With the adoption of the Expanded Sanitary Inspection Compliance, Monitoring and Enforcement (ESICOME), MoHS seeks to: (i) target the owners and occupants of domiciles and commercial premises; and (ii) ensure that they develop and maintain good sanitation on their properties and environs. The project will support the reviewing Public Health Ordinance (1960).

The Persons with Disability Act, 2011

Establish 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.

The Right to Access Information Act, 2013

The Act provided for the disclosure of information held by public authorities or by persons providing services for them and to provide for other related matters.

2.3. The World Bank safeguard policies

2.3.1. *Environmental assessment*

The World Bank has keen interest in protection of the environment, for investment projects they support, in line with its ten environmental safeguards policies. These policies provide guidelines, aimed at preventing and mitigating undue harm to people and the environment, when implementing development projects. The environmental safeguard policies, which provide a platform for the participation of stakeholders in project design and implementation, are:

- (i) Environmental Assessment (OP/BP 4.01) (TRIGGERED)
- (ii) Forests (OP/BP 4.36)
- (iii) Involuntary Resettlement (OP/BP 4.12)
- (iv) Indigenous Peoples (OP/BP 4.10)
- (v) Safety of Dams (OP/BP 4.37)
- (vi) Pest Management (OP 4.09)
- (vii) Physical Cultural Resources (OP/BP 4.11)
- (viii) Natural Habitats (OP/BP 4.04)
- (ix) Projects in Disputed Areas (OP/BP 7.60)
- (x) Projects on International Waterways (OP 7.50)

Interventions with any of the attributes listed below will be ineligible for support under the proposed emergency support:

Sub-projects concerning significant conversion or degradation of critical natural habitats, including, but not limited to, any activity within:

- (i) Wildlife reserves
- (ii) Ecologically-sensitive marine and terrestrial ecosystems
- (iii) Parks or sanctuaries
- (iv) Protected areas, natural habitat areas
- (v) Forests and forest reserves
- (vi) Wetlands
- (vii) National parks or game reserves
- (viii) Any other environmentally sensitive areas
- (ix) Any areas near disposal sites or requiring significant expansion into an existing disposal site.
- (x) Use of pesticides that fall in WHO classes IA, IB, or II.

Sub-projects requiring land acquisition or resulting in involuntary resettlement and/or permanent or temporary loss of access to assets or loss of assets for the project affected populations.

The project triggers operational policy OP 4.01 on Environmental Assessment, as construction of new facilities and rehabilitation of facilities have potential of some negative impacts, which requires that appropriate mitigation measures are put in place. The Policies on Natural Habitats (OP 4.04) Pest Management (OP4.09) and Forests (OP4.36) are not triggered as the Project activities will not involve conversion or degradation of critical or sensitive natural habitats and forests and also is not expected to

involve the use of pesticides. The Policies on Indigenous Peoples (OP 4.10) and Involuntary Resettlement (OP4.12) are also not triggered as the project does not involve any involuntary land acquisition.

2.3.2. World Bank's categorization of projects

Environmental consequences should be recognized early in the project cycle; and taken into account in project selection, siting, planning and design. In so doing, adverse environmental and social impacts may be prevented, minimized, mitigated and/or compensated for; and positive impacts may be enhanced. The World Bank's Environmental Assessment includes the process for mitigating and managing environmental and social impacts throughout project implementation and the Environmental Assessment Sourcebook (1993) and its updates (1996, 1997) provide technical guidance. The World Bank's categorization of projects, with respect to significance of environmental impacts is as follows:

- (i) Category "A": A proposed project is classified as Category "A" if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subjected to the physical works. Environmental Assessment for a Category "A" project examines the project's potential negative and positive environmental and social impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate or compensate for adverse impacts and improve environmental performance. For a Category "A" project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive or sectoral EIA) that includes as necessary, elements such as environmental audits or hazard or risk assessments.
- (ii) Category "B": A proposed project is classified as Category "B" if its potential adverse environmental and social impacts (on human populations or environmentally important areas including wetlands, forests, grasslands, and other natural habitats) are less adverse than those of Category "A" projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category "A" projects. The scope of EIA for a Category "B" project may vary from project to project, but it is narrower than that of Category "A" EIA. Like Category "A" EIA, it examines the project's potential negative and positive environmental and social impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.
- (iii) Category "C": A proposed project is classified as Category "C" if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category "C" project.
- (iv) Category "FI": A proposed project is classified as Category "FI" if it involves investment of Bank funds through a financial intermediary, in subprojects that might result in adverse environmental impacts.

Most of the sub-project being financed under the project fall under B: because the environmental impacts are easily identified and can be mitigated. All of the identified negative impacts can be reduced or in some cases avoided, with timely implementation of the mitigation measures through the following system:

- (i) Environmental and social screening of sub-projects using a screening form attached as annex 3. The screening process will be done to appraise environmental and social risks and identify potential mitigation measures in advance.
- (ii) Preparation of Environmental and Social Management Plan (ESMP) for individual sub-projects to guide the implementation of mitigation measures.
- (iii) Implementation of Environmental and Medical Waste Management Plan (EMWMP) in each facility

3. Environment and social impact process

3.1. Impact identification methodology

The Health Service Delivery and System Support Project falls under the World Bank Category B; therefore requiring an Environmental and Social Assessment. This ESMF has identified and assessed generic potential environmental and social impacts and outlined measures for addressing the negative impacts as follows.

The project implementers is required to include in the sub-project Letter of Interest a brief description of any activities that may involve environmental impacts, any known environmental sensitivities, and any sites with known or potential archeological, paleontological, historical, religious or unique natural values. In the event of sub-projects with potential minor and manageable environmental impacts, an environmental review should be undertaken (for more guidance; contact Environmental Protection Agency).

The review examines the sub-project's potential negative and positive environmental impacts and defines any measures needed to prevent, minimize or mitigate adverse impacts and improve environmental performance. This would in most cases be a simple review through reference to existing reports and studies (if available), and through discussions with local communities and other stakeholders, if needed. In some cases a more detailed review may be needed.

The findings and results of environmental review are described in the sub-project full proposal. Applications that do not provide adequate environmental data, should not be considered for financing until they meet the requirements. Sub-project proposals with minor and manageable environmental impacts should include the following basic elements in the application:

- (i) A description of the possible adverse effects that specific sub-project activities may occur (for some basic guidance on potential environmental impacts contact EPA);
- (ii) A description of any planned measures to avoid or mitigate adverse impacts, and how and when they will be implemented;
- (iii) A system for monitoring the environmental effects of the project;
- (iv) A description of who will be responsible for implementing and monitoring the mitigation measures; and
- (v) A cost estimate of the mitigation measures (the costs for environmental management will be included in the of sub-project).

The scope of any environmental review and mitigation measures will be determined by the Directorate of Environmental Health and Sanitation (DEHS) in consultation with the project implementer through the sub-project screening and approval process. If needed, the DEHS may request further information or a more detailed environmental review prior to approving a project. Guidance may be sought from the World Bank, if needed.

3.2. Summary of significant generic impacts and mitigation measures

3.2.1. *Potential environmental and social impacts*

The activities being financed on the ground are not expected to involve large scale construction, land acquisition or involuntary displacement of people. However, there are environment and social impacts resulting from infection control interventions and use and disposal of chemicals and management of healthcare waste within and from healthcare facilities.

The small-scale construction of infrastructure may have minor, short-term direct impacts on vegetation and local species-mainly due to soil excavation, dust, and noise. Issues related to labour and worker safety and safety and access of patients will also need to be managed.

The social impacts of the HSDSSP are expected to be positive, and the likelihood of negative social impact is nil. Positive impacts can be expected from the increased awareness of a healthy lifestyle and the risk factors for chronic disease. This would not lead to the isolating stigma that sometimes results from greater awareness about communicable diseases; rather, it could increase social encounters, especially for the elderly, women and children. Moreover, addressing substance use and abuse by bringing it out of the shadows and providing counselling services could contribute to de-stigmatization. Indirect social benefits are expected from the effort to make the health system more efficient and to increase the capacity of health workers to provide better quality services in a friendlier work environment. Health workers themselves are expected to benefit from the attention to the workload, which could increase as a result of the additional requirements involved in providing preventive and other screening services at the primary level. This would be analyzed, and provisions have already been made for additional workers at the primary care level under the ongoing MoHS reforms. There could be negative impacts associated with poor management of healthcare waste and also disruption of healthcare services during construction activities; disruption of access to patients and communities etc. These negative impacts are to be mitigated through implementation of the measures detailed in this document.

Table 1: Potential environmental and social impacts

ENVIRONMENTAL IMPACTS	
Planning Phase	
Physical Restrictions on building space.	The size of the health care facilities premises are either too small, with little room to expand outwards or on steep slopes with high erosion potentials. All construction is expected to be within the existing premises and therefore there is no requirement for land acquisition.
Construction Phase	
Flora and Fauna	The rehabilitation, refurbishment and upgrading of existing healthcare facilities could result in some clearing and depletion of vegetation that could result in loss of tree/plant cover within the existing premises

Soil and Land Pollution	Earth-moving equipment such as excavators will be used in excavation work. This could potentially/temporarily decrease the drainage of the area resulting in water logging.
	The risk of accidental discharge of hazardous products, leakage of hydrocarbons, oils or grease from construction machinery also constitute potential sources of soils and water pollution.
Vehicular Traffic	Construction works will result in a higher volume of traffic around the healthcare facilities and within the neighborhood. This could result in obstruction of normal traffic, disruption of access of the community and road safety around the construction site. The noise and movement could also affect normal hospital operations while impacting patient well-being through noise and dust.
Waste Management	Activities at construction sites will produce construction wastes such as excavated soils and cement bags, paint drums, brick and concrete rubble, metal, broken glass, timber waste and debris. Excavated wastes could obstruct the general public, the movement of the workers and vehicles as well as affect the aesthetics of the environment.
	Old buildings have asbestos and PCBs, which if dismantled or disposed haphazardly, can result in serious pollution and health impacts
Ambient air quality	Air Quality will be impacted by emissions from vehicles, earthmoving equipment and released particulate matters. Demolition to modify the built environment will lead to considerable levels of cement dust which can affect workers and patients. Deteriorated indoor air quality will be of critical effect to especially asthmatic construction workers, patients and health workers, with either minor or severe health impact depending on level and duration of exposure.
Water pollution	Wastewater discharges from construction activities or onsite sewage system and rainwater run-off can run into surface waters will impact water quality by causing changes to its physical, chemical and biological properties.
SOCIAL AND HEALTH IMPACTS	
Planning Phase	
Disruption of Services	Healthcare services can get disrupted, and there is need for clear agreement on when and how the promised extension and refurbishments will be undertaken.
Construction Phase	
Disruption of Utilities Service	The excavation and civil works may cause temporary disruptions of utility services such as electricity communication and water. This could impact the provision of services and also the neighborhood communities
Temporary disruption of healthcare services	Since facilities under renovation will not be closed, they will experience shortages of working space. Thus modifications of buildings in which medical services are provided may entail moving patients or equipment from one area or room to another. This may cause temporary disruption in delivery of health services to patients
Occupational Safety and Health	The safety of the local population may be at risk during construction activities. The movement of trucks to and from the site, the operation of various equipment and machinery and the actual construction activities will expose the workers to work-related accidents and injuries. Pollutants such as dust and noise could also have negative implications for the health of workers and near-by communities.
Impacts of construction activities on patients, healthcare staff and other stakeholders.	Refurbishment work undertaken in the same buildings having patients has potential to cause injuries to patients or health workers. At all sites, renovation works will have the following potential hazards to staff and patients:
	Exposure to asbestos containing materials. (Old Buildings with asbestos roofs).
	Falling from tripping on building materials.
	Noise and vibrations during demolition
	Injury from falling or flying debris when demolishing walls
	Cracking of existing structures from vibrations
	Spillages and dust during transportation of materials
Noise	Noise and vibration caused by machines, site vehicles, pneumatic drills etc during construction activities can be a nuisance to patients and the community.
Traffic	Communities around the rehabilitation sites will experience heavier human and vehicular traffic. Construction related activities will be a nuisance to road users e.g.

	storage of construction stones by the roadside.
Inflow of construction workers	While most workers may originate from the local community where they have families, there might be others from distant places and working away from their families. Management of security, water and sanitation and waste will be the responsibility of the contractor
Poor Stakeholder Participation	Despite various efforts (e.g. newspaper notices, bulletins at the potential sites, announcement at various local meetings) to reach out to people affected by the project, there has been relatively low participation of communities, staff members and other stakeholders during project planning and designing. Note that stakeholder participation will take place both centrally and at the district level.
Operation Phase	
Improved medical services at healthcare facilities	The project will have positive impact on the health of the people through easing access to quality medical care currently nonexistent at these facilities. Renovation of facilities and installation of medical equipment will enable currently ineffective healthcare facilities to provide new or improved services to patients such as maternity.
Employment opportunities	Equipping healthcare facilities with modern equipment, enabling provision of new healthcare services and resultant increase in visiting patients may create additional long-term technical and non-technical job opportunities for medical professionals, janitors, security guards, etc.
Air pollution from onsite incinerators	Incineration of unsegregated health care waste can result in localized pollution of air with pollutants such as respirable ash, furans and dioxins. Dioxins are known to promote cancers in humans. Downwash of incinerator emissions has potential to degrade indoor air quality of healthcare buildings or those of nearby offsite buildings. The model chosen by UNOPS and UNFPA has been tested for air pollution and residual smoke are considered within an acceptable range (Lab results are available)
Community health risk due to improper waste management	Improper infectious waste disposal can cause public health risks due to environmental pollution: impaired air quality, wastewater/sewage handling, storm water contamination of water courses or when adults and children rummage through raw waste stockpiles.
Occupational health and safety risks	Medical facilities are a potential source of infectious waste in gaseous, liquid or solid forms. These could pose unsafe conditions for healthcare staff. Of particular concern are janitors handling infectious waste (including sharps) without adequate protective gear, storage of sharps in containers that are not puncture-proof and management of radioactive waste at healthcare facilities where x-ray equipment will be installed. While some OHS risks will be borne by new equipment or services introduced after renovation or upgrade of facilities, most other effects are existing (hence cumulative) and would only be exacerbated by increased scale of healthcare services.
Improved aesthetics and life of healthcare facilities	Renovation will allow better healthcare services to be provided to communities

3.2.2. Mitigation measures

Since only sub-projects with minor impacts are eligible, these are easily mitigated through the application of sensible site selection criteria, good construction practices and diligent management practices in the operational phase. This may include proper siting of infrastructure to avoid and minimize impacts, construction contract procedures for dealing with “chance finds,” control of dust generation and prevention, waste management and technology for toilet facilities like leaching fields, organic composting, and septic tanks .

There is a possibility that sub-project activities may result in damage to physical cultural property unless these are identified. Sub-project proposals with activities that may occur in areas with possible physical cultural resources will specify procedures for identifying physical cultural property and for avoiding impacts on these, including:

- (i) Consultations with the appropriate authorities and local inhabitants to identify known or possible sites during sub-project planning;
- (ii) Siting of sub-project activities to avoid identified sites (including identifying such areas in protected and natural resource management planning and zonation);
- (iii) “Chance finds” procedures will include cessation of work until the significance of a “find” has been determined by the appropriate authorities and local inhabitants, and until fitting treatment of the site has been determined and carried out;
- (iv) Construction contract procedures will include the same procedures for dealing with “chance finds;”
- (v) Buffer zones or other management arrangements to avoid damage to cultural resources such as “sacred” forests and graveyards. Local communities to which these areas belong should decide access procedures and should not be excluded from accessing these areas.

The ESMF stresses community participation since local knowledge is important in identifying, designing and planning the implementation of practical mitigation measures. It is especially important where the success depends on community support and action, both in implementing mitigation measures and in monitoring their success.

4. Environmental and social screening

4.1. Application of the screening processes

Environmental and Social Screening will be undertaken for each of the proposed sub-project in order to:

- (i) assess whether sub-projects are likely to have potential negative environmental and social impacts;
- (ii) determine appropriate mitigation measures for activities with significant adverse impacts, for incorporating them into the sub project design;
- (iii) review and approve sub-project proposals; and
- (iv) monitor environmental parameters during project implementation.

The PIU with the assistance of a consultant team (where required), will determine appropriate instruments for mitigating environmental and social safeguards impacts. This will allow the PIU to:

- (i) Determine the level of environmental work required (i.e. whether an ESMP is required; whether the application of simple mitigation measures will suffice; or whether no additional environmental work is required);
- (ii) Determine and incorporate appropriate mitigation measures for addressing adverse impacts

The Consultant with the help of the PIU will prepare a Safeguard Screening Summary which includes:

- (i) a list of micro-projects and sub-projects that are expected to have environmental and social safeguards impacts;
- (ii) the extent of the expected impacts;
- (iii) the instruments used to address the expected impacts; and
- (iv) timeline to prepare the instruments.

The Safeguard Screening Summary, when completed, will provide information on the assignment of the appropriate environmental and social category to a particular activity for construction of new facilities or rehabilitation of existing structures.

The PIU, with the assistance of a consultant team (where required), will determine and prepare appropriate instruments for mitigating environmental and social safeguards impacts identified in the screening process. During the preparation of sub-projects, the PIU will ensure that technical design can avoid or minimize environmental and social impacts, avoiding land acquisition. A Matrix of Mitigation measures for potential environmental impacts is attached as Annex 2.

The Consultant will carry out the initial screening in the field, through the use of the Environmental and Social Screening Form – Part 1 of the Environment Management Plan – Checklist (Annex 3). The PIU/EPA will retain a copy of the Safeguards Screening Summary for possible review by the Implementing Agency and the World Bank. The review, which may be conducted on sample basis, will verify the proper application of the screening process, including the scoping of potential impacts and the choice and application of instruments.

4.2. Preparation of safeguards instruments

The environmental and social impact assessment process will identify and assess the potential environmental and social impacts of the proposed construction activities, evaluate alternatives, as well as design and implement appropriate mitigation, management and monitoring measures. These measures will be captured in the Environmental and social Management Plan (EMP) which will be prepared.

This ESMF includes an EMP-checklist which can be used as the Environmental Management Plan (EMP) for individual sub-activities once identified during the scoping identification phase. (Annexes 3 and 4) For each sub-activity in which the specific buildings/sites for rehabilitation, and/or demolition and complete reconstruction is known, the EMP-checklist is completed. The checklist has three parts:

- (i) Part 1 includes the descriptive part that describes the project specifics in terms of the physical location, institutional arrangements, and applicable legislative aspects, the project description, inclusive of the need for a capacity building program and description of the public consultation process. This section could be up to two pages long. Attachments for additional information can be included. (This is the ESSF, Part 1 as detailed in Annex 3)
- (ii) Part 2 includes the environmental and social screening of potential issues and impacts, in a simple Yes/No format followed by mitigation measures for any given

- activity. Currently, the list provides examples of potential issues and impacts. This list can be expanded to specific site issues and /or impacts; and good practices and mitigation measures. (Annex 4)
- (iii) Part 3 will include the monitoring plan for activities during project construction and implementation. It retains the same format required for current EMPs. It is the intent of this checklist that Part 2 and Part 3 be included as bidding documents for contractors.(Annex 4)

The EMP-checklist which is to be filled out for each sub-project, will be used to determine the type and scope of the environmental and social safeguards impacts. The practical application of the EMP-checklist would include filling in of Part 1 to obtain and document all relevant site characteristics. In Part 2 the type of foreseen works, would be checked, and the completed tabular EMP is additionally attached as integral part to the works contract and, analogous to all technical and commercial terms, that is signed by the contract parties. Part 3 of the EMP-checklist, the monitoring plan, is designated for the Contractor responsibility, to be supervised by the PIU.

The Consultant with the help of the PIU will prepare the EMPs in consultation with affected peoples and with relevant NGOs, as necessary. The EMP will be submitted to the Implementing Agency, for review, and the approved EMPs must be well maintained for subsequent review by the Bank. If there are any sites, which are seen to have potentially larger risks and impacts, or if there are social issues or those sites where land will need to be acquired, the draft EMPs must be sent to the Bank for approval prior to finalization and starts of construction works.

All such site-specific EMPs will be disclosed at the sites (translated in local language) and consulted with neighboring communities, project affected persons and key community representatives before the mitigation actions are finalized and the contractor starts civil works on the ground. The record of such consultations must be documented and maintained by the Implementing Agency.

4.3. Application and review of safeguards instruments

The PIU and other relevant body will supervise and monitor the overall safeguards implementation process and prepare a progress report on the application of safeguards policies during the planning, design, and construction phases of the Project. The Monitoring and evaluating officer will develop the reporting requirements and procedures to ensure compliance of the contractors. Environmental consultants will be hired by the World Bank to support the PIU, in conducting public consultation and public awareness programs; and carry out periodic training for field engineers and contractors as appropriate.

Appropriate mitigation measures will be included in the bidding documents and contract documents to be prepared by the PIU. Compliance by the contractors will be monitored in the field by the project field observers, working under close supervision. The performance of the contractors will

be documented and recorded for possible later review. Sample Environmental Safeguards procedures for inclusion in the technical specifications of construction contracts are provided in Annex 6.

5. Environmental management and monitoring

5.1. Institutional and implementation responsibilities

5.1.1. Project implementation responsibilities

Within the MOHS, the Directorate of Environmental Health and Sanitation is responsible for (i) policy formation, regulation and standards setting (ii) resource mobilisation;(iii) information, education and advocacy; and (iv) monitoring and oversight of the efforts of all health care providers and development partners at all level relating to environmental health and sanitation activities. Responsibilities for water supply and sanitation are defined in: (i) the Public Health Ordinance (1960); (ii) the Local Government Act (2004), which devolves the water supply and sanitation responsibilities to Ministry of Local Government and Rural Development; and the Public Health Act (1996, amended 2004). Consistent with the legislation, Local Councils (and other local level structures) have a clear mandate for the implementation of premises inspection, with MoHS providing strategic direction and back-up support to enable Councils to perform their roles effectively. With the adoption of the expanded Sanitary Inspection Compliance, Monitoring and Enforcement (ESICOME), MOHS seeks to : target the owners and occupants of domiciles and commercial premises and ensure that they develop and maintain good sanitation on their properties and environs.

The Directorate of Primary Health Care is responsible for management of the DHMTs and will oversee the DHMT strengthening subcomponent, with implementation support from DHSPPI. With assistance from the IHPAU, the MoHS will contract services to conduct the DHMT assessment, develop a management training curriculum, and implement the agreed-on capacity building measures. MoHS will also oversee the recruitment of Health Management Officers to be embedded at each of the DHMTs. The Health Management Officers will support the District Medical Officer and the DHMT with day to day operations, focusing especially on strengthening the monitoring and evaluation systems (HMIS, MDSR, SLA, etc.) and the use of information for decision-making (by the DHMT, Local Councils, facilities, etc.).DHMTs will provide inputs to the terms of reference for the recruitment of the Health Management Officers.

As the district level structure of the MOHs, District Health Management Teams (DHMTs) are the primary implementers of the Basic Package of Essential Health Service and the National Health Sector Strategic plan. As such they are responsible for planning, implementing and monitoring health service provision: training personnel; engaging with communities; supply equipment and drugs to health facilities within the district: collecting data from PHUs and reporting it to the national level;

and generally ensuring that quality and equitable health service reach the population within the district. the DHMTs leadership and management roles are essential to health service delivery within the district, and to the recovery of the health system post Ebola

The Directorate of Primary Health Care will be responsible for overseeing the Community Outreach Component of the HSDSSP. This component will strengthen the national CHW program, originally launched in 2012 and currently under revision, by providing financial incentives to community health workers, and by providing more regular and robust supervision from peer supervisors to CHWs. These two areas have been chosen given that lack of supportive supervision and limited incentives have been highlighted as two weaknesses of the current national CHW program

5.1.2. ESMF implementation responsibilities: overview

The Directorate of Environmental Health and Sanitation (DEHS) in Collaboration with Environmental Protection Agency (EPA) has the overall responsibility for ensuring that environmental and social issues are adequately addressed within the sub-project cycle, and also to develop and collate the environmental Safeguard document. The sub-project implementers are responsible for actual preparation and implementation of required safeguard procedures and measures. The World Bank will finance workshops on the safeguard policies for stack holders, staffs, implementers and other MDA's. The World Bank will be responsible for general supervision of implementation.

Ministry of health and sanitation

- (i) Responsible for carrying out EI
- (ii) Consults project-affected groups and local NGOs
- (iii) Provides relevant information in timely manner prior to consultation in a form and
- (iv) language understandable and accessible to groups being consulted

Project implementing unit

- (v) Have key processes in Operational Manual
- (vi) Provide technical support for safeguard screening to implementers
- (vii) Review safeguard documentation
- (viii) Maintain safeguard documents for all subprojects
- (ix) Monitor subproject compliance with mitigation plans

Table 2: Responsibilities for ESMF implementation

Project Phase	MOHS/EPA	Implementers
Screening	<p>Inform and advise applicants and other stakeholders of the ESMF procedures</p> <p>Review Letter of Interest and screen for potential safeguard issues, and advise applicants regarding the nature and content of the safeguard documents and measures to be prepared</p>	<p>Assess any potential safeguard issues early in the preparation process, including screening for the presence of indigenous peoples</p> <p>Describe potential safeguard issues in the Letter of Interest</p>
Preparation	<p>Advise applicants on safeguard issues, as needed</p>	<p>Undertake safeguard required processes, such as consultations with local communities, environmental review, and social assessment</p> <p>If needed, design safeguard measures and prepare safeguard documents, such as an Indigenous Peoples Plan (IPP) and a Process Framework (PF) with the participation of local communities</p> <p>If applicable, disclose draft safeguard documents with the sub-project proposal to affected communities prior to final review of proposal by the project</p>
Review and approval	<p>Review sub-project proposal for safeguard impacts and social risks</p> <p>Assess the adequacy and feasibility of the safeguard assessment and consultation process. If needed, request further steps</p> <p>Assess the adequacy and feasibility of the safeguard measures and documents. If needed, request appropriate changes to these and re-assess prior to final approval</p> <p>If indigenous peoples are affected, ascertain that they have provided their free, prior and informed consent to sub-project activities affecting them. Sub-projects affecting indigenous peoples cannot be approved without such agreement</p> <p>Assess the capacity of the applicant to implement safeguard measures</p> <p>If applicable, publicly disclose safeguard related information on the web after sub-project approval</p>	<p>Submit sub-project proposal with safeguard measures and documents (e.g. social assessment, environmental review, IPP, PF), if required</p> <p>If requested by SOS, take additional steps to meet ESMF and safeguard policy provisions. Re-submit proposal with revised safeguard measures and documents, as needed</p>
Implementation	<p>Supervise and review environmental and social safeguard documents (IPP, PF) and issues during sub-project implementation. If needed, request changes to safeguard measures and/or implementation of these</p> <p>Review and approve Plan of Actions that are required to be prepared during implementation of sub-projects restricting access to natural resources (as will be described in the PF for sub-projects with potential impacts from such restrictions)</p>	<p>Disclose final safeguard documents (e.g. IPP, PF), if any, to affected communities</p> <p>Monitor and document the implementation of safeguard measures. When indigenous peoples are affected, include them in participatory monitoring and evaluation exercises</p> <p>Prepare Plan of Actions for sub-projects restricting access to natural resources (as per the PF prepared). Monitor and document implementation of these plans</p>
Evaluation	<p>Ensure inclusion and review of environmental and social safeguard issues and outcomes in mid-term and final sub-project evaluation and reporting, including concerning any lessons learned</p>	<p>Evaluate the implementation and outcomes of safeguard measures. When indigenous peoples are affected, include them in participatory evaluation exercises</p>

5.1.3. Environmental and social monitoring

Throughout the sub-project review process, the DEHS will maintain contact with the implementers to obtain clarification on information provided and the preparation process in general. It may request additional steps, information and documentation as needed to meet the objectives of the ESMF. There are two key decision points during the sub-project preparation process. A screening of sub-project proposals (Letter of Interest) will identify potential safeguard issues and ascribe preparation procedures to further assess potential impacts and design mitigation measures, as needed. A review of the final sub-project proposal will, besides reviewing the general proposal against the

project objectives and procedures, assess the adequacy of the sub-project's preparation process and implementation measures vis-à-vis the safeguard issues, including:

- (i) Compliance with this ESMF, EPA policies, and resolutions, and World Bank environmental and social safeguard policies
- (ii) Potential for the project to cause adverse environmental impacts
- (iii) Potential for the project to cause adverse social impacts
- (iv) Adequacy and feasibility of the proposed safeguard mitigation measures and monitoring plans, including any Indigenous Peoples Plan or Process Framework for restrictions of access to resources
- (v) Capacity of the applicant to implement any required safeguard-related measures during the preparation and implementation of the project

This review may find the safeguard process and measures satisfactory, or may find the need for further discussion with, and steps by, the applicant to achieve the objectives of this ESMF, including revising safeguard measures and documents as appropriate. If the risks or complexity of particular safeguard issues outweigh the benefits, the sub-project should not be approved as proposed. For sub-projects affecting indigenous peoples their free, prior and informed consent is required .

During sub-project implementation, safeguard issues are tracked along with performance toward sub-project objectives. At each performance reporting stage, DEMS will revisit the safeguard issues to assess their status and address any issues that may arise. In cases where the implementers implementing a safeguard instrument or other mitigation measures, they will report on the progress of such implementation similar to that which they are doing for other project elements. The intent of this process is to ensure that the environmental and social safeguard issues are continually monitored and mitigated throughout project implementation.

The DEHS will monitor the implementation of safeguard issues during sub-project implementation. It will review and approve Plan of Actions that are required to be prepared during implementation of sub-projects restricting access to natural resources . The World Bank will include supervision of safeguard issues in its regular supervision of the project. The key responsibilities of the project implementers and stakeholders are described in further detail.

Implementation and Supervision undertaken by all Directorates implementing the various sub-project includes:

- (i) Preparing contracts with environmental clauses for Directorates and communities executing subprojects
- (ii) Undertake site visits to ensure that environmental criteria and mitigation measure, as required by contracts, have been incorporated into subprojects
- (iii) Require changes to subproject design and/or implementation if unforeseen impacts occur
- (iv) Approval required to issue final payment for subproject implementation

Monitoring of the ESMF by the DEHS in collaboration with EPA:

- (v) Identify potential problems at an early stage of implementation of the project and propose possible solutions.

- (vi) Provide constant feedback on the extent to which the projects are achieving their goals.
- (vii) Evaluate the extent to which the project is able to achieve its general objectives and deadlines.
- (viii) Monitor the efficiency with which the different components of the project are being implemented and suggest improvements.
- (ix) Evaluate the extent to which the project is able to achieve its general objectives and deadlines. Site visits during subproject execution and operation to assess how environmental screening and mitigation measures are succeeding or have succeeded in minimizing impacts
- (x) ESMF and EMWMP monitoring will be done quarterly joint at central level and Annually at central and district level.
- (xi) Visit sites during subproject execution and operation to assess how environmental screening and mitigation measures are succeeding or have succeeded in minimizing impacts

The co-ordination structure should be set up by the project implementing unit The Directorate of Environmental Health and sanitation in collaboration with EPA should take the lead in developing the ESMF regulations and technical guidelines.

5.2. Budget and timeline

5.2.1. Monitoring and evaluation budget

Table 3: Monitoring and evaluation budget

Item	unit	unit type	unit	unit type	unit cost	total cost per month	Total cost per year	Total cost for 3 years	Total cost in dollars
Printing of checklist & supervision tools	3	pages	40	copies	5000	600000	7200000	21600000	4320
Replicating checklist	3	pages	40	copies	5000	600000	7200000	21600000	4320
Printing of ESMF&HCWMP Document	80	pages	80	copies	10000	6400000	84000000	84000000	16800
Staff DSA for supervision of construction and Rehabilitation	3	staff	13	days	350000	13650000	163800000	491400000	98280
Top up cards	1	top up	3	staff	200000	600000	7200000	21600000	4320
Fuel for field visits	3	staff	13	staff	250000	9750000	117000000	351000000	70200
DSA for Drivers	3	Drivers	13	Days	150000	5850000	70200000	210600000	42120
External Auditor	1	person	35	days	1000000	35000000	35000000	105000000	21000
Laptop for data collection/report writing	2	Laptop	2	Laptop	6000000	12000000	12000000	36000000	7200
Internet	1	modem	1	modem	1000000	1000000	1000000	3000000	600
internet running cost	1	modem	1	modem	400000	400000	4800000	14400000	2880
				Total	9370000	143450000	509400000	1528200000	305640

5.2.2. Implementation timeline

Table 4: Project implementation timeline

Objectives	2015				2016				2017				2018				2019			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Support for PHU staff/Training (Supply)																				
Capacity building and skills transfer through in-service training and on the job mentoring																				
completion of the national Environmental Health Policy and																				
Drafting of the revised Public Health Ordinance																				
Training of 400 Public Health Aide																				
Clinical residency training																				
Recruitment and deployment of the health professional																				
Project management monitoring and evaluation																				
Health Care will be responsible for overseeing the Community Outreach Component of the HSDSSP																				
DHMT leadership & management capacity strengthening																				
Health Systems, Policy, Planning & Information																				

5.3. Public consultation and disclosure

Key documents prepared to address safeguard issues need to be publicly disclosed according to the World Bank disclosure policy. Should the project implementers be required to develop a stand-alone environmental review or social assessment, an Indigenous Peoples Plan (IPP), or a Process Framework (PF), these documents will be disclosed to local communities in a form, manner and language appropriate for the local context. Disclosure will occur in two phases:

- (i) Disclosure of assessment documents (e.g. social assessment and environmental review) and draft safeguard documents (e.g. IPP and PF) during project preparation and prior to final review and approval of the sub-project proposal. Disclosure during sub-project preparation aims to seek feedback and input from local communities, and as appropriate other stakeholders, on the sub-project proposal and safeguard measures and documents.
- (ii) Disclosure of final safeguard documents prior to sub-project implementation to inform local communities of implementation measures concerning safeguard issues.

The project will disclose information of approved sub-projects, including any safeguard issues, through consultation meeting and validation meeting. Stakeholders can inquire further documentation and raise their concerns or recommendations to the Document.

The key stakeholders include individuals suffering from EVD, affected communities, healthcare workers, the donor community, the implementing Ministries and related government agencies specially set up to help implement the joint EVD Outbreak Response Plan within the three hardest hit countries. The draft ESMF that will be prepared during implementation, will be publicly consulted on and disclosed in-country (and globally through the World Bank Info Shop) in a form and

language appropriate for public comprehension prior to its finalization. All comments provided during these consultations will be recorded, and included in the final ESSAF and any subsequent safeguard instruments which will be developed as required.

6. Healthcare waste management plan

6.1. Overview

6.1.1. Purpose of the HCWMP

The intent of an HCWMP is to recommend feasible and cost-effective measures to prevent or reduce significant adverse impacts to acceptable levels. particular attention is given to outlining best management practices and design measures which should be put in place to ensure that environmental impacts are minimized during civil works activity and that human health and environmental concerns are fully addressed on an ongoing basis during project implementation. Best management practices and mitigation measures are detailed by activity in the following sections.

6.1.2. National Action Plan

The MOHS must develop a step-by-step strategy to improve the management of HCW in the HCFs of the country and reduce significantly the occupational risks associated with the current practices. The strategy should show clearly the medium- and long-term objectives to be achieved and reflect the integrated effort that is necessary to set-up safe and environmentally sound HCWM practices. Whenever possible, it should underline the institutional and individual responsibilities as well as define the monitoring and administrative procedures. There are four objectives contained in the National HCWM Plan, namely:

- (i) ☐ Objective 1: Develop the Administrative Framework for the Implementation of the National Action Plan
- (ii) ☐ Objective 2: Develop HCWM Legal and Regulatory Framework
- (iii) ☐ Objective 3: Standardize Healthcare Waste Management Practices
- (iv) ☐ Objective 4: Strengthen Institutional Capacities of HCWM Stakeholders

A three-step approach is proposed for implementation of the National Action Plan:

Step 1: Organize a National Workshop to validate the National HCWM Plan and the strategy that is proposed.

The National workshop should focus on amending and validating the National HCWM Plan and National HCWM Guidelines. The implementation of the HCWM plan will require a regular commitment and monitoring. Thus participative decisions should be taken during the workshop to ensure a good cooperation between all the stakeholders for the future implementation of the plan. The following institutions should participate in the workshop:

Step 2: Establish the institutional framework to initiate the HCWM plan: recruit a Project Coordinator and form a National Steering Committee for HCWM

The DEHS in collaboration with EPA and the National Steering Committee for HCWM should supervise and monitor the overall implementation of the HCWM plan. The Steering Committee should meet on a regular basis (every months minimum). They should be divided into specific Work Groups aiming at implementing specific portions of the NHCWM plan.

It is recommended that the Ministries of Health and Environment seek external support such from EPA and other Environmental related agencies. The tasks of the National Steering Committee should be the following:

- (i) Nominate a project coordinator and compose the work groups;
- (ii) Establish the criteria for the monitoring of the HCWM plan during its implementation;
- (iii) Designate the administrative authorities in charge of the implementation of the HCWM plan at state and LGA levels;
- (iv) Select HCFs and states where the National HCWM plan could be tested in a first step;
- (v) Set-up intermediary and final evaluations of the implementation of the HCWM plan.

A Project Coordinator (PC) should be assigned a full time position during the overall duration of the implementation of the plan. He/she should have excellent organizing, managing and communication skills. It is recommended that the PC should receive periodic external support.

Step 3. Launch the National Action Plan.

The implementation of the four objectives contained in the National HCWM Plan requires the development of specific actions. They are included in the National Action Plan (NAP) presented hereafter. The plan should be periodically monitored and reviewed. As mentioned previously, a typical timeframe for a NAP is around 3 years.

Table 5: Cost estimate of National Action Plan

	Actions	Unit	Quantity	Unit cost (USD)	Total (USD)
Objective 1: Develop Administrative System for NHCWMP Implementation					
1.1.1	District support visit to set up District Steering Committee on HCWM (12 district)		12	7,000	84000
1.2.1	Develop Evaluation criteria tools		1000	4	4000
1.3.1	Set up a structure for co -ordination and follow up of the HCWM plan; develop regulations and guidelines for HCWM	Months	60	200	12000
Objective 2: Develop HCWM Legal and Regulatory Framework					
2.2.1	Validate National guidelines for HCWM		3	3,000	
2.3.1	Collation and harmonization of existing relevant environmental and health documents		-	-	-
2.3.2	Develop HCWM guidelines and SOPs		30	200	6,000
Objective 3: Standardise HCWM Practices					
3.1.3	Enforce the use of colour coded containers for specific HCW at all facilities		1000	15	15,000
3.1.4	Organize national , and District level workshop for stake		4	3,000	12,000

	holders on HCWM practices				
3.5.1	Create awareness on HCWM activities (WM meetings)		5,280	710	115,00
Objective 4: Strengthen Institutional Capacities of HCWM Stakeholders					
4.3.3	Develop guidelines for training		50	200	10,000

6.2. Institutional framework

6.2.1. Responsibilities

At the national level, the HCWM Plan is part of the Government's Environmental Health strategy, of which it is an important component. Implementation will be coordinated by the EHD of the MoHS, in concordance with other stakeholders (EPA, CBOs and NGOs) who will participate in a range of activities from implementation to supervision.

Part of improving HCW management involves clarifying who is responsible for what functions and identifying the fields of competencies of each institutional actor involved in this process. A brief synopsis of functions and competencies is provided below.

At the central level: The MoHS is responsible for national health policy and ensures the guardianship of the health facilities. The Department of Preventive Health Services (Environmental Health Section) will take the lead in coordinating implementation of the HCWM plan because: (i) it is part of its mission, (ii) it has competent staff in this field, and (iii) it has decentralized services at district level. The Health Education Service Unit has a role to play because it is concerned with activities of public information and awareness rising.

At the district level/city council level: The City Assemblies and District Assemblies will need to put in place arrangements to make sure that HCW are not mixed with general wastes in their public landfills. They should also give their opinion about the HCWM plan activities proposed for health facilities in their jurisdiction, in case some may have negative impacts on the local population's health. Coordination of the monitoring and reporting on implementation of the HCWM POA will be exercised by the Health Team, in particular the Environmental Health Officer.

At the health facility level: The manager of each health facility shall be responsible for HCWM in his/her establishment. S/he must ensure that a HCWM plan is prepared and then watch to ensure that procedures and regulations are respected. S/he must designate the teams charged with HCW segregation, collection, transportation and treatment.

Table 6: Implementation responsibilities by Component

Strategies	Activities	Levels of implementation	Who is responsible	Objectively verifiable Indicators	Means of verification	Risk Assumptions
1.1 Develop National HCWMG Stakeholder Support	1.1.1 Organise national workshop to modify and validate the HWMG and set-up specific task groups	National and District		HCWMG modified and validated	Report of the workshop	availability of funds
1.2 Identify coordination	1.2.1 Set-up a National Steering Committee on HCWM Establishment of District Steering Committees	National/District	MOHS/DEHS	Membership list, stipulation of objectives, scheduling of regular meetings	Minutes of meetings held	
	1.2.2 Designate of a National/ District Coordinator Designate of HCWM Officers at Council	National and District	MOHS/DEHS/Council	Job description with clear listing of tasks	Name of coordinator	Funds required
1.3 Develop National and District evaluation and reporting system	1.3.1 Establish evaluation criteria for HCWM	National and District	MOHS/DEHS	Established indicators	Reports of indicators	
	1.3.2 Establishment of District Steering Committees			Membership list, stipulation of objectives, scheduling of regular meetings	Minutes of meetings held	
1.4 Identify implementing agents	1.4.1 Designate of HCWM Officers at agencies Support private initiatives and partnership in HCWM	National and District	NGO/CBO	Job description with clear listing of tasks	Identifiable agent HCWM Officer	
Develop HCWM Legal and Regulatory Framework	Develop HCWM guidelines and SOP	National and District	MOHS/DEHS			
1.5 Make the general public aware of the risks linked to HCW	Television messages Radio messages Posters in health facilities	National and District facilities	NGO/CBO/ EHD/MoHS	Reaching the public	Presentation on National TV, Local radios	
1.6 Support the execution of HCWM Plan	Monitor the execution (national and local level) Evaluation of the HCWM POA (halfway and final)		MOHS/DEHS/ Council	Plan HCWM activities	Plan HCWM activities develop	
Standardise HCWM Practices	Enforce the use of colour coded containers for specific HCW at all	National and District				

	facilities Organize national , and District level workshop for stake holders on HCWM practices					
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6.2.2. Potential partners and field of intervention

Delivery of essential health services and the fight against Ebola and proper waste management relies on the involvement of a wide range of actors -- public and private sectors, NGOs, and civil society. It is therefore necessary to establish a partnership framework to identify the roles and responsibilities of each category of actor.

Table 7: Potential field of intervention

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 Implementation of the service Level agreement over sees the planning process and implementing the recovery phase
Directorate of Environmental Health and Sanitation	Will monitor ESMF and EMWMP
The government level	Coordinate the post Ebola recovery planning in all sectors
City councils/district governments	participate in the mobilization of populations ensure HCW are properly disposed in their landfill participate in training, monitoring and evaluation
world bank project team & safeguard specialists	.Conduct supervision Provide safeguard enhancement Ensure Policies are followed Conduct reviews
Environmental protection Agency	To ensure effective protection and management of the environment. Review and clear sub-projects according to EPA Act 2008 as amended in 2010 Issue EIA licenses Monitor the compliance level of projects
Private operators	Invest in HCWM (e.g., treatment, transport, disposal) Supervised and monitor by MHS operate as sub-contractors (City Assemblies / District Government Health Facilities) Monitor by MOHS
NGOs and CBOs	inform, educate and make population aware participate in / offer training activities
Ministry of Works	Provide Infrastructural development
Min. of Lands, Housing, Country Planning and the Environment	Provide primary disposal sites and landfill sites
Directorate of Environmental Health and Sanitation	Revitalization of the existing Public Health Aide Improve the implementation of the environmental strategy
Primary Health Care	Strengthen the existing community Health Worker cadre and their linkages to the Peripheral Health Units
Directorate of Health System and planning	Planning and supervision monitoring and evaluation (HMIS development, publication of the quarterly HMIS bulletin organization of special sector studies (NHA, health sector financing strategy)

Training Institution	Training of health personnel at District and regional Hospital Specialists in the areas of obstetrics and gynecology, pediatrics, surgery, internal and family medicine
Hospital and Laboratory	Strengthen community level engagement Enhance facility -level services and ensure emergency transport, especially for pregnant women, from communities and PHUs to the District Hospitals
EERP, Global Fund and GAVI	Support an Integrated Health Project Administration Unit (IPHAU)
Emergency Medical Service	Responsible for the overall direction and policy, standard (including clinical and operational), licensing of emergency services operators
IHPAU	Will oversee the fiduciary elements of all externally financed projects with a view to improving their capacity for procurement, financial auditing and monitoring.
Public health facilities / Private health facilities	participate in training activities supply staff with security equipment elaborate internal plans and guidelines about HCWM allocate financial resources for HCWM ensure HCW management plan is implemented

6.2.3. Institutional arrangements

The overall responsibility of implementing the environmental and healthcare waste management issues particularly the present EMWMP will rest with the Project implementers, Directorate of Environmental Health and City Council. A public health superintendent will be appointed as the Medical Waste Management Focal Point (MWMFP). The MWMFP will maintain vertical and horizontal coordination to ensure effective implementation of the present Plan, and will be responsible for province-level monitoring, documentation, and reporting. S/he will also liaise with outside agencies, donors, and other stakeholders. At the district level, the District Environmental Health Superintendent of each district will be the focal point for performing/supervising the environment and healthcare waste management functions particularly implementing the present EMWMP in the respective district. The District Environmental Health Superintendent will maintain coordination with the MWMFP for the implementation of the present Plan. At the facility level, the WMO will be designated as the focal point for EMWMP implementation. The WMO will maintain coordination with the District Environmental Health Superintendent for the implementation of the present Plan. The management company contracted for the waste management operation will also appoint a focal point for EMWMP implementation among its staff. S/he will maintain coordination with the District Environmental Health Superintendent and MWMFP for the implementation of the present Plan. Waste Management Team. In each healthcare facility, a Waste Management Team (WMT) will be constituted, and an appropriate officer designated as Waste Management Officer (WMO) in accordance with the Hospital Waste Management Rules. The WMT will be responsible for preparing and implementing Waste Management Plan (WMP) in the facility. The roles and responsibilities of various personnel for the hospital waste management and implementation of the present Plan are summarized in the table below.

Table 8: Role and responsibilities of personnel

Programs Director	Overall responsible for the implementation of EMWMP; Monitor and supervise MWMFP Medical
Medical Waste Management Focal Point	Effective implementation of EMWMP; within Ministry, with DEHS; Coordination with CC/EPA; Coordination with other agencies (WB, others); Visits to healthcare facilities to monitoring Plan implementation; Organizing trainings on provincial level; Producing quarterly progress reports and sharing with MOHS, WB, and others.
EHS of each district	Coordinate with MWMFP Coordinate with Directorate for the implementation of EMWMP Organizing trainings on district level Monthly reports to MWMFP on Plan implementation
WMO of each facility	Health; Coordination with CC/Massada; Coordination with other agencies ; Visits to healthcare facilities to monitoring Plan implementation; Organizing trainings on provincial level; Producing quarterly progress reports and sharing with MOHs, , and others. Directorate Coordinate with DEHS Prepare WMP in accordance with the HWM Rules Provide monthly reports on EMWMP implementation to DEHS

The Ministry of Health and Sanitation (MoHS) will be responsible for the improvement of the institutional and legal framework. These activities should be conducted in the first year of the programme by the Department of Preventive Health Services (DPHS) and through the Environmental Health Division (EHD).

At the local level, the control and monitoring of HCWM plan implementation should be done by the district team which will ensure monthly monitoring, while the yearly follow up will be realized by the EH department.

The evaluation of the HCWM Plan should be assigned to international consultants (under supervision of the EH department), to ensure objectivity. This evaluation should be done halfway through (at the end of the 2nd year) and at the end of the first phase of the program (year 5).

6.3. Monitoring methodology

6.3.1. Overview

The MoHS will monitor and evaluate the progress and outcomes of the interventions supported by the project through its structural units (The Directorates). The area-specific M&E responsibilities for the project mirror those reflected in the MoHS Strategic Plan, thus complementing the monitoring of the MoHS strategic objectives to which the project would contribute. Hands-on support and guidance to the M&E function of the implementing Directorates will be provided by experienced M&E staff and will be strengthened through in-service training and external capacity-building activities under the project management component. In addition, given the issues with data consistency, the quality and reliability, M&E capacity building is aimed at strengthening MoHS institutional capacity for M&E. Responsibility for aggregating the collected M&E data and reporting it

to the World Bank and relevant government agencies as part of annual implementation progress reports rests with the PIU.

6.3.2. Date source and frequency of reporting

To the extent possible, progress on results will be monitored using routine data sources, such as those available from the information systems (DHIS2) and administrative records of the MoHS and affiliated agencies.

The MoHS, through the PIU, will annually report on most of the indicators for which data sources will be provided through administrative data sources and annual surveys. For a limited number of other indicators, survey data would be provided at larger intervals. This will be conducted at the beginning, middle, and end points of project implementation. Monitoring and Supervision will be done on a quarterly basis and as well annually. The list of planned surveys will be monitored and supervised during the period of implementation. Evaluation of project implementation will be done at the mid-term review and project closing.

At district level, the Local Government Act 2004 and other legislation, provide the Local council and local level structures with a clear mandate for the inspection of domiciliary and commercial premises. At district level, inspection team will comprise one public health inspector and one or more public health Aide (PHA), trained by the project. under the supervision of the District Health Superintendent (DHS) and local Council officer in charge of Environmental sanitation, the inspection team will be responsible for carrying out the regular ESICOME activities, complying with established work plans and comprehensive check lists.

The daily operation of inspection team shall be recorded day by day and records will be inspected by the DHMT's District Health Environmental Officer (Zonal EH) supervisors on weekly basis except in emergencies or as the need may arise. Monthly reports completed by the EHO will be submitted to Council for compilation using the prescribed forms including narratives of field notes. The DHS will forward the report to the DEHS, where the Director of Environmental Health and Sanitation will collate the district summary reports into a national monthly summary and submit to the CMO. The CMO will then submit the monthly report to the minister of Health and sanitation with copies to the Minister of Local Government and Rural Development.

6.3.3. Sustainability

From an institutional perspective, this project's sustainability is likely. The Government has shown its commitment to health sector reform for more than a decade and has used information to refocus attention on the new burden of disease, Ebola . At the same, there is strong commitment to maintaining the earlier achievements by the continued strengthening of the free Health care. Of particular importance for sustainability is the improvement of the Health Care Data System, which

would bring higher-quality data that would be collected and reported in real time from the primary source. There will also be accountability and feedback mechanisms introduced in the data submission system. As in the past, greater autonomy and flexibility in the public hospital system will be part of this project, as will the kind of efforts to build capacity that were successfully begun previously. This project would increase efficiency by introducing learning modalities, efficiency gains in hospital management, and improved targeting for screening and preventive health behaviour activities.

6.4. Mitigation

6.4.1. *Mitigation measure or environmental and social impacts*

The operation of incinerators has negative impacts on environment and health. However, the quantities of HCW to be incinerated daily by each establishment are quite small, so environmental and health impacts will not be significant and the harm caused will not be great. Nevertheless, the following measures should be taken:

- (i) When installing incinerators inside health facility grounds, a location should be selected that is distant from the admission rooms and health care rooms.
- (ii) To minimize noise disruption and smoke discomfort during working hours of the facility, the incinerator should be operated at night.
- (iii) To reduce polluting by-products from solid wastes incineration, non-chlorine plastic containers should be promoted; for example, they should be recommended as dustbins for waste collection.
- (iv) Incinerators should operate at sufficiently high temperature to get rid of dioxins and should also have efficient scrubbers.

For the large central disposal sites, wire fencing and locks should be installed to reinforce security and to minimize the access of scavengers and children. These protection measures will allow site managers to: (i) control and regulate access to the landfill, (ii) identify the scavengers and (iii) make users aware of danger.

Implementation of the HCWM Plan might have negative social impacts on scavengers earning their daily living at landfills. Their income may decrease as a result of well-organized management of HCW, particularly when segregation is done at source. Health facilities should explore developing a mechanism for giving local scavengers non-infectious reusable objects (such as empty bottles), for example, authorizing them to collect items according to well defined modalities.

For the populations neighbouring the landfills, the risks of being driven away and resettled in other areas are minor. Generally, these populations did not settle around the landfills. Rather, the disposals sites have been created inside these districts.

- (i) There are cultural issues relating to disposal of anatomical wastes (amputated body parts, placenta, etc.), which communities may be strongly sensitive to. These cultural aspects should be taken into account in each health facility HCWM action plan, to better ensure the acceptability of disposal methods. For example: the

- placenta could be buried or put in septic pits, as it is the case presently in some health facilities;
- (ii) anatomical wastes (such as body parts) can be buried inside the hospital; • Liquid wastes from washing of the dead are generally evacuated in septic pits

6.4.2. Mitigation plan

Two separate mitigation plans are presented in Table below, for HCW management and facility renovation/rehabilitation/expansion, respectively. The mitigation plans describe the potential impacts and associated mitigation measures, and also assigns implementation and monitoring responsibilities.

Table 9: Mitigation plan

Activity	Potential Impact	Mitigation Measures	Responsibility Monitoring
Waste segregation	Health and patient safety risks for staff and	Use of infection control protocol; Comply Rules, 2005; Use of PPEs; Use of colour coded buckets with thick, puncture resistant plastic bags; Ensuring that bags are not punctured (disinfection of the bucket/area to be carried out in case of leakage from bags); Capacity building and training of staff including waste handlers; Awareness raising of patients and their attendants. with Waste Management	MOHS, WMO; DEHS ;
Infectious waste collection and transportation	Health and safety risks for waste handlers	<ul style="list-style-type: none"> - Use of specialized trollies to move wastes from point of generation to storage and final disposal. - No waste handlers should carry waste bags on their shoulders or on their bodies. 	WMO MOHs; DEHS, MWMFP, Massada
Infectious waste storage	Health and safety risks for waste handlers	The duration in which waste is stored should not be more than 72 hours	
Infectious waste disposal (burial)	Health and safety risks for waste handlers, waste pickers; Soil and water contamination	Use of infection control protocol; Comply with Waste Management Rules, 2005; Use of PPEs; Proper documentation and handover-takeover protocol; Capacity building of staff including waste handlers; Using impervious lining in the pits to avoid soil and water contamination; Locating the pit at least 50 m from any water source; Using proper signage for pit location; Maintain complete record of waste disposal and pit location in each facility. Burial pits should at least be two (2) meters above water table. Hydro geo physical survey to determine the water table of disposal site. Properly lined pit to avoid seepage..	
Infectious waste disposal (burning)	Health and safety risks for waste handlers; Air contamination	Use of infection control protocol; Comply with Waste Management Rules, 2005; Uncontrolled, open burning of infectious waste particularly containing plastics and PVC objects will be avoided to the extent possible; Proper documentation and handover-takeover protocol; Use of PPEs; Capacity building; Maintain complete record of waste disposal. A burning pit should be constructed to avoid open burning of infectious wastes.	
Infectious	Health and safety	Use of infection control protocol; Comply with	WMO Or

Activity	Potential Impact	Mitigation Measures	Responsibility Monitoring
waste disposal (incineration)	risks for incinerator operators and nearby communities; Air contamination.	Waste Management Rules, 2005; Proper documentation and handover-takeover protocol; Use properly designed for medical waste treatment, double chamber incinerators with wet scrubbers; Ensure that incineration is carried out at 1200 °C; Properly operate and maintain incinerators particularly to avoid leakage of gases from the first chamber; Ensure that dioxins are not released, and exhaust gases comply with NEQS; Maintain complete record of the key incinerator operation parameters (waste quantity incinerated, temperature in first chamber, temperature in second chamber, resident time, and others); Capacity building of operators; Use of PPEs.	Incinerator operators
Non-risk waste	Contamination of soil and water, odour, proliferation of vectors (rodents, flies, others)	Non-risk waste will be disposed with the municipal waste; Proper storage arrangements (such as dumpsters) avoiding any spill-over/over-flowing; Regular transportation of waste from healthcare facility to the municipal waste disposal site.	Sanitary staff Municipality; DEHS Massada
Water supply	Health hazard for staff and patients	Ensure that drinking water complies with NEQS; Carry out water analysis periodically. Collaboration with the Ministry of water resources and water Directorate to ensure that there is proper water supply.	MWR
Sewage disposal	Health hazard for staff and patients	Ensure that the treatment system (eg, septic tank) is properly working	CC

6.5. Budget and timeline

6.5.1. Monitoring and Evaluation budget

Table 10: Monitoring and evaluation budget of the HCWMF

Item	Unit	unit type	unit	unit type	unit cost (SLL)	Total cost per month	Total cost per year	Total cost for 5 years	Totalcost (\$)
printing of tools	3	Pages	11	copies	20000	660000	7920000	39600000	7920
replicating checklist	3	Pages	11	copies	20000	660000	7920000	39600000	7920
staff DSA	4	Staff	5	days	350000	7000000	84000000	420000000	84000
top up	1	top up	4	staff	200000	800000	9600000	48000000	9600
Fuel	4	Staff	4	staff	250000	4000000	48000000	240000000	48000
DSA for Drivers	4	Drivers	4	Driver	150000	2400000	28800000	144000000	28800
Independent auditor	1	Person	11	days	1000000	11000000	132000000	660000000	132000
				Grand Total	4000000	53700000	644400000	3222000000	644400

6.5.2. Implementation timeline

Table 11: Implementation timeline of the HCWMF

	2016				2017				2018				2019			
Objectives	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Develop National HCWMG Stakeholder Support Identify coordination committee																
Capacity building and skills transfer through in-service training and on the job mentoring																
Develop National and District evaluation and reporting system																
Develop HCWM Legal and Regulatory Framework																
Standardise HCWM Practices																
Develop HCWM guidelines and SOP																
Make the general public aware of the risks linked to HCW																
Monitoring and Evaluation of HCWM plan																

7. Conclusion and recommendations

This EMSF is a document that provide guidelines as to how the environmental safeguard issues can be addressed. As discussed in the earlier sections, the proposed sub-projects under the project will have rather small scale environmental impacts that can be managed if the procedures given in this EMSF are followed. The project staff and other relevant persons should be trained so that they can fully implement the actions needed under the EMP. Provision for adequate funding must be made in the project's operational budget for this purpose.

ANNEX 1: Minutes of the ESMF validation meeting and stakeholder consultation

To date, the Bank-financed Ebola Emergency Response Project (EERP) has provided support to the Government's Post Ebola Recovery Strategy and the Ministry of Health and Sanitation's (MoHS) post-Ebola Health Sector Recovery Plan (2015-2020). The former focuses on three sequential steps: (i) getting to and maintaining zero cases of Ebola, (ii) implementing immediate recovery priorities and (iii) transitioning into the Agenda for Prosperity. The strategy's immediate priority for the health sector is to restore health services and plan towards building a robust health care system that is resilient and strengthened to ward off emergencies and recurring tropical diseases. Linked to this overarching Government strategy, the MoHS's plan comprises three overlapping phases: Early Recovery (July 2015-March 2016), Recovery (April 2016-December 2017), and health system strengthening and resilience building (2018-2020) and addresses five key priorities: (i) patient and health worker safety; (ii) health workforce; (iii) essential health services; (iv) community ownership; and (v) information and surveillance.

The Health Service Delivery and System Support Project (HSDSSP) is a three-year US\$ 35 Million (IDA: \$30 Million and Ebola Recovery and Reconstruction Trust Fund and ERRTF: \$5 Million) project designed to: (i) maintain the momentum of support by the EERP; and (ii) contribute to the flagship programs proposed by the Health Sector Recovery Plan. The project will also be complementary to ongoing efforts by the Development Partners in Sierra Leone to support the post Ebola recovery efforts and to the regional project proposed by the Bank (Regional Disease Surveillance).

The project also relates to sub-national support to improve service delivery via the rehabilitation or construction of primary health care facilities, provision of medical equipment, strengthening management and supervision, and health promotion in communities. This output will support sub-national governments to build an enabling environment for rural and urban health service delivery. It will include including staffing, and sanitation. It is proposed that health facilities in the district will be supported with medical equipment to meet national standards and supervision. The executing agency for the project is the Ministry of Health and Sanitation while the implementing directorate responsible for all the components are Environmental Health and sanitation, Primary health Care, Hospital and laboratory and planning and information.

The Environmental safe guard document will presents a general assessment of the project's environmental impacts, proposed mitigations, monitoring, consultation disclosure, and grievance redress mechanism, institutional responsibilities, and reporting. The document will be carried out in

compliance with the World Bank Safeguard Policy Statement. The main purpose of this Document is to provide a practical example for implementing agencies to follow during implementation.

Purpose of validation

The main purpose of the validation workshop was for partners to go through the document and make necessary corrections where necessary before the actual implementation process starts.

The meeting started with individual silence prayer which was led by Mrs. Juliana Kamanda. Dr Sillah gave the welcoming address and Christiana M. Fortune gave the over view and objectives of the Environment and social management framework and health care waste management plan. She stated that World Bank is supporting five Directorates in the implementation of projects in the Ministry of Health and Sanitation and the Directorate of Environmental Health and Sanitation happens to be one of the beneficiaries.

The participants were divided into groups based on the document and there were three groups in all. The groups were to go through the document and make corrections where necessary. Some key findings and recommendations got from the sub-groups are as follows:

- (i) Impacts should be put alongside mitigation measures.
- (ii) Some mitigation measures should be time bound.
- (iii) Annex 1-Land(point 6)-Needs expert advice (or the responsible agency together with implementing partners/contractor shall take an inventory of all large trees in the vicinity of the construction activity.....
- (iv) Annex 1-Air quality-PPE should be provided to further strengthen occupational Health and Safety (e.g. Face mask, Helmet, aprons, rubber bootsetc.)
- (v) Annex 1-Waste (point c)-All wastes generated during construction should be collected and disposed properly by licensed waste collectors or companies.
- (vi) Routine monitoring should be done to ensure the quality of the water.
- (vii) Appropriate disposal options should be put in place and operational.
- (viii) After validation of the document, all sub projects within the document that have potential impacts on the environment should have a valid environmental impact assessment license.
- (ix) Use of specialized trolleys to move wastes from point of generation to storage and final disposal sites.
- (x) Waste handlers should not carry waste bags on their shoulders or on their bodies.
- (xi) Burial pits should at least be two (2) meters above water table. Hydro geo physical survey should be done to determine the water table of disposal sites.
- (xii) Disposal pits should be properly lined to avoid seepage.
- (xiii) The project should address the availability of water in Health Facilities.
- (xiv) Wastes should be disaggregated at collection point. There should be a structure in every facility to prepare waste and the contractor to come and collect it.

Conclusion

The workshop ended with a vote of thanks given by Dr. Ansumana R.M Sillah, the Director of Environmental Health and Sanitation on behalf of Ministry of Health and Sanitation.

Recommendations

- (i) The first ESMF Document for the EERP project to be shared

- (ii) The ESMF document to be implemented as the EERP project has already commenced
- (iii) Ensure that the HSDSSP safe guard document be implemented / act upon in time
- (iv) Routine monitoring should be done to ensure the quality of the water.
- (v) Appropriate disposal options should be put in place and operational.
- (vi) Ensure that all Burial pits should at least be two (2) meters above water table. Hydro geo physical survey should be done to determine the water table of disposal sites.
- (vii) PPE should be provided to further strengthen occupational Health and Safety (e.g. Face mask, Helmet, aprons, rubber boots etc.)

List of participants

Name	Organization
Dr Ansumana Sillah	MOHS
Lovetta Juanah	EPA
Josephe Mansaray	
Meredith Dyson	HSSHUB-MOHS
Lucky Chikayra	WHO/ENV
George Bundu	UNOPS
Francis Moses	CHEW
Patrick Pokawa	WASH-NET
David J Allieu	HFAC-SL
Michaela S. Kargbo	MOHS
Thanya Pratt	YOUTH ADVOCACY
Charles Ngombo	MOHS
Mohamed Bangura	MWR
Daniel Ah Coopers	MOHS
Christian Fortune	MOHS
Juliana Kamanda	ASI/MOHS
Abdulai I Jalloh	MOHS
Elizabeth Tejan	DHSPPI
Mohamed Marah	PHC
Joseph Benjamin Bangura	MOHS/DPHC
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Sorie I Koroma	MOHS
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Isata T Kamara	PHS/MOHS
Joshua M Kanukin	PHS/MOHS
Anthony D Foday	PHS/MOHS
Alie M Kamara	EHO/MOHS

ANNEX 2: Matrix of mitigation measures

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
General Conditions	Land	<p>The local construction and environment inspectorates and communities have been notified of upcoming activities</p> <p>The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works)</p> <p>All legally required permits have been acquired for construction and/or rehabilitation</p> <p>The Contractor formally agrees that all work will be carried out in an environmentally friendly manner designed to minimize impacts on neighboring residents and environment.</p> <p>All recognized natural habitats, wetlands and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities.</p> <p>An inventory shall be made of large trees in the vicinity of the construction activity, large trees shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided; Tree replanting should be undertaken to replace those which need to be cut</p> <p>There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.</p> <p>Adjacent wetlands and streams shall be protected from construction site run-off with appropriate erosion and sediment control feature to include by not limited to hay bales and silt fences</p> <p>If there are any religious or cultural artifacts on site, these must be identified in site-specific EMP, and recommended actions must be agreed in consultation with local community.</p>
Building-related Specifications		<p>Building designs must be in compliance with national standards for energy efficiency, water and sewerage and healthcare waste management</p> <p>Facility design features must ensure adequate space and equipment for health service delivery</p> <p>As far as possible, local material must be used to reduce the energy consumption in transport</p> <p>Asbestos must not be used; Low-cost lead-based paints should be avoided and building materials should be fire resistant.</p> <p>Proper ventilation and natural lighting should be ensured in the building design</p> <p>In case archaeological or religious site exists in the vicinity, the site-specific EMP must include all due diligence measures to avoid any harm or impact on those structures.</p> <p>The drainage pattern should be studied to determine whether the site would be subject to flooding and stagnant water. The building designs must include systems for drainage of excess water</p> <p>Alternative sources of power for lighting and heating options must be assessed for each site and the assessment and recommendations must be clearly documented in the site-specific EMP.</p> <p>The contractor shall ensure that construction materials such as sand, quarry stone, soils or any other construction materials are acquired from approved suppliers</p>
General Rehabilitation and/or Construction Activities	Air Quality	<p>Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust</p> <p>During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site</p> <p>The surrounding environment (sidewalks, roads) shall be kept free of debris to minimize dust.</p> <p>Dust and noise barriers are specially required where construction faces hospital wards and patient movement</p> <p>There will be no open burning of construction / waste material at the site</p> <p>There will be no excessive idling of construction vehicles at sites</p> <p>PPE should be provided to further strengthen occupational Health and Safety (eg. Nose mask, helmet etc)</p>
	Noise	<p>Construction noise will be limited to restricted times agreed to in the permit</p> <p>During operations the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible</p>

	Waste management	<p>Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities.</p> <p>Construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers.</p> <p>All wastes generated during Construction should be collected and disposed properly by licensed collectors or companies.</p> <p>The records of waste disposal will be maintained as proof for proper management as designed.</p> <p>Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)</p>
	Water Supply and Quality	<p>If piped water can be accessed, review possibility of linking the facility to the water source. In case of extending pipeline, environmental due diligence must be conducted with regard to the infrastructure required, materials used, layout of pipes within the facility etc. These must be clearly assessed and recorded in the site-specific EMP.</p> <p>If there is no piped water, possibility of having a shallow-well/tube-well within the facility premises. In case of this option, environmental due diligence will involve assessment of the quality of groundwater and type of aquifers, availability of materials and equipment required to install the pumps etc. These must be clearly assessed and recorded in the site-specific EMP.</p> <p>All laid pipes must be preferably copper, cast-iron sewer pipes to avoid Polyvinyl chloride (PVC) venting. Open pipes and insulation should be of non-toxic materials.</p> <p>The quality of the water must be assessed for usage (drinking, sanitation etc). Specific plans to address any particular issues of water quality, such as arsenic and fluoride contamination, should be made if required.</p> <p>Instructions must be included with regard to usage of the water, especially how to make it potable/drinkable.</p> <p>Adequate provision for storage of sufficient volumes of water should be provided to ensure continuous availability of water within the building.</p> <p>Routine monitoring should be done to ensure the quality of the water.</p>
	Sewerage and Sanitation	<p>The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities and technical agencies.</p> <p>Assessment will be made of conditions of sewerage facility and where there is no system in place, options for constructing pit latrines must be assessed. Pit latrines must be installed downhill from water sources/wells and should be at least 2 meters</p> <p>Above the water-table and about 6m away from the building. The design of the pit must follow international standards (WHO, WSP etc). A users and management manual must be prepared and disseminated to the users and healthcare staff. The assessment must be clearly documented in the site-specific EMP.</p> <p>In case of infectious wastewater, the EMP must document what systems are being put in place for treatment and discharging of such waste water.</p> <p>Construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies.</p> <p>Appropriate disposal options should be put in place and operational.</p>
		<p>The contractor shall provide all necessary protective clothing for workers exposed to hazardous and dangers work activities.</p> <p>Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots)</p> <p>Appropriate signposting of the sites will inform workers of key rules and regulations to follow</p> <p>All workers shall be regularly sensitized on safety regulations on the site.</p> <p>The construction shall maintain on the site first aid kits for male and female workers.</p> <p>Workers shall be provided with clean potable water on the site and safety cooking places, wash rooms and ventilated pit latrines.</p>
Toxic Materials	Asbestos management	<p>If asbestos is located on the project site, it shall be marked clearly as hazardous material; it is to be stored temporarily, it securely contained and sealed to minimize exposure and marked appropriately</p> <p>The removed asbestos will not be reused and should be secured so it cannot be pilfered by (worse yet, sold to) local people seeking building material. The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust</p> <p>Workers dealing with asbestos removal must be provided with protective equipment as per</p>

		<p>OSHA guidelines (glove bags, protective clothing and approved respirators); Asbestos will be handled and disposed by trained workers.</p> <p>All asbestos containing materials (ACM) ACM should be transported in leak-tight containers to a secure landfill in a manner that precludes air and water contamination that could result from ruptured containers.</p> <p>In case where there is no secured landfill, the preferred alternative solution is secure burial. The ACM could be buried under the foundations of the new construction but precautions must be taken that it is not broken or crushed</p> <p>All measures will be documented in site-specific EMPs</p>
	Toxic / hazardous waste management	<p>Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information</p> <p>The containers of hazardous substances shall be placed in an leak-proof container to prevent spillage and leaching</p> <p>The wastes shall be transported by specially licensed carriers and disposed in a licensed facility.</p> <p>Paints with toxic ingredients or solvents or lead-based paints will not be used</p>
Disposal of medical waste	<i>Addressed in Medical Waste management Plan</i>	<p>In compliance with national regulations the contractor will insure that newly constructed and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to:</p> <p>Special facilities for segregated healthcare waste (including soiled instruments “sharps”, and human tissue or fluids) from other waste disposal; and</p> <p>Appropriate storage facilities for medical waste are in place; and</p> <p>If the activity includes facility-based treatment, appropriate disposal options are in place and operational</p>
Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	<p>In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards</p> <p>Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes.</p> <p>Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement</p> <p>Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public.</p> <p>Ensuring safe and continuous access to office facilities, shops and residences during renovation activities, if the buildings stay open for the public.</p>

ANNEX 3: Environmental and Social Screening forms

INSTITUTIONAL & ADMINISTRATIVE				
Project title				
Scope of project and activity				
Institutional arrangements (Name and contacts)	WB (Project Team Leader)	Project Management	Local Counterpart and/or Recipient	
Implementation arrangements (Name and contacts)	Safeguard Supervision	Local Counterpart Supervision	Local Inspectorate Supervision	Contactor
SITE DESCRIPTION				
Name of site				
Describe site location				
Who owns the land?				
Description of geographic, physical, biological, geological, hydrographic and socio-economic context				
Locations and distance for material sourcing, especially aggregates, water, stones?				
LEGISLATION				
Identify national & local legislation & permits that apply to project activity				
PUBLIC CONSULTATION				
Identify when / where the public consultation process took place				
INSTITUTIONAL CAPACITY BUILDING				
Will there be any capacity building? <input type="checkbox"/> N or <input type="checkbox"/> Y if Yes. Attachment 2 includes the capacity building program				

This Form is to be used by the PIU for screening sub-project proposals. One copy of this form and accompanying documentation will be kept in the PIU office, and one copy to be sent to the World Bank Task Team Leader.

ANNEX 4: ESMF checklist and monitoring plan

Plan

Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
During activity preparation							
During activity implementation							
During activity supervision							

Checklist

No	Issues	Yes	No	Proposed Mitigation Measures
A.	Zoning and Land Issues			
1	Will the sub-project affect land use zoning and planning or conflict with prevalent land use patterns?			
2	Will the sub-project involve significant land disturbance or site clearance?			
3	Will the sub-project land be subject to potential encroachment by urban or industrial use or located in an area intended for urban or industrial development?			
4	Is the sub-project located in an area susceptible to landslides or erosion?			
5	Will the sub-project involve the disturbance or modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?			
6	Is the sub-project located on prime agricultural land?			
7	Does the sub-project have access to potable water?			
8	Is the sub-project located far (1-2 km) from accessible roads?			
9	Will the sub-project need to change the vegetation and /or cutting of trees on site			
10	Is the sub-project located in an area with a wastewater network?			
11	Is the sub-project located in the urban plan of the city?			
12	Is the sub-project located in a polluted or contaminated area?			
13	Is the sub-project located in an area with designated natural reserves or protected areas? [Note: If YES, the sub-project cannot be financed]			
14	Will the sub-project involve the disturbance or modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?			

B	Construction related Issue			
1	Will the sub-project require the setting up of ancillary production facilities?			
2	Will sub-project require sourcing of building and construction materials and equipment			
3	Will the sub-project require construction workforce who will need to be provided accommodation or service amenities			
4	Will the sub-project generate solid (construction, rubble, cement etc) and liquid waste (chemicals, oils, wastewater etc)			
5	Will the sub-project require raw materials or construction materials?			
6	Will the sub-project lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?			
7	Will the sub-project involve the use of chemicals or solvents?			
8	Will the sub-project lead to the creation of stagnant water bodies in borrow pits, quarries, etc., encouraging for mosquito breeding and other disease vectors?			
9	Will the sub-project increase the levels of air emissions during construction or equipment movement?			
10	Will the sub-project generate dust and noise during construction?			
11	Will the sub-project increase ambient noise levels?			
12	Will the sub-project involve the storage, handling or transport of hazardous substances?			
13	Will the sub-project have an impact on on religious monuments, structures and/or cemeteries, archaeological or historical sites?			
14	Will the sub-project lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles?			
15	Will the sub-project result in dismantling or removal of asbestos			
16	Will the sub-project involve demolition of existing structures?			
C	Design Issues			
1	Does the sub-project need provision of water supply			
2	Does the sub-project need provision of electricity			
3	Will the sub-project generate large amounts of residual wastes, construction material waste or cause soil erosion?			
4	Will the sub-project result in potential soil or water contamination (e.g., from oil, grease and fuel from equipment yards)?			
5	Will the sub-project lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?			
6	Will the sub-project involve the use of chemicals or solvents?			
7	Will the sub-project involve the storage, handling or transport of hazardous substances?			
8	Does the sub-project need provision of wastewater treatment			

9	Safety Issues			
10	Will the sub-project lead to inflow of labour and temporary construction camps?			
11	Is the -project or sub-project located in an area from which people have been displaced?			
12	Is the sub-project located in an area where people will be temporarily relocated?			
13	Is the sub-project located in a densely populated area?			
14	Does the sub-project require land acquisition? [Note: If YES, the sub-project cannot be financed]			
15	Will the sub-project negatively impact livelihoods? [Note: Describe separately if YES]			

ANNEX 5: Environmental guidelines for civil work contracts

The contractors are required to use environmentally acceptable technical standards and procedures during the implementation of construction of works. All construction contracts will contain the following requirements:

- (i) Take precautions against negative influence on environment, any environmental damage or loss through prevention or suppression measures (where it is possible) instead of liquidation or mitigation of negative consequences.
- (ii) Observe all national and local laws and rules on environmental protection. Identify officers responsible for the implementation of activities on environmental protection conforming to instructions and directions received from the construction and design or environmental protection agencies.
- (iii) Store and dispose of construction waste consistent with national regulations and the sub-project (site-specific) EMP
- (iv) Minimize dust emission to avoid or minimize negative consequences influencing air quality.
- (v) Provide pedestrian crossing and roads and access to the public places.
- (vi) Provide markets with light and transient roundabout connections to assure safety and convenience.
- (vii) Prevent or minimize vibration and noise from vehicles during explosive activities.
- (viii) Minimize damages and assure vegetation recovery.
- (ix) Protect surface and underground water from soil pollution. Assure water collection and distribution.

Safeguards Procedures for Inclusion in the Technical Specifications of Contracts (for rehabilitation/repairs activities)

I. General

1. The Contractor and his employees shall adhere to the mitigation measures set down and take all other measures required by the Engineer to prevent harm, and to minimize the impact of his operations on the environment.
2. Remedial actions which cannot be effectively carried out during construction should be carried out on completion of each subproject and before issuance of the "Taking over certificate":

- (i) these subproject locations should be landscaped and any necessary remedial works should be undertaken without delay, including grassing and reforestation;
 - (ii) water courses should be cleared of debris and drains and culverts checked for clear flow paths; and
 - (iii) borrow pits should be dressed as fish ponds, or drained and made safe, as agreed with the land owner.
3. The Contractor shall limit construction works to between 6 am and 7 pm if it is to be carried out in or near residential areas.
 4. The Contractor shall avoid the use of heavy or noisy equipment in specified areas at night, or in sensitive areas such as near a hospital.
 5. To prevent dust pollution during dry periods, the Contractor shall carry out regular watering of earth and gravel haul roads and shall cover material haulage trucks with tarpaulins to prevent spillage.
 6. To avoid disease caused by inadequate provision of water and sanitation services, environmentally appropriate site selection led by application of the environmental and social screening form provided in this ESSAF, design and construction guidance, and a procedure for ensuring that this guidance is followed before construction is approved. Ensure engineering designs include adequate sanitary latrines and access to safe water.
 7. To prevent unsustainable use of timber and wood-firing of bricks, the contractor should replace timber beams with concrete where structurally possible. In addition, the contractor should ensure fired bricks are not wood-fired. Where technically and economically feasible, substitute fired bricks with alternatives, such as sun-dried mud bricks, compressed earth bricks, or rammed earth construction.
 8. The Contractor shall conduct appropriate disposal of waste materials and the protection of the workforce in the event of asbestos removal or that of other toxic materials.

Prohibitions

9. The following activities are prohibited on or near the project site:
 - Cutting of trees for any reason outside the approved construction area;
 - Hunting, fishing, wildlife capture, or plant collection;
 - Use of unapproved toxic materials, including lead-based paints, asbestos, etc.
 - Disturbance to anything with architectural or historical value;
 - Building of fires;
 - Use of firearms (except authorized security guards);

II. Transport

10. The Contractor shall use selected routes to the project site, as agreed with the Engineer, and appropriately sized vehicles suitable to the class of road, and shall restrict loads to prevent damage to roads and bridges used for transportation purposes. The Contractor shall be held responsible for any damage caused to the roads and bridges due to the transportation of excessive loads, and shall be required to repair such damage to the approval of the Engineer.
11. The Contractor shall not use any vehicles, either on or off road with grossly excessive, exhaust or noise emissions. In any built up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor.
12. Adequate traffic control measures shall be maintained by the Contractor throughout the duration of the Contract and such measures shall be subject to prior approval of the Engineer.

III. Workforce

13. The Contractor should whenever possible locally recruit the majority of the workforce and shall provide appropriate training as necessary.
14. The Contractor shall install and maintain a temporary septic tank system for any residential labor camp and without causing pollution of nearby watercourses.
15. The Contractor shall establish a method and system for storing and disposing of all solid wastes generated by the labor camp and/or base camp.

16. The Contractor shall not allow the use of fuel wood for cooking or heating in any labor camp or base camp and provide alternate facilities using other fuels.
17. The Contractor shall ensure that site offices, depots, asphalt plants and workshops are located in appropriate areas as approved by the Engineer and not within 500 meters of existing residential settlements and not within 1,000 meters for asphalt plants.
18. The Contractor shall ensure that site offices, depots and particularly storage areas for diesel fuel and bitumen and asphalt plants are not located within 500 meters of watercourses, and are operated so that no pollutants enter watercourses, either overland or through groundwater seepage, especially during periods of rain. This will require lubricants to be recycled and a ditch to be constructed around the area with an approved settling pond/oil trap at the outlet.
19. The Contractor shall not use fuel wood as a means of heating during the processing or preparation of any materials forming part of the Works.
20. The Contractor shall conduct safety training for construction workers prior to beginning work. Material Safety Data Sheets should be posted for each chemical present on the worksite.
21. The Contractor shall provide personal protective equipment (PPE) and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed and –shanked boots, etc.) for construction and pesticide handling work. Use of PPE should be enforced.

IV. Quarries and Borrow Pits

22. Operation of a new borrow area, on land, in a river, or in an existing area, shall be subject to prior approval of the Engineer, and the operation shall cease if so instructed by the Engineer. Borrow pits shall be prohibited where they might interfere with the natural or designed drainage patterns. River locations shall be prohibited if they might undermine or damage the river banks, or carry too much fine material downstream.
23. The Contractor shall ensure that all borrow pits used are left in a trim and tidy condition with stable side slopes, and are drained ensuring that no stagnant water bodies are created which could breed mosquitoes.
24. Rock or gravel taken from a river shall be far enough removed to limit the depth of material removed to one-tenth of the width of the river at any one location, and not to disrupt the river flow, or damage or undermine the river banks.
25. The location of crushing plants shall be subject to the approval of the Engineer, and not be close to environmentally sensitive areas or to existing residential settlements, and shall be operated with approved fitted dust control devices.

V. Earthworks

26. Earthworks shall be properly controlled, especially during the rainy season.
27. The Contractor shall maintain stable cut and fill slopes at all times and cause the least possible disturbance to areas outside the prescribed limits of the work.
28. The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.
29. In order to protect any cut or fill slopes from erosion, in accordance with the drawings, cut off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other plant cover. Cut off drains should be provided above high cuts to minimize water runoff and slope erosion.
30. Any excavated cut or unsuitable material shall be disposed of in designated tipping areas as agreed to by the Engineer.
31. Tips should not be located where they can cause future slides, interfere with agricultural land or any other properties, or cause soil from the dump to be washed into any watercourse. Drains may need to be dug within and around the tips, as directed by the Engineer.

VI. Historical and Archeological Sites

32. If the Contractor discovers archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractor shall:
 - (i) Stop the construction activities in the area of the chance find.

- (ii) Delineate the discovered site or area.
- (iii) Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities take over.
- (iv) Notify the supervisory Engineer who in turn will notify the responsible local authorities and the Ministry of Culture, Youth and Sports immediately (less than 24 hours).
- (v) Contact the responsible local authorities and the Ministry of Information, Culture and Communication who would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out. This would require a preliminary evaluation of the findings to be performed by the archeologists of the relevant Ministry of Information, Culture and Communication (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage, including the aesthetic, historic, scientific or research, social and economic values.
- (vi) Ensure that decisions on how to handle the finding be taken by the responsible authorities and the Ministry of Information, Culture and Communication. This could include changes in the layout (such as when the finding is an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage.
- (vii) Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the Ministry of Information, Culture and Communication; and
- (viii) Construction work will resume only after authorization is given by the responsible local authorities and the Ministry of Information, Culture and Communication concerning the safeguard of the heritage.

VII. Disposal of Construction and Vehicle Waste

- 33. Debris generated due to the dismantling of the existing structures shall be suitably reused, to the extent feasible, in the proposed construction (e.g. as fill materials for embankments). The disposal of remaining debris shall be carried out only at sites identified and approved by the project engineer. The contractor should ensure that these sites: (i) are not located within designated forest areas; (ii) do not impact natural drainage courses; and (iii) do not impact endangered/rare flora. Under no circumstances shall the contractor dispose of any material in environmentally sensitive areas.
- 34. In the event any debris or silt from the sites is deposited on adjacent land, the Contractor shall immediately remove such, debris or silt and restore the affected area to its original state to the satisfaction of the Supervisor/Engineer.
- 35. Bentonite slurry or similar debris generated from pile driving or other construction activities shall be disposed of to avoid overflow into the surface water bodies or form mud puddles in the area.
- 36. All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary, will be considered incidental to the work and should be planned and implemented by the contractor as approved and directed by the Engineer.
- 37. Vehicle/machinery and equipment operations, maintenance and refueling shall be carried out to avoid spillage of fuels and lubricants and ground contamination. An oil interceptor will be provided for wash down and refueling areas. Fuel storage shall be located in proper bounded areas.
- 38. All spills and collected petroleum products shall be disposed of in accordance with standard environmental procedures/guidelines. Fuel storage and refilling areas shall be located at least 300m from all cross drainage structures and important water bodies or as directed by the Engineer.

ANNEX 6: UNOPS guidance to environmental management system handbook

Structure of the UNOPS EMS

- (x) Environmental Policy OD40: Gives overall organisational commitment and direction
- (xi) EMS Procedures and Processes: Sets out what needs to be in place and what needs to be done for the Environmental Management system. Found in EMS Handbook section 1 to 24

Key sections covered by UNOPS key procedures:

- (xii) Planning
 - 1. Aspects & Impacts: Environmental Screening, Environmental Review, Environmental Management Plans (SEMP and PEMP)
 - 2. UNOPS Guidelines, Local Requirements, other requirements iii. Objectives, Targets, Plans
- (xiii) Implementation
 - 1. Ensuring that Environmental Plan is understood by all and that it becomes part of business as usual. Also ensuring that the key controls are in place and working
 - 2. Assigning responsibilities
 - 3. Training: EMS training, Toolbox Talks/fact sheets, lessons learned iv. Communications v. Emergency preparedness vi. Use of latest documents/templates and maintaining records
- (xiv) Self-monitoring
 - 1. Weekly Inspections
 - 2. Monthly Reporting
- (xv) External/Independent Monitoring
 - 1. Legal and other requirements compliance Monitoring
 - 2. Internal Audits
 - 3. External Audits

Management Review: Senior management review the EMS and change the direction and thrust of the system. They may reduce, increase or maintain the same resources and organisational focus on the EMS depending on the needs of the organization.

LeadS ID/Project Number	
Project title	EERP – Ebola Emergency response project
Proposed project budget	
Proposed project duration	9 months
Implementing BU	
Project manager/Developer	Antonio Baio
Officer responsible for environmental planning	
Brief outline of the project scope	To provide (22) hospital(s) with a low fuel consumption “built <i>in situ</i> ” De Montfort Mark 9 Incinerator, to rehabilitate waste management area, to be matching minimum standards requirements (fencing, ash and placenta pits, separated zone for waste selection (biohazard, organic, bio-medic, general))

Version Control

Version	Date	Author
V 0.00	24.07.2015	Itai Mukuvvari, Antonio Baio
V 0.01		
V 0.02		

The Project Environmental Management Plan (PEMP) describes how the potential environmental impacts will be addressed throughout the project cycle.

The Project Environmental Management Plan covers the design and implementation of the project, and includes mitigation measures/actions that are within UNOPS control and influence only.

Issues to consider	ASPECT description	Potential IMPACT (under normal, abnormal or emergency situations, as required)	Applicable Environmental Legislation, Other Requirements and Guidance	Significance Rating	Action required / MITIGATION	Responsible party	Status of mitigation measures
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<i>The list of impact types is not exhaustive and will vary between projects (see additional guidance on page 2 of this programme)</i>	How do the project activities interact with the environment in terms of the issues in the left hand column? <i>E.g. Debris from bridge repairs falls into river; or New road reduces congestion in town centre</i>	What change (impact) would this aspect of the activity have on the environment? Impacts may be positive(+) or negative(-) <i>E.g. Debris pollutes river; or Improved air quality, reduced noise</i>	List relevant environmental legislation and regulations, related requirements of the brief or contract and any relevant guidance	Low, Medium or High – see the Notes below	Identify whether the impact can be controlled or influenced by UNOPS and if so, what action is required <i>E.g. Erect shuttering to prevent debris falling into river, or incorporate green design, or to be managed by contractor on site according to REI</i>	Who is responsible, eg: <i>A named person within UNOPS or Contractor</i>	Sign off the aspect once proposed actions completed
Community and stakeholder issues (i.e. planning requirements)	1. Transportation of materials to site, movement of construction crews 2. Establishment of a construction camp	1. Interference with traffic, obstructing patients and health service providers 2. Conflict between construction workers and community, inadequate welfare facilities for employees	Public Health Act (2004)	L H	1. Good planning of Route and time of movements, coordination with Hospital Management 2. Refer to UNOPS construction camp guideline GHS14. Have communication /consultation process with relevant stakeholders	Project Manager (PM)	
Landscape & visual impact, Archaeology and cultural heritage	Location of structures and placement of debris and materials	Visual intrusion from works may affect the appearance of the scenery or interfere if structures of cultural or other significance	UNOPS Guideline GEM 06	L	Ensure hospital land ownership, consider appropriate scenery, culture and any other issues they may be important to the local population when siting works	PM	waste management area selected together with staff operating the incinerator as well as hospital management to ensure lower impact

Ecology (habitats, flora and fauna)	Clearing land for building incinerators	Destruction of flora and fauna, damage to habitats, loss of endangered species	Environmental management Act (2008)	M	Keep to demarcated/fenced area, if available-choose lowest impact area for specific site	PM	rehabilitation of the dedicated area included in the SoW
Air quality (emissions and indoor air quality)	1. Handling of materials, excavations 2. Incineration process	1. Release of dust into the air and onto vegetation and building, occupational exposure, 2. Under designed, easy to use incinerator might not sufficiently destroy pathogens in highly infectious waste therefore contaminating surroundings e.g. through fall-out dust or residues.	Environmental management Act (2008) Public Health Act (2004)	M H	Watering down, covering materials e.g. during delivery, PPE and administrative controls to limit employee exposure. 2. UNOPS will supply lower temperature incinerator for the medium size Health centre incinerators. Host Government and Donor shall formally acknowledge that this is the practical solution they requested and commit to put in place training and other arrangements for identification and further treatment of waste that cannot be incinerated in these units. UNOPS shall impart skills for running and maintaining the units installed. Residual from low temperature incineration will be temporary stored in the “sharp” pit	Site Supervisor/Engineer PM	coordination with other partners providing “high tech” incinerators to cope with the gap

Water (usage, discharges and risk of floods)	Siting of incinerator, placing of material, removed soil	Negative effect on drainage, erosion, siltation	Local Government Act (2004)	M	Weekly inspection program (using attached form) will identify issues that need correction.	Site Supervisor/Engineer	
Contamination	Interaction with existing waste on surface or in excavated materials.	Spreading of contaminated areas, exposure of construction workers to disease.	Public Health Act (2004)	M	Contractor to do risk assessment (refer to attached form - Health and safety system) if contamination is suspected.	PM	
Energy (usage, source, cost etc)	Design of Triage and incinerators, training and handover of facilities	Damage to the environment because of poor energy source, Depletion of source energy resources	Environmental Management Act (2008)	M	1. Sustainable energy solution to be part of the design solution. Consideration for potential to use renewable/ clean, readily available source of energy. Consideration for local ability to maintain a solution with a particular energy source.	PM	de Montfort incinerator has been chosen because of its low fuel consumption functioning, enhancing sustainability in terms of low running cost as well as easier maintenance
Materials (quantity and type used)	1. Materials supplied or disposed of by contractors/suppliers	1. Damage to environment from poor practices by supplier	Environmental Management Act (2008)	M	1. Use suppliers/contractors that are authorized by the local authority. Ensure that they employ environmentally friendly practices e.g at the quarry or where they dispose waste from the site.	PM	relevant requirements included in the ToR for the procurement of the works

Waste management	1. Generation of waste from construction process, 2. Considerations for waste management during operations of completed facility	1. Pollution from poorly managed waste. Lost opportunity to minimise/reuse/recycle waste, 2. Contamination from poorly managed medical waste	Local Government Act (2004) Public Health Act (2004)	H	1. Segregate waste- do not mix hazardous waste such oil contaminated materials, cement washings, medical wastes with domestic waste. Separate reusable materials. Decide good practice for a site based on UNOPS guideline on waste management (GEM02), the health facility's plan, also refer to ESMF document.	PM Supervisor/Engineer	protocols included in the ToR for the procurement of the works
Transport (transport / traffic plans)	Construction activities- movement of materials, personnel	Causing traffic congestion, reducing access of service providers, the public or medical teams		M	Good planning of Route and time of movements coordination with Hospital management	Site Supervisor/Engineer	
Emergency Plan (Is a project one required?) Who would be the principal agency?	Emergency situations arising during construction	Damage to property, flora, fauna, injuries to personnel		H	1. Prepare emergency preparedness plan: site evacuation, emergency numbers. Carry out awareness training, e.g. spill clean-up process, Including medical emergency if project team/contractors get injured or start showing signs of Ebola infection. Test procedures through drills.	PM	

Socio-Economic	1. Employing personnel directly or through contractors, stakeholder consultations. 2. Getting service providers and procuring materials.	1. Some members of the community may be side lined in employment, consultations, etc. 2. Local personnel, contractors and suppliers may be side lined.	UN gender policies,	M M	1. Apply UNOPS gender mainstreaming principles 2. Encourage participation of local personnel, contractors and suppliers may be side lined. Seek to develop local capacity.	PM PM	
Other							

ANNEX 7: Procedures for health care waste management

I. Packing and Labeling Requirements

GENERAL

Segregation of regulated medical waste at the point of generation is essential to ensure proper handling and worker safety. Waste generators are responsible for ensuring that regulated medical waste is discarded directly into clearly identifiable containers and labeled as described below. Regulated medical waste must be packaged and labeled before it is stored, treated, transported or disposed of. Persons packaging regulated medical waste shall wear heavy gloves of latex (22 mil gauge minimum) or equivalent material and other items consistent with level of hazard.

PACKAGING

This section refers to waste accumulated at the site of generation.

- (i) All bags containing regulated medical waste shall be red in color and leak proof, including bags used in steam sterilization. Any waste contained in red bags shall be considered regulated medical waste and handled as such.
- (ii) Free liquids shall be contained in sturdy highly leak resistant containers that resist breaking.
- (iii) Sharps shall be placed directly in rigid puncture resistant containers at the point of generation.
- (iv) All bags and containers shall be labeled according to the labeling section below.
- (v) Bags and containers shall be placed in a fiberboard disposal box immediately once full or treated via steam sterilization.
- (vi) Regulated medical waste shall be placed in the red bags and corrugated fiberboard boxes that are provided by the hospital
- (vii) One bag shall be used to line the box.
- (viii) Liquids may be placed in the box; however free liquids in excess of 20cc shall be contained in sturdy highly leak resistant containers that resist breaking, prior to being placed in the box.
- (ix) Sharps containers shall be closed and placed inside a plastic bag prior to being placed in the box.
- (x) The contents of the box shall not exceed 40 lbs.
- (xi) When the bag is full, it shall be sealed by lapping the gathered open end and then binding it with tape or a closing device such that no liquid can leak. The box shall be closed and all seams shall be taped with clear packaging tape to prevent leakage.

LABELING

This section refers to labeling bags and containers at the site of generation.

- (i) All bags and containers shall display a label with the biological hazard symbol and the words “regulated medical waste,” “biohazard,” “biohazardous waste” or “infectious waste.”
- (ii) The label shall be securely attached to the outer layer of packaging and be legible. The label may be a stick-on or tied-on tag affixed to the package or pre-labeled package.

- (iii) The disposal boxes come pre-printed with the applicable labeling required for transport. Indelible ink shall be used to complete the generator information section on the box.
- (iv) Prior to putting any waste in the box, the following generator information shall be completed: generator ID Number, name, address, and phone number.

The date of shipment and manifest number will be completed by the contractor when the waste is picked up.

II. Waste Storage

GENERAL

Storing small quantities (less than 64 gallons) of regulated medical waste awaiting transportation to a collection area or disposal site is permissible as long as the packaging and labeling requirements and conditions are met.

Treatment and Disposal

GENERAL

Regulated medical waste shall be disposed of only by:

- (i) steam sterilization (autoclaving) followed by placement in the solid waste stream or
- (ii) incineration by a licensed regulated medical waste disposal facility.

STERILIZATION

Whenever regulated medical waste is treated in a steam sterilizer, the waste shall be subject to the following operational standards (at one hundred percent steam conditions and all air evacuated):

- (i) Temperature of not less than 250 degrees Fahrenheit for 90 minutes at 15 pounds per square inch of gauge pressure,
- (ii) Temperature if not less than 272 degrees Fahrenheit for 45 minutes at 27 pounds per square inch gauge pressure, or
- (iii) Temperature of not less than 320 degrees Fahrenheit for 16 minutes at 80 pounds per square inch gauge pressure.

Note: In the event that an autoclave unit does not operate at optimum temperatures the device shall not be used, and will clearly and legibly tagged “DO NOT USE” and state the reason, along with the signature of person placing tag.

STERILIZATION CONTROLS AND RECORDS

Each package of waste sterilized must have a tape attached that will indicate if the sterilization temperature has been reached. Waste is not satisfactorily sterilized if the indicator fails to indicate proper temperature was achieved during the process.

A log shall be kept at each steam sterilization unit that is complete for the proceeding three-year period. Entries shall include date, time, and operator of each usage; the type and approximate

amount (pounds) of waste treated; the post sterilization reading of the temperature sensitive tape, dates and result of calibration and monthly effective testing with *B. stearothermophilus*.

Note: Waste shall not be compacted or subjected to violent mechanical stress before sterilization. After sterilization, it may be compacted in a closed container.

DISPOSAL

The health officer is responsible to remove regulated medical waste generated in the hospital. Regulated medical waste shall only be transported for disposal by transporters. Treated waste contained in red bags and steam sterilized shall be placed in orange plastic bags, sealed and disposed of via the solid waste stream. The bag shall have a label placed on it with the following message in indelible ink and legible print of a 21 point or greater typeface stating:

“The generator certifies that this waste has been treated and is no longer regulated medical waste.

Treated: _____ (include date treatment performed)

Generator: (include name, address, and telephone number of generator ”

III. Transporting Waste

GENERAL

Regulated medical waste shall only be transported from point of generation to a storage area or to designated steam sterilized for treatment. Prior to transporting, the red bags must be placed in an outer container, such as polyethylene bucket or corrugated fiberboard box and labeled in accordance with section four.

Training

GENERAL

Departments and laboratories generating regulated medical waste shall instruct assigned personnel in packaging, labeling, storage and disposal requirements of this guide. Additionally, individuals assigned to treat regulated medical waste by steam sterilization shall attend blood borne pathogen training and shall be aware of autoclave temperature, pressure, time, and performance testing and record keeping requirements. Records of training shall be maintained by each generator for verification.

IV. Management of Waste Spills

GENERAL

Spills of regulated medical waste must be cleaned up immediately to prevent further contamination of the area. This shall be handled only by personnel who have met all training requirements. Departments and laboratories shall maintain a supply of the following:

- (i) Materials: Material designed to absorb liquids, such as absorbent pads or blankets, depending on quantity of liquid waste likely to be present.
- (ii) One gallon of hospital grade disinfectant effective against mycobacteria, with a spray bottle capable of discharging its content in a mist and stream.
- (iii) Red plastic bags, sealing tape and biohazard labels or tags. The bags shall be large enough to over-pack containers normally used to store regulated medical waste.

Note: These materials should be kept within the vicinity of any area where regulated medical waste is managed; however, the materials may be kept in a central location in a building as long as the materials are easily accessible and a rapid and efficient cleanup of spills can be accomplished.

SPILL CONTAINMENT AND CLEAN UP

Upon spilling waste or finding regulated medical waste that has been spilled, take immediate steps to prevent further loss of material by establishing a barrier around the material to prevent its spread. Then take the following steps:

- (i) Leave the area until the aerosol settles (if applicable).
- (ii) Clean up crew shall don personnel clothing and secure the spill area.
- (iii) Spray the broken containers of regulated medical waste with disinfectant.
- (iv) Place broken containers and spillage inside over-pack bags, minimizing exposure.
- (v) Disinfect the area and take over steps deemed appropriate.
- (vi) Clean and disinfect non-disposable items.
- (vii) Clean and disinfect protective clothing before removing.
- (viii) Remove protective clothing and place disposable items in waste bag.
- (ix) Replenish containment and cleanup kit.

Prepare a waste report documenting the date, location, nature of regulated medical waste involved, and describe the incident, cleanup procedures and disposition of wastes. Forward on copy to the Directorate of Environmental Health and Sanitation

V. Definition and characterization of health-care waste

Waste from infected patients in isolation wards includes excreta, dressings from infected or surgical wounds, and clothes heavily soiled with human blood or other body fluids. Waste from non-infective patients and that is not contaminated with blood or body fluids may be considered non-infectious. In low-resource settings, the infection- control or medical personnel should determine whether waste from non-isolation ward patients should be classified as infectious waste. They should apply the principles of the chain of infection to assess the risk of disease transmission from local practices used in the collection, handling, transport, treatment and disposal of waste.

Pathological waste could be considered a subcategory of infectious waste, but is often classified separately – especially when special methods of handling, treatment and disposal are used. Pathological waste consists of tissues, organs, body parts, blood, body fluids and other waste from surgery and autopsies on patients with infectious diseases. It also includes human fetuses and infected animal carcasses. Recognizable human or animal body parts are sometimes called anatomical waste.

Pathological waste may include healthy body parts that have been removed during a medical procedure or produced during medical research.

Pharmaceutical waste, including genotoxic waste Pharmaceutical waste includes expired, unused, spilt and contaminated pharmaceutical products, prescribed and proprietary drugs, vaccines and sera that are no longer required, and, due to their chemical or biological nature, need to be disposed of carefully. The category also includes discarded items heavily contaminated during the handling of pharmaceuticals, such as bottles, vials and boxes containing pharmaceutical residues, gloves, masks and connecting tubing.

Genotoxic waste is highly hazardous and may have mutagenic (capable of inducing a genetic mutation), teratogenic (capable of causing defects in an embryo or fetus) or carcinogenic (cancer-causing) properties. The disposal of genotoxic waste raises serious safety problems, both inside hospitals and after disposal, and should be given special attention. Genotoxic waste may include certain cytostatic drugs (see below), vomit, urine or faeces from patients treated with cytostatic drugs, chemicals and radioactive material. Technically, genotoxic means toxic to the deoxyribonucleic acid (DNA); cytotoxic means toxic to the cell; cytostatic means suppressing the growth and multiplication of the cell; antineoplastic means inhibiting the development of abnormal tissue growth; and chemotherapeutic means the use of chemicals for treatment, including cancer therapy. Cytotoxic (chemotherapeutic or antineoplastic) drugs, the principal substances in this category, have the ability to kill or stop the growth of certain living cells and are used in chemotherapy of cancer. They play an important role in the therapy of various neoplastic conditions, but are also finding wider application as immunosuppressive agents in organ transplantation and in treating various diseases with an immunological basis. Cytotoxic drugs are most often used in specialized departments, such as oncology and radiotherapy units, whose main role is cancer treatment. Their use in other hospital departments and outside the hospital in clinics and elsewhere is also increasing. Cytostatic drugs can be categorized as follows:

- (i) alkylating agents: cause alkylation of DNA nucleotides, which leads to cross-linking and miscoding of the genetic stock;
- (ii) antimetabolites: inhibit the biosynthesis of nucleic acids in the cell;
- (iii) mitotic inhibitors: prevent cell replication.

VI. Safe management of wastes from health-care activities

Cytotoxic wastes are generated from several sources and can include the following:

- (i) contaminated materials from drug preparation and administration, such as syringes, needles, gauzes, vials, packaging;
- (ii) outdated drugs, excess (leftover) solutions, drugs returned from the wards;
- (iii) urine, faeces and vomit from patients, which may contain potentially hazardous amounts of the administered cytostatic drugs or of their metabolites, and which should be considered genotoxic for at least 48 hours and sometimes up to 1 week after drug administration. In specialized oncological hospitals, genotoxic waste

(containing cytostatic or radioactive substances) may constitute as much as 1% of the total health-care wastes.

GUIDING PRINCIPLES

Health-care facility managers have a “duty of care” (often required by national regulations) to ensure that waste is kept under control at all times within a health-care facility and disposed of safely either onsite or offsite. Proper segregation, onsite storage and transportation systems are continuous sequence of safe keeping at each step in the process, from the point of generation of waste to its final treatment or disposal. Each step in the concept of managing the “waste flow” is given below. The following general principles of waste segregation, storage and transportation relate to the control of waste flow from generation to disposal:

- (i) health-care waste is generated in a medical area and should be segregated into different fractions, based on their potential hazard and disposal route, by the person who produces each waste item;
- (ii) separate containers should be available in each medical area for each segregated waste fraction;
- (iii) waste containers when filled should be labelled to help managers control waste production;
- (iv) closed local storage inside or near to a medical area may be needed if wastes are not collected frequently;
- (v) hazardous and non-hazardous wastes should not be mixed during collection, transport or storage;
- (vi) collected waste is often taken to central storage sites before onsite or offsite treatment and disposal;
- (vii) staff should understand the risks and safety procedures for the wastes they are handling.

SEGREGATION SYSTEMS

The correct segregation of health-care waste is the responsibility of the person who produces each waste item, whatever their position in the organization. The health-care facility management is responsible for making sure there is a suitable segregation, transport and storage system, and that all staff adhere to the correct procedures.

Segregation should be carried out by the producer of the waste as close as possible to its place of generation, which means segregation should take place in a medical area, at a bedside, in an operating theatre or laboratory by nurses, physicians and technicians. If classification of a waste item is uncertain, as a precaution it should be placed into a container used for hazardous health-care waste. The simplest waste-segregation system is to separate all hazardous waste from the larger quantity of nonhazardous general waste. However, to provide a minimum level of safety to staff and patients, the hazardous waste portion is commonly separated into two parts: used sharps and potentially infectious items. In the latter, the largest components are typically tubing, bandages, disposable medical items,

swabs and tissues. Consequently, the segregation of general, non-hazardous waste, potentially infectious waste and used sharps into separate containers is often referred to as the “three-bin system”. Further types of containers can be used for other categories of wastes, such as chemical and pharmaceutical wastes, or to separate out pathological waste, where it is to be handled and disposed of in different ways from the other portions of the waste flow.

WASTE CONTAINERS, COLOUR CODES AND LABELS

Ideally, the same system of segregation should be in force throughout the country. Colour coding makes it easier for medical staff and hospital workers to put waste items into the correct container, and to maintain segregation of the wastes during transport, storage, treatment and disposal. Colour coding also provides a visual indication of the potential risk posed by the waste in that container.

WASTE CONTAINERS: SPECIFICATIONS AND SITTING

Waste containers can come in many shapes and sizes and be made from different materials. Many modern waste containers are designed for automated systems that empty their contents into the waste-disposal system and wash and disinfect them mechanically. At the other end of the scale, waste containers may also be made out of reused plastic and metal containers. In all cases, they should be sturdy and leak-proof, and (except for sharps containers) lined with a sturdy plastic bag. The recommended thickness of bags for infectious waste is 70 μm (ISO 7765 2004). Plastics used for either containers or bags should be chlorine-free. Not all plastic bags can withstand temperatures of 121 °C, and some can melt during an autoclave process. Containers should have well-fitting lids, either removable by hand or preferably operated by a foot pedal. Both the container and the bag should be of the correct colour for the waste they are intended to receive and labelled clearly. Mixing colours – such as having yellow bags in black bins – should be avoided, because it will increase the potential for confusion and poor segregation. Since sharps can cause injuries that leave people vulnerable to infection, both contaminated and uncontaminated sharps should be collected in a puncture-proof and impermeable container that is difficult to break open after closure. Performance specifications for these containers are given in WHO (2007).

Sharps containers may be disposable or designed for disinfection and reuse. Disposables are boxes made of plasticized cardboard or plastic ; reusable designs are plastic or metal. Low-cost options include the reuse of plastic bottles or metal cans. If this is to be done, the original labels should be removed or obscured, and the containers should be clearly relabeled as “Sharps containers”. The appropriate waste receptacle (bags, bins, sharps boxes) should be available to staff in each medical and other waste-producing area in a health-care facility. This permits staff to segregate and dispose of waste at the point of generation, and reduces the need for staff to carry waste through a medical area. Posters showing the type of waste that should be disposed of in each container should be posted on

walls to guide staff and reinforce good habits. Segregation success can be improved by making sure that the containers are large enough for the quantity of waste generated at that location during the period between collections. Up-to-date waste audit data can be used to assess the volume and type of waste containers necessary, since waste managers also need to spend time with staff in medical areas identifying the type of work that is undertaken. No two areas will be the same.

Medical staff should be encouraged to think of waste disposal as part of a patient's treatment, so all aspects of the care process are completed at the bedside or treatment room. If intervention at the bedside is required, a waste container should be taken to the bed. Sharps bins are also sometimes taken to a patient for drug administration or blood sampling. A mobile trolley with infectious waste and sharps containers may therefore be more versatile and should be given serious consideration. The alternative is establishing a limited number of locations in a medical area where general waste (black bags) and infectious health-care waste (yellow bags and sharps containers) are placed. The locations should be away from patients; typical sites are the sluice (utility) room, treatment room and nurses' station. Where containers for segregating hazardous and non-hazardous health-care wastes are in use, they should be located close together, wherever possible. Containers for infectious waste should not be placed in public areas because patients and visitors may use the containers and come into contact with potentially infectious waste items. Static bins should be located as close as possible to sinks and washing facilities, because this is where most staff will deposit gloves and aprons after treating patients. If the general waste container is closest to the sink or under a towel dispenser, it will encourage staff to place towels into the non-infectious receptacle. Containers should be of similar size to overcome the observed tendency for staff to put waste in the largest receptacle. Unless patients are known or suspected to have readily transmitted infections, the assumption should be that general waste generated in a medical area is of low risk. However, if there is a known communicable infection (e.g. methicillin-resistant *Staphylococcus aureus*, tuberculosis or leprosy), all waste used in and around the patient should be classed as an infection risk and placed in the yellow, potentially infectious waste container. This "blanket" approach to all waste being assumed to be infectious can be avoided where there is a high level of training and communication between the clinical and support staff. Waste from each patient should be treated according to their known infection status

Table: Segregation of healthcare waste

Waste category	Typical waste items	Type of container	Colour or mark/sign
Non-sharps wastes	Infectious, pathological wastes and some pharmaceutical and chemical residues	Leak-proof container or plastic bag in a holder	Yellow or special mark or sign
Used sharps	Syringes with needles, sutures, blades, broken glass	Leak- and puncture proof sealable container, box or drum bearing the word "contaminated sharps"	Yellow or special mark or sign
General waste	Similar to municipal wastes,	Container or plastic bag	Black or special mark or sign

S. N o.	Type of Waste	Location	Color coding	Segregation	Institution Treatment	Storage	Transportation	End Treatment
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	not contaminated by hazardous substances	in a holder	
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Table: Waste type classification, color coding description




Infectious Clinical Waste Hazardous	Poses a known or potential risk of infection including anatomical waste, diagnostic specimens, reagent or test vials. Potentially infectious waste, autoclave and laboratory waste. Poses a known or potential risk of infection including anatomical waste, Human tissue, body parts and placenta	
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	
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.	
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	
General Waste:	Card box, paper, kitchen waste , food waste etc.	

Table: Method of health care waste collection, treatment and final disposal

1	Human tissue, body parts and placenta	OT, Labour room, Wards	<p>. Infectious Clinical Waste Hazardous</p> <p>Poses a known or potential risk of infection including anatomical waste, tissue, body parts and placenta</p>	To be collected in red plastic bags kept in buckets	Waste Management Unit	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	<p>. Infectious Clinical Waste Hazardous</p> <p>Poses a known or potential risk of infection including anatomical waste, diagnostic specimens, reagent or test vials</p>	bucket lined with yellow plastic liners	Waste Management Unit	Storage site	Transported by waste collection covered vehicle	Autoclave
3	All types of plastics i.e. plastic syringes, I.V. lines, I.V. bottles, bags	All wards and departments	<p>Infectious Clinical Waste Hazardous</p> <p>Poses a known or potential risk of infection including anatomical waste, diagnostic specimens, reagent or test vials</p>	buckets lined with yellow plastic liner	5% Hypochlorite solution for 30 minutes	Storage site	Transported by waste collection vehicle	Autoclave and shredding
4.	Discarded medicines and Cytotoxic drugs and heavy chemicals	Stores	Hormone and cancer treatment medicinal waste must be separated from other medicinal waste	bucket with yellow plastic liners,	Pharmacy Board	Storage site	Sent by waste collection covered vehicle	Deep burial

5.	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	Storage site	Laundry vehicle	Washed in laundry
6.	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	Waste Management unit	Storage site	Transported by Municipal vehicle	No treatment is required
7.	Needles, blades and Vials	All wards departments All wards departments	Infectious Clinical Waste Hazardous Potentially infectious waste, autoclave and laboratory waste	disinfection by needle destroyer then put in sharps container with 1% hypochlorite solution	1% hypochlorite for 30 minutes	Storage site	Transported by vehicle	Autoclave
8.	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 hypochlorite solution 1%	1% hypochlorite for 30 minutes	Storage site	Transported by vehicle	Autoclave

9.	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	Pharmacy Board	Storage site	Transported by vehicle	No treatment required
10.	Microbiology and other pathological waste	Labs	Infectious Clinical Waste Hazardous Poses a known or potential risk of infection including anatomical waste, diagnostic specimens, reagent or test vials	Tight lid bucket	5% Hypochlorite solution for 30 minutes & discarded in drainage	Storage site	Transported by vehicle	Autoclave
11	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, reagent or test vials and liquid waste	Tight lid bucket	5% Hypochlorite for 30 minutes & discarded in drainage	Storage site	Transported by vehicle	In Toilet/drainage
12	Broken thermometers and sphygmomanometer	All wards/ Departments	Infectious Clinical Waste Hazardous Poses a known or potential risk of injury including radioactive waste	Glass bottle with water	Waste Management Unit	Storage site	Transported by vehicle	Deep burial-

13	Chemicals used in disinfection	All wards and departments	Infectious Clinical Waste Hazardous [Redacted] Poses a known or potential risk of infection including chemical reaction	Waste Management	5% Hypochlorite for 30 minutes & discarded in drainage	Storage site	Transported by vehicle	In Toilet/drainage
14	Heavy chemicals containers/aero containers	OT, Surgery Depts., other Depts.	Infectious Clinical Waste Hazardous [Redacted] Poses a known or potential risk of infection including chemical reaction	collection point	5% Hypochlorite for 30 minutes	Storage site	Transported by vehicle	Mutilated in shredder
15	Discarded expired infected blood or its products.	Blood bank	Infectious Clinical Waste Hazardous [Redacted] Poses a known or potential risk of infection including blood tissue products waste	Tight Lid bucket with 5% hypochlorite solution	5% hypochlorite solution for 30 minutes and liquid discarded in main drainage	Storage site	Transported by vehicle	Incinerator
16	Card boxes, kitchen waste, papers, cartons	Office, kitchen, store	General Waste: These are waste that are not Infectious/hazardous.	[Redacted] Tight Lid bucket/plastic bag	Burning pit	Storage site	Transported by vehicle	Burnt in a burning pit

Collection within the health-care facility

Collection times should be fixed and appropriate to the quantity of waste produced in each area of the healthcare facility. General waste should not be collected at the same time or in the same trolley as infectious or other hazardous wastes. Waste bags and sharps containers should be filled to no more than three quarters full. Once this level is reached, they should be sealed ready for collection. Plastic bags should never be stapled but may be tied or sealed with a plastic tag or tie. Replacement bags or containers should be available at each waste-collection location so that full ones can immediately be replaced. Waste bags and containers should be labelled with the date, type of waste and point of generation to allow them to be tracked through to disposal. Where possible, weight

should also be routinely recorded. Anomalies between departments with similar medical services or over time at one location can show up differences in recycling opportunities, or problems such as poor segregation and diversion of waste for unauthorized reuse. Collection should be daily for most wastes, with collection timed to match the pattern of waste generation during the day. For example, in a medical area where the morning routine begins with the changing of dressings, infectious waste could be collected mid-morning to prevent soiled bandages remaining in the medical area for longer than necessary. Visitors arriving later in the day will bring with them an increase in general waste, such as newspapers and food wrappings; therefore, the optimum time for general and recyclable waste collection would be after visitors have departed. In comparison with this general type of medical area, a theatre would generate a high proportion of potentially infectious waste and could have several collections during the day to fit in with the schedule of operations. A child and maternal health clinic might generate primarily sharps waste from injections, which would be collected at the end of each working day.

Interim storage in medical departments

Where possible, hazardous waste generated in medical areas should be stored in utility rooms, which are designated for cleaning equipment, dirty linen and waste. From here, the waste can be kept away from patients before removal, then collected conveniently and transported to a central storage facility. This is known as interim or short-term storage. If utility rooms are not available, waste can be stored at another designated location near to a medical area but away from patients and public access. Another possibility for interim storage is a closed container stationed indoors, within or close to a medical area. A storage container used for infectious waste should be clearly labeled and preferably lockable.

Onsite transport of waste

GENERAL REQUIREMENTS

Onsite transport should take place during less busy times whenever possible. Set routes should be used to prevent exposure to staff and patients and to minimize the passage of loaded carts through patient care and other clean areas. Depending on the design of the health-care facility, the internal transport of waste should use separate floors, stairways or elevators as far as possible. Regular transport routes and collection times should be fixed and reliable. Transport staff should wear adequate personal protective equipment, gloves, strong and closed shoes, overalls and masks. Hazardous and non-hazardous waste should always be transported separately. In general, there are three different transport systems:

- Waste transportation trolleys for general waste should be painted black, only be used for non-hazardous waste types and labelled clearly “General waste” or “Non-hazardous waste”.

- Infectious waste can be transported together with used sharps waste. Infectious waste should not be transported together with other hazardous waste, to prevent the possible spread of infectious agents. Trolleys should be coloured in the appropriate colour code for infectious waste (yellow) and should be labelled with an “Infectious waste” sign.

- Other hazardous waste, such as chemical and pharmaceutical wastes, should be transported separately in boxes to central storage sites. The use of waste chutes in health-care facilities is not recommended, because they can increase the risk of transmitting airborne infections.

Transport trolleys

Health-care waste can be bulky and heavy and should be transported using wheeled trolleys or carts that are not used for any other purpose. To avoid injuries and infection transmission, trolleys and carts should:

- be easy to load and unload
- have no sharp edges that could damage waste bags or containers during loading and unloading
- be easy to clean and, if enclosed, fitted with a drainage hole and plug
- be labelled and dedicated to a particular waste type
- be easy to push and pull
- not be too high (to avoid restricting the view of staff transporting waste)
- be secured with a lock (for hazardous waste)
- be appropriately sized according to the volumes of waste generated at a health-care facility.

Waste, especially hazardous waste, should never be transported by hand due to the risk of accident or injury from infectious material or incorrectly disposed sharps that may protrude from a container.

Spare trolleys should be available in case of breakdowns and maintenance. The vehicles should be cleaned and disinfected daily. All waste bag seals should be in place and intact at the end of transportation.

Routing

Separate hazardous and non-hazardous routes should be planned and used. In general, a waste route should follow the principle “from clean to dirty”. Collection should start from the most hygienically sensitive medical areas (e.g. intensive care, dialysis, theatres) and follow a fixed route around other medical areas and interim storage locations. The frequency of collection should be refined through experience to ensure that there are no overflowing waste containers at any time.

Biologically active waste (e.g. infectious waste) must be collected at least daily. A routing plan would be influenced by:

- waste volume and number of waste bags or containers
- waste types
- capacity of the waste storage within medical areas and at interim storage areas
- capacity of the transportation trolleys
- transport distances and journey times between the collection points.

Central storage inside health-care facility

A storage location for health-care waste should be designated inside the health-care facility. Space for storing wastes should be incorporated into a building design when new construction is undertaken; for an example, see the Guidelines for design and construction of hospitals and health care facilities (Facility Guidelines Institute, 2010). These storage areas should be sized according to the quantities of waste generated and the frequency of collection. The areas must be totally enclosed and separate from supply rooms or food preparation areas. Loading docks, space for compactors and balers for cardboard, staging areas for sharps boxes, recycling containers and secure storage (e.g. for batteries) should all be provided. Storage facilities should be labelled in accordance with the hazard level of the stored waste. typical signs advising the hazard posed by waste should be used. In general, there are four different kinds of waste-storage areas:

- non-hazardous or general waste
- hazardous waste
- infectious and sharps waste
- chemical and hazardous pharmaceutical waste
- radioactive waste

Infectious waste storage

The storage place must be identified as an infectious waste area by using the biohazard sign. Floors and walls should be sealed or tiled to allow easy disinfection. If present, the storage room should be connected to a special sewage system for infectious hospital wastewater. The compacting of untreated infectious waste or waste with a high content of blood or other body fluids destined for offsite disposal (for which there is a risk of spilling) is not permitted. Sharps can be stored without problems, but other infectious waste should be kept cool or refrigerated at a temperature preferably no higher than 3 °C to 8 °C if stored for more than a week. Unless a refrigerated storage room is

available, storage times for infectious waste (e.g. the time gap between generation and treatment) should not exceed the following periods:

- temperate climate - 48 hours in summer
- warm climate - 48 hours during the cool season - 24 hours during the hot season.

Pathological waste storage

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

Pharmaceutical waste storage

Pharmaceutical waste should be segregated from other wastes and local regulations followed for final disposal. In general, pharmaceutical wastes can be hazardous or non-hazardous, and liquid or solid in nature, and each should be handled differently. The classification should be carried out by a pharmacist or other expert on pharmaceuticals. The pharmaceutical waste streams that are listed below can be distinguished (WHO, 1999):

- Pharmaceutical waste with non-hazardous characteristics that can be stored in a non-hazardous storage area - ampoules with non-hazardous content (e.g. vitamins);
 - fluids with non-hazardous contents, such as vitamins, salts (sodium chloride), amino salts;
 - solids or semi-solids, such as tablets, capsules, granules, powders for injection, mixtures, creams, lotions, gels and suppositories;
 - aerosol cans, including propellant-driven sprays and inhalers.
- Hazardous waste that should be stored in accordance with their chemical characteristics (e.g. genotoxic drugs) or specific requirements for disposal (e.g. controlled drugs or antibiotics)
 - controlled drugs (should be stored under government supervision);
 - disinfectants and antiseptics;
 - anti-infective drugs (e.g. antibiotics);
 - genotoxic drugs (genotoxic waste);
 - ampoules with, for example, antibiotics.

Genotoxic waste is highly toxic and should be identified and stored carefully away from other health-care waste in a designated secure location. It can be stored in the same manner as toxic chemical waste, although some cytotoxic waste may also carry a risk of infection.

Chemical waste storage

When planning storage places for hazardous chemical waste, the characteristics of the different chemicals to be stored and disposed of must be considered (flammable, corrosive, explosive). The storage place should be an enclosed area and separated from other waste storage areas. When storing liquid chemicals, the storage should be equipped with a liquid- and chemical-proof sump. If no sump is present, catch-containers to collect leaked liquids should be placed under the storage containers. Spillage kits, protective equipment and first aid equipment (e.g. eye showers) should be available in the central storage area. The storage area itself should have adequate lighting and good ventilation to prevent the accumulation of toxic fumes.

To ensure the safe storage of chemical wastes, the following separate storage zones should be available to prevent dangerous chemical reactions. The storage zones should be labelled according to their hazard class. If more than one hazard class is defined for a specific waste, use the most hazardous classification: • explosive waste

- corrosive acid waste
- corrosive alkali waste (bases)
- toxic waste
- flammable waste
- oxidative waste
- halogenated solvents (containing chlorine, bromine, iodine or fluorine)
- non-halogenated solvents.

Liquid and solid waste should be stored separately. If possible, the original packaging should be taken for storage too. The packaging used to store and transport chemical wastes offsite should also be labelled. This label should have the following information: hazard symbol(s), waste classification, date, and point of generation (if applicable).

The storage area for explosive or highly flammable materials must be suitably ventilated above and below, with a bonded floor and constructed of materials suitable to withstand explosion or leakage.

Documentation of the operation of storage places

Keeping clear records of the wastes stored and their treatment and disposal dates is important to ensure a good control of waste management. Some countries have strict legal requirements to achieve a high level of safety. The following forms of additional documentation are suggested:

- a written spill contingency plan;
- a weekly store inspection protocol;
- protocols for using, repairing and replacing emergency equipment;
- training system and documentation (names of trained staff, job descriptions, form of training, date of training, date for refresher or revalidation training);
- hazardous waste storage documentation;
- collection of relevant material safety data sheets.

Logistic staff

Drivers of vehicles carrying hazardous health-care waste should have appropriate training about risks and handling of hazardous waste. Training on the following issues should be included:

- relevant legal regulations
- waste classifications and risks
- safe handling of hazardous waste
- labelling and documentation
- emergency and spillage procedures.

In addition, drivers should be declared medically fit to drive vehicles.

In case of accident, contact numbers or details of the emergency services and other essential departments should be carried in the driver's cab. For safety reasons, vaccination against tetanus and hepatitis A and B is recommended, and vaccination and training details of staff should be recorded.

Vehicle requirements

A fundamental requirement is for the vehicle transporting hazardous waste to be roadworthy and labelled to indicate its load, and its payload to be secured to minimize the risk of accidents and spillages. Any vehicle used to transport health-care waste should fulfil several design criteria:

- The body of the vehicle should be of a suitable size commensurate with the design of the vehicle.

- There should be a bulkhead between the driver's cabin and the vehicle body, which is designed to retain the load if the vehicle is involved in a collision.

- There should be a suitable system for securing the load during transport.

- Empty plastic bags, suitable protective clothing, cleaning equipment, tools and disinfectant, together with special kits for dealing with liquid spills, should be carried in a separate compartment in the vehicle.

- The internal finish of the vehicle should allow it to be steam-cleaned and internal angles should be rounded to eliminate sharp edges to permit more thorough cleaning and prevent damage to waste containers.

- The vehicle should be marked with the name and address of the waste carrier.

- An international hazard sign should be displayed on the vehicle and containers, as well as an emergency telephone number.

- The driver should be provided with details of the waste being carried.

Vehicles or containers used for transporting health-care waste should not be used for transporting any other material. Vehicles should be kept locked at all times, except when loading and unloading, and kept properly maintained. Articulated or demountable trailers (temperature-controlled if required) are particularly suitable, because they can easily be left at the site of waste production. Other systems may be used, such as specially designed large, closed containers or skips. Open-topped skips or containers are unsuitable because they fail to isolate waste from the general public during transportation, and should not be used for health-care waste. Where the use of a dedicated vehicle cannot be justified, a bulk container that can be lifted onto a vehicle chassis may be considered. The container may be used for storage at the health-care facility and replaced with an empty one when collected. Refrigerated containers could be used if the storage time exceeds the recommended limits described previously, or if transportation times are long. The same safety measures should apply to the collection of hazardous health-care waste from scattered small sources, such as clinics and general practice surgeries.

Labelling of the transport vehicle

The transport vehicle should be labelled according to the type of waste that is being transported. The label that is displayed will depend on the United Nations classification of the waste.

Cleaning of container and vehicle

Vehicles and transporting containers used for the transportation of waste should be cleaned and disinfected daily after use. Mechanical cleaning, combined with soaps and detergents, which act as solubility promoting agents, can be used. Cleaning and disinfection have to be carried out in a

standardized manner or by automated means that will guarantee an adequate level of cleanliness. A standard operating procedure for cleaning should be prepared and explained to cleaning staff. In addition, a schedule for preventive maintenance should be set up for all equipment and vehicles used in the transportation process.

Transport documentation

Before sending hazardous health-care wastes offsite, transport documentation (commonly called a “consignment note” or “waste tracking note”) should be prepared and carried by the driver. A consignment note should be designed to take into account the control system for waste transportation in operation within a country. If a waste regulatory authority is sufficiently well established, it may be possible to pre-notify the agency about a planned offsite transport and disposal of hazardous health-care waste and to obtain the agency’s approval. Anyone involved in the production, handling or disposal of health-care waste should recognize that they have a general “duty of care” – that is, an obligation to ensure that waste handling, treatment and disposal and the associated documentation comply with the national regulations.

The consignment note for a vehicle carrying a hazardous health-care waste load should include the following information in case of accidents or official inspection:

- waste classes
- waste sources
- pick-up date
- destination
- driver name
- number of containers or volume
- receipt of load received from responsible person at pick-up areas. This information allows quick and effective countermeasures to be taken in the event of an accident or incident. Weight of waste is useful for commercial treatment and disposal operators who bill health-care facilities for their waste services. On completion of a journey, the transporter should complete a consignment note and return it to the waste producer.

Segregated waste should be kept separated until final disposal. General waste should follow a municipal waste disposal route, if available, and sharps and non-sharps wastes should be treated and disposed of using the best available practices based on the minimum options.

Segregation and packaging

All containers and bags should be filled to three quarters of their capacities to avoid spillage and kept covered to prevent casual access by people or disease vectors. Should colour coding of

plastic bags and containers not be possible, signs or marks can be put on containers to differentiate between hazardous health-care waste and general waste. Segregated waste should be regularly removed and safely stored to reduce the risk of transmission of pathogens and improve general standards of cleanliness and hygiene in medical areas. If plastic bags are not available, containers for non-sharps wastes should be washed and disinfected after being emptied. Body parts should be safely stored and disposed of according to local culture and customs.

Collection

Exclusively allocated carts or trolleys with lids should be used to collect and transport health-care waste. Carts should be regularly cleaned and disinfected. Highly infectious wastes (e.g. laboratory wastes and wastes from persons with contagious diseases) should be collected quickly and carried to a single, secure central storage area; on no account should collected waste be left anywhere other than at a central storage point.

Storage

Segregated waste should preferably be stored in specific restricted areas. The storage area should be a locked room or guarded enclosure. If this is not available, large containers with lids may be used for temporary storage of segregated waste and should be placed in restricted areas to minimize contact with people and animals. Mark the storage area with the biohazard symbol, or put a sign or mark that is understood locally to differentiate between hazardous and non-risk wastes.

Treatment and disposal

Gradual change and improvement in waste-treatment and disposal practices are normal as resources and confidence of local decision-makers returns. Should resources not be available, minimal treatment and disposal practices should continue to be used as follows:

- (i) onsite burial in pits or trenches;
- (ii) disposal in special cells in municipal dumping sites;
- (iii) burning in pits and then covering with soil;
- (iv) incineration in low-cost double-chamber incinerators;
- (v) encapsulation of sharps wastes or small quantities of pharmaceuticals followed by onsite burial or burial in special cells in municipal dumping sites;
- (vi) incineration in high-temperature industrial incinerators (provided that there is a safe means of transportation);
- (vii) disinfection of infectious and sharps wastes with a small autoclave (when resources are available); non-sharps disinfected wastes should join the general waste stream.

The following waste categories should not be incinerated:

- (i) mercury thermometers (preferably collect for mercury recovery);
- (ii) pressurized containers (safe burial in pits);
- (iii) polyvinyl chloride (PVC) plastics such as intravenous sets, catheters and PVC containers for sharps (safe burial in pits);
- (iv) vials of vaccines (safe burial in pits);

- (v) anatomical wastes or body parts (safe burial in pits). The following is a summary related to some minimum treatment and disposal options.

ONSITE BURIAL IN PITS

Dig a pit 1–2 m wide and 2–3 m deep. The bottom of the pit should be at least 2 m above the groundwater. Line the bottom of the pit with clay or permeable material. Construct an earth mound around the mouth of the pit to prevent water from entering. Construct a fence around the area to prevent unauthorized entry. Inside the pit, place alternating layers of waste, covered with 10 cm of soil (if it is not possible to layer with soil, alternate the waste layers with lime). When the pit is within about 50 cm of the ground surface, cover the waste with soil and permanently seal it with cement and embedded wire mesh.

BURIAL IN SPECIAL CELLS IN DUMPING SITES (IF AVAILABLE IN THE AFFECTED AREA)

Cells to contain waste can be used when burying waste in dumping sites. The cell should be at least 10 m long and 3 m wide, and 1–2 m deep. The bottom of the cell should be at least 2 m above the groundwater. The bottom of the cell should be covered by soil or a material with low permeability. The waste in the cell should be covered immediately with 10-cm layers of soil to prevent access by people or animals (in diseases outbreaks, preferably spread lime on waste before covering with the soil). It is strongly recommended that health-care waste be transported in a safe manner to minimize public exposure to bio contaminated wastes.

LOW-COST DOUBLE-CHAMBER INCINERATORS

Double-chamber incinerators may reach a temperature of about 800 °C with a residence time of more than one second in the second chamber to kill pathogens and break down some of the particulates in the outlet gases. The incinerators should be built at a convenient distance away from buildings. Such incinerators need to be heated with paper, wood or dry non-toxic waste (small quantities of kerosene may be added, if available) before adding infectious wastes.

ENCAPSULATION

Place sharps wastes or pharmaceutical wastes in hard containers, such as metal drums, and add an immobilizing material, such as cement, bituminous sand or clay. When dry, the drum or container can be sealed and buried in local landfill or a pit in a health-care facility.

DISPOSAL OF PHARMACEUTICALS AND EXPIRED DRUGS

During emergencies, large quantities of pharmaceuticals are often donated as part of humanitarian assistance. However, in some circumstances (e.g. when there is inadequate stock management, lack of space or unwanted quantities of pharmaceuticals), large quantities of pharmaceuticals may not be used and therefore should be disposed of safely.

Table: Summary of pharmaceutical disposal methods

Disposal method	Type of pharmaceutical	Comments
Return to donor or manufacturer, transfrontier transfer for disposal	All bulk waste pharmaceuticals, particularly antineoplastics	Usually not practical – transfrontier procedures may be time consuming
Highly engineered sanitary landfill	Limited quantities of untreated solids, semi-solids and powders PVC plastics	Immobilization of waste pharmaceuticals is preferable before disposal
Engineered landfill Waste solids, semi	solids and powders PVC plastics	Engineered landfill Waste solids, semi
Open, uncontrolled, non engineered dump	Untreated solids, untreated semi-solids and untreated powders	Untreated solid Semisolids and powders must be covered immediately with municipal waste Immobilization is preferable before disposal Not for untreated controlled substances
Immobilization: waste encapsulation or inertization	Solids, semi-solids, powders, liquids, antineoplastics and controlled substances	Immobilization – not applicable Chemical decompositions are not recommended unless special expertise and materials are available
High-temperature incineration with temperature more than 1200 °C	Solids, semi-solids, powders, antineoplastics and controlled substances	Expensive, particularly for purpose-built incinerators Use of existing industrial plants may be more practical
Medium-temperature incineration with two-chamber incinerator, minimum temperature of 850 °C	In the absence of high-temperature incinerators, solids, semi-solids, powders and controlled substances	Antineoplastics best incinerated at high temperature
Burning in open containers	Packaging paper and cardboard	As last resort Not acceptable for PVC plastics or pharmaceuticals
Sewer or fast-flowing watercourses	Diluted liquids, syrups, intravenous fluids, small quantities of diluted disinfectants (supervised)	Not recommended for antineoplastics, undiluted disinfectants or antiseptics
Chemical decomposition	NA	Not recommended unless special expertise and materials are available Not practical for quantities of more than 50 kg