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UNICEF

YEMEN EMERGENCY HUMAN CAPITAL PROJECT

Parent Project (P176570)

**Additional Financing (YEHCP-AF1) (P178655) and
Second Additional Financing (EHCP-AF2) (P181317)**

MEDICAL WASTE MANAGEMENT PLAN

Updated: June 2023

Table of Contents

1. BACKGROUND	4
1.1 Introduction	4
1.2 Project Components	5
2. Current Situation	8
2.1 Policy, Regulatory, and Institutional Context in Yemen	8
2.2. Roles and Responsibilities (Institutional arrangement)	9
2.3. Situation of Medical Waste Management in project-supported Health Facilities	10
3. Management of Medical Waste Generated through the YEHCP-AF	11
3.1 Objective	11
3.2 Incineration	12
3.3 Training and Awareness Raising	13
3.4 Supply (Equipment & Materials)	14
4. Monitoring the Medical Waste Management Plan	15
4.1 Monitoring Objectives	15
4.2 Monitoring Arrangements	15
4.3 Monitoring Indicators	15
4.4 Cost of Implementing the Medical Waste Management Plan	16
Annex 1: Major Categories of Medical Waste	17
Annex 2: Standards and Guidelines for Medical Waste Management	18
Medical Waste Management Procedures	19
Medical Waste Segregation, Collection, and Transport	19
Medical waste storage and packaging	20
Disposal of Contaminated Waste	21
Best Practice for the Disposal of Liquid Contaminated Wastes	22
Best Practice for the Disposal of Solid Contaminated Wastes	22
Burying Waste	23
Emergency Preparedness and Response	24
Emergency response	24
<i>Reporting accidents and incidents</i>	24

Annex 3: Medical Waste Management Monitoring Questionnaire	26
Annex 4: Treatment and Disposal Methods for Categories of Health Care Waste	31
Annex 5: Design of De Mont Fort Incinerators Categories	34
Annex 6: UNICEF Proposed Incinerator perspective	35

1. BACKGROUND

1.1 Introduction

The Second Additional Financial (AF- 2) under the Yemen Emergency Human Capital Project (EHCP-AF2) – hereinafter the Project – has been designed with support and finance from the World Bank and is implemented by United Nation Children’ Fund (UNICEF) World Health Organization (WHO) and United Nations Office for Project Services (UNOPS) to provide essential health, nutrition, water and sanitation services to the population of Yemen. UNICEF will implement part of component 1, (Sub-Components 1.1 and 1.2) of the projects, in partnership with implementing partners and service providers.

Sub-Component 1.1 of the EHCP-AF2 will support the continuity of delivering Minimum Services Package (MSP) services and provision of an integrated package of services at Primary Health Care level including facility, outreach, mobile, and community with a particular focus on integrating the maternal and newborn health (MNH). Sub-Component 1.2 will support child nutrition services including treatment of children with severe acute malnutrition (SAM) without complications, strengthen quality of treatment including scale-up to reach the most vulnerable and marginalized populations, and prevention of both acute and chronic malnutrition. UNICEF’s activities will focus on the provision of an essential package of services to address the health and nutrition basic needs of the population and maintain the operational capacity of the existing health system at the governorate and district levels. Subcomponent 1.5 is on systems strengthening and is aimed to continue building individual and institutional capacities, the proposed AF will continue to support in strengthening health information system capacities. The proposed AF will continue to implement capacity building activities for improved quality-of-care, and enhanced project and public financial management for the health sector. UNICEF will work with implementing partners to enhance implementation, monitoring and documentation of the quality-of-care initiatives at the PHC levels as well as supporting the health information management system

During the implementation of project activities in Health Care Facilities and through the provision of outreach and community-based services, medical waste will be produced. The types and volume of medical waste will vary by the size of the service delivery site and the services provided.

UNICEF has prepared this Medical Waste Management Plan (MWMP) to address the risk associated with medical waste generated during the provision of health and nutrition services within the project-supported service delivery sites. The overall objective of the plan is to prevent and/or mitigate the negative impacts and risks of medical waste on people and the environment. The plan is updated in the framework of the Additional financing 2, and it builds upon Additional financing 1 and the parent project

This plan aims at ensuring that the proposed activities incorporate sound environmental and social management principles and practices and complies with World Bank environmental and social standards

(ESSs), the applicable World Bank Group Environment, Health and Safety (WBG EHS) guidelines¹, and is consistent with the WHO relevant guidelines², as well as with the applicable environmental policies and legal requirements of the Republic of Yemen (RoY).

The plan includes advocacy for good practices in medical waste management and is to be used by health and nutrition, sanitary and cleaning workers who manage medical waste in mobile and fixed units, as well as health centers, mobile teams, outreach teams, vaccination campaigns, and communities that are included in the project. All the health facilities and health services supported through the EHCP- are to have appropriate procedures and capacities in place to manage medical waste. The plan includes good practices and procedures for the waste packaging and storage, segregation, transportation, treatment, and disposal.

UNICEF will ensure to monitor on the potential negative impacts of the medical waste and to detect unforeseen impacts, by implementing the relevant mitigation measures. The monitoring plan includes indicators for the storage, segregation, transportation and disposal of the medical waste. The plan will be implemented both internally as part of the project's overall monitoring and reporting process, and externally by the third-party monitoring (TPM) service which will be used under the project.

1.2 Project Components

The Project Component 1 will finance health and nutrition services as well as help maintain the capacity of the existing health system, i.e. public health facilities and community-level engagement. The project will include five sub- components as follows:

Component 1: Improving Access to Healthcare, Nutrition, and Public Health Services (implemented by UNICEF and WHO).

This component aims to ensure continuity of delivery of Minimum Services Package (MSP) services and provision of an integrated package of services at Primary and Secondary Health Care levels including facility, outreach, mobile, and community with a particular focus on integrating the maternal and newborn health (MNH), and child nutrition services including treatment of children with SAM children to ensure continuity of services and strengthening quality of treatment including scale-up to reach the most vulnerable and marginalized populations. The component will sharpen the focus on strengthening prevention of acute malnutrition including infant and young child feeding, micronutrient supplementation targeting children and women (including adolescent girls). It will also make emphasis on the integration of mental health and psychosocial support (MHPSS) interventions with health and nutrition. The component will implement activities focused on the prevention of chronic malnutrition through school health and outreach programs that promote healthy diet, integrated management of childhood illness (IMCI), and routine delivery of selected public health programs and immunizations (EPI) through different delivery models and platforms. Inputs from this project will include per diems, provision of operating costs, basic supplies, equipment, maintenance, medical and non-medical supplies, essential drugs, vaccines, micronutrients, therapeutic foods, fortified nutritious supplements, training, per diem and

¹ <https://www.ifc.org/wps/wcm/connect/960ef524-1fa5-4696-8db3-82c60edf5367/Final+-Health+Care+Facilities.pdf?MOD=AJPERES&CVID=jqeCW2Q&id=1323161961169>

² World Health Organization (WHO). 2004. Safe Health-care Waste Management. Policy Paper. Geneva: WHO. Available at http://www.who.int/water_sanitation_health/medicalwaste/en/hcwmpolicye.pdf

transportation allowances, and minor rehabilitation of existing facilities. This project will continue to support the same primary health care facilities and hospitals currently supported through the EHCP AF. If resources allow, UNICEF will also consider scaling up to additional PHCs.

Subcomponent 1.1: Improving Access to the MSP at Primary Healthcare Level (implemented by UNICEF)

This subcomponent will ensure continued delivery of: (i) MSP services at the PHC level through (a) integrated outreach (outreach and mobile teams for the population in remote areas and IDPs); (b) community-based service delivery and referral [CHWs and community midwives (CMWs)]; and (c) PHC facilities (permanent and temporary fixed sites); and integrating detection and management or referral of suspected cases in all PHC facilities; and (ii) facilitating community engagement and generating demand for health and nutrition services through community sensitization and promoting key healthy behaviors, including individual, household, and community-level hygiene and sanitation practices.

Subcomponent 1.2: Improving Access to Essential Preventive and Curative Nutrition Services (implemented by UNICEF)

This subcomponent will support the delivery of a package of essential nutrition services. This will include maternal and child nutrition services and will be delivered at PHC facilities and community level through mobile teams and an extensive network of CHNVs. The package will include the following: maternal nutrition: (a) iron-folic acid (IFA) supplementation; (b) regular weight measurement; (c) nutrition counselling on adequate dietary diversity, consumption of adequate quantities of food, importance of compliance of consumption of iron and importance of rest; and (d) deworming after the first trimester. As for child nutrition, the following interventions will be supported: (a) age-appropriate breastfeeding and complementary feeding counselling; (b) growth monitoring and promotion ; (c) vitamin A supplementation; (d) deworming; (e) iron supplementation through multiple micronutrient powders; (f) zinc in the treatment of diarrhea; (g) active case finding and referral of malnourished children under five years, children and malnourished pregnant and lactating women through regular mid-upper arm circumference screening and referral to the nearest treatment facilities [health facilities (HFs) and mobile teams]; (h) treatment of acute malnutrition through Outpatient Therapeutic Centers in high burden areas; and (i) piloting services for adolescents (IFA and social and behavior change communication) in two governorates.

Subcomponent 1.3: Improving Access to the MSP at Secondary and Tertiary Healthcare Level (implemented by WHO)

Subcomponent 1.4: Sustaining the National Health System Preparedness and Public Health Programs (implemented by WHO)

Subcomponent 1.5: Health System Strengthening – (Implemented by UNICEF and WHO)

1. To continue building individual and institutional capacities, the proposed AF will continue to support in strengthening health information system capacities. The proposed AF will continue to implement capacity building activities for improved quality-of-care, and enhanced project and public financial management for the health sector. For quality of care, WHO will use the indicator framework developed under the EHCP to strengthen capacities at the facility level through training and performance monitoring, including supportive supervision. UNICEF will work with implementing partners to enhance implementation, monitoring and documentation of the

quality-of-care initiatives at the PHC levels that are described above (refer to subcomponent 1.1). For public financial management, WHO will support a needs assessment and subsequent rollout of training for health workers. With the Harmonized Approach to Cash Transfer (HACT), UNICEF conducts micro-assessment for all its implementing partners on their financial management capacities and capacity enhancement is done where gaps have been identified. Capacity of GHOs and DHOs will be strengthened on district health systems management systems including on planning, implementation and monitoring of the PHC systems at the different levels in addition to enhancing their financial management capacities

Component 2: Improving Access to Water Supply and Sanitation (WSS) and Strengthening Local Systems (implemented by UNOPS)

Component 3: Project Support, Management, Evaluation and Administration (implemented by UNICEF, WHO, and UNOPS)

This component will support the implementation, administration, management, monitoring and evaluation, and environmental and social aspects of the Project, including: (a) Direct Cost; (b) Indirect Cost; (c) provision of consultancy services required for Project monitoring, evaluation and coordination at local level; (d) conducting independent audits of Project activities; (c) audit; (d); Third-Party Monitoring; and e) Supporting the provision of technical assistance on system strengthening and service delivery improvement.

UNICEF will engage a Third-Party Monitoring (TPM) agent to undertake independent results verification of subprojects funded under the Project's Component 1. The TPM agent will include female staff. On a quarterly basis, the TPM agent will report on the activity outputs, improving access to Health care and nutrition services for the intended beneficiaries, and the fiduciary and safeguard processes followed by the local partners. The Terms of Reference (TORs) for the TPM agent are developed by UNICEF and agreed upon with the World Bank.

Component 4: Contingent Emergency Response (implemented by UNICEF, WHO, and UNOPS – US\$0)

The objective of this component is to support the country's response capacity in the event of an emergency, following the procedures governed by OP 10.00 paragraph 12 (Rapid Response to Crises and Emergencies). There is a possibility that, during Project implementation, a natural disaster, epidemic or another emergency may occur, which would cause a major adverse economic and/or social impact. In anticipation of such an event, the Contingent Emergency Response Component (CERC) allows UNICEF to receive support by reallocating funds from other Project sub-components or serving as a conduit to process additional financing from other funding sources for eligible emergencies to mitigate, respond to and recover from the potential harmful consequences arising from the emergency. Disbursements under this component will be subject to the declaration of emergency by the RoY, the international community or the UN, and an Emergency Response Operational Manual will be prepared jointly and agreed upon with the World Bank to be used if this component is triggered.

2. Current Situation

2.1 Policy, Regulatory, and Institutional Context in Yemen

Related to the environment:

The environmental related policies and laws in Yemen include inter alia: The Environment Protection Law (EPL) number 26 / 1995 forms the basis for the protection of the environment, issuance of permits, and Environmental Impact Assessments (EIA's). The provisions of this law are implemented through Executive Regulations (By-Law 148-2000), issued by a decree of the Council of Ministers to protect the environment, natural resources, society, and health. In addition, the law is designed to protect the national environment from activities practiced beyond national boundaries and to implement international commitments ratified by the Republic of Yemen in relation to environmental protection, control of pollution, conservation of natural resources, and the protection of such globally important environmental issues such as the ozone layer depletion and climate changes. The law equally stipulates the incorporation of environmental considerations in economic development plans at all levels and stages of planning for all sectors. It also requires the preparation of EIAs for projects proposed by the public and private sectors. However, to date there is still no regulatory framework to support the implementation of the EPL and the provision of undertaking EIAs for projects is not strictly enforced. EIAs studies should be undertaken by an independent authority.

Related to Waste Management and Pollution Prevention

Law No: 20/ 1999 for establishment the Cleanliness Fund.

Law No: 26 / 1995 EPL Environmental Protection Law.

Law No: 39 / 1999 Regulate the Public Cleanliness requirements in addition to the rules and responsibilities for managing several types of waste.

Other relevant multilateral agreements:

The Yemeni Government has ratified multilateral environmental agreements on agro-biodiversity and natural resources, oceans and seas, hazardous materials and chemicals, atmosphere and air pollution, and health and workers' safety. The following list provides the multilateral agreements relevant to the project activities:

- United Nations Framework Convention on Climate Change (UNFCCC).
- Kyoto Protocol.
- United Nations Convention on Combating Desertification (UNCCD).
- Ozone Layer Protection.
- Stockholm Convention on Persistent Organic Pollutants (Signed: 12/05/2001; Ratified: 01/09/2004), which is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife.
- Yemen is also party to Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, since 21/02/1986. The Basel Convention is a global treaty to protect human health and the environment from the adverse effects of hazardous wastes. Its

scope of application covers a wide range of wastes defined as “hazardous wastes” based on their origin and/or composition and their characteristics.

Public Health and Healthcare System Laws

The Ministry of Public Health and Population (MoPHP) is responsible for the management of healthcare sector in the country and to ensure all required regulations are implemented.

Public Health Law, Law No: 04 / 2009

The law includes: the regulations needed to improve the public health and the overall healthcare services in the country in addition to the requirements to control the infectious diseases; occupational health and safety at the healthcare system in addition to the required rules to prevent any cause of infection from the health facilities.

Law No: 26 / 2002, regulating the requirements for practicing the Medicine and Pharmaceutical professions in the Republic of Yemen.

Yemen is also applying the WHO Safe management of wastes from health-care activities guidelines on the medical waste management, and the WBG-Guidelines for healthcare facilities.

In the framework of YEHCP-AF2, the relevant environmental and social standards are the following: ESS1, 3 and 4. Besides ensuring the compliance with the above mentioned ESS, this plan is developed in accordance with the WBG-EHS Guidelines for healthcare facilities³ (which are also available in Arabic) and the WHO Safe management of wastes from health-care activities guidelines, in addition to the relevant national regulation and laws.

2.2. Roles and Responsibilities (Institutional arrangement)

Under the Emergency Human Capital Project (original and AF1&2) UNICEF is the grant recipient as well as the managing and implementing entity. UNICEF is responsible for the respective activities based on the project design and the implementation experience that been gained so far.

UNICEF is a key member of the Yemen Health Cluster, which is contributing to the Health Engagement Plan in Yemen. Through its respective networks of providers, government health offices (GHOs), district health offices (DHOs), UNICEF will work with the existing local health system structures at the governorate, district and community levels to preserve the national capacity and maintain the core functions of the health system and to supervise and contribute to the implementation of the medical waste management plan as well.

In 2019 the MoPHP established an institution, Medical Waste Management General Directorate (MWMD) dedicated to medical waste management in Health Care Facilities. This directorate is working on the ground and already coordinates with all agencies working in the health care programs. They already started preparing the medical waste national guidelines and working on preparation of the organizational set-up regulation. The directorate also working to compensate the gaps on the waste management inside

³ <https://www.ifc.org/wps/wcm/connect/960ef524-1fa5-4696-8db3-82c60edf5367/Final+-Health+Care+Facilities.pdf?MOD=AJPERES&CVID=jqeCW2Q&id=1323161961169>

the health facilities currently targeting the hospitals with support from WHO. It established medical waste staff of qualified staff, some of them are part of the directorate and others from the academia, they are participating in the training as speakers/trainers of health facility staff. They are using national staff. It carryout the supervision and monitoring to ensure good practices of medical waste management are applied inside the HFs. This directorate is planned to expand further to the GHO levels. UNICEF will coordinate with this directorate to facilitate the implementation of the provisions of this plan and further to ensure medical waste management sustainability beyond the scope and duration of the project.

This management plan will be implemented directly by the health facility staff under responsibilities of the health facility manager, with supervision from the MoPHP offices at district and governorate level, and with overall the supervision of UNICEF. The MWMD will follow-up, supervise the medical waste management too at different levels and will contribute with UNICEF in providing the capacity building for the HFs workers especially those working in waste management.

Some of the health workers at primary health care level mostly in health centers have been trained in waste management under the original and first additional financing. Training roll out will continue under the second additional financing as more than 70% of the health staff working in waste handling are in need of training and awareness. To facilitate the implementation of this management plan at the PHC level, UNICEF will work closely with the health workers (doctors, nurses, technicians, etc.). UNICEF will further engage with GHOs and DHO staff networks for supervisory, support, and monitoring roles. UNICEF will also be responsible for the training, and monitoring of CHWs, CMWs, and CHNVs .

UNICEF has established ESS unit/team that is responsible for providing oversight of the MWMP and will work closely with UNICEF personnel at central and field levels. UNICEF field staff will be closely involved in conducting the management, monitoring and reporting of environmental and social risk management aspects throughout project implementation.

The Third-Party Monitoring (TPM) agent that will be hired by UNICEF to monitor the project and will include monitoring and reporting on implementation of the MWMP provisions.

2.3. Situation of Medical Waste Management in project-supported Health Facilities

Reports from TPMA⁴ revealed that, most of project-supported HFs implement proper waste segregation, and collection. More than 99% of the health facilities uses safety boxes for collecting sharps. Even though there are noticeable improvements in waste management, including the use of personal protective equipment among staff responsible for collecting medical waste, there is still need for continuous improvement.

The reports also revealed that about 47% of the healthcare facilities targeted by the project (1946 visited Health Centers and Health Units in total) have a functional incinerator. The remaining facilities are either burning the waste inside the HFs premises or nearby the premises. Some are collecting it for the garbage trucks to transport it into the dumping site. Other HFs, especially those located in the rural areas, are

⁴ EHCP, Targeted Health Care Facilities Monitoring Reports, Third Party Monitoring. March 2023,

collecting the waste and either throw it on the general village's garbage or in the wadi's beds. The risk of injury and infection resulting from the improper management of the waste is likely very high. In particular, the dangers of the spread of disease from the misuse of discarded syringes and the handling of infected or blooded equipment, such as tubes, bags or plastic bottles are very serious indeed.

Although some good basic groundwork has been carried out in an attempt to bring about improvements including under the Emergency Human Capital Project (EHCP), the situation remains deplorable and represents a grave health risk, not only to medical staff but also to general public and environment. There are cases where disposable syringes, plastic bottles are dumped in open pits in the health facilities wastes. Some HF's burn their wastes, which results in the production of toxic gases. The risk of injury and infection resulting from the improper management of the waste is very high. It is important to mention that under the original and additional financing 1 the project supported the construction of the incinerators in health centres to improve waste management in health facilities. The measures contained in this plan would be appropriate for safe management of medical waste generated during HF's operation and will be implemented in parallel with measures identified in the parent MWMP. Therefore, it is imperative for safe implementation of the whole provision of this plan as integrated and complete set from the first phase the segregation to disposal phase. These will contribute to mitigating the risk that could likely occur to people and the environment because of waste production, and its safe management.

The targeted project health facilities are small health units and medium-sized health centers providing basic primary health care services, and not large hospitals; thus the volume of the medical waste generated is limited.

3. Management of Medical Waste Generated through the EHCP-AF2

The guidelines and standards outlined in Annex 2 are the best practices according to global guidance and WHO recommendations. It is not expected that all of these measures will be realistic within the context of Yemen, however it is the project's responsibility to identify the risks and most practical mitigation measures as applicable in the operating environment to mitigate the risks related to medical waste management that are inherent in the activities supported through the project. The EHCP will provide vaccines, medicines, and supplies including syringes to health facilities and mobile and outreach teams, all of which will generate medical waste that may be hazardous to project workers, health and nutrition workers and volunteers, and the environment.

3.1 Objective

The plan's overall objective is to prevent and/or mitigate the negative effects of medical waste that is generated through the implementation of the project on people and the environment. This must be managed in a safe manner to prevent the spread of infection and reduce the exposure of health workers, patients, the public and the environment to the risks from medical waste.

MWM is part of a set of measures to ensure patient safety and quality of medical services. In addition to the implementation of the MWMP, UNICEF will further develop and support the implementation of appropriate standards for patient safety, including for example Infection Prevention and Control measures, and adequate water, sanitation and hygiene standards.

The EHCP MWMP consists of three components:

1. Installation and maintenance of incinerators in larger health centers (but still used for the primary health care with very low quantities of the waste)
2. Training and awareness raising of health workers
3. Provision of supplies and materials for medical waste management

3.2 Incinerators

Practical Incinerators at Small Scale Health Facilities

De Montfort 8 incinerator model is considered as a suitable option **of** waste disposal in larger primary health care facilities, such as those UNICEF supports through the EHCP and Additional Financing 1. The incinerator is a double chambered refractory structure having metal components in the form of waste loading door, ash removal door, and chimney. The incinerator burns medical waste at a specific temperature above 850°C which removes flue gases very quickly to avoid formation and reformation of Persistent Organic Pollutants (POPs). The temperature range is monitored by a high temperature digital thermometer mounted on the main structure. Close monitoring of the controlled burning reduces the emission of dioxin and furan, which are the main objectionable environmental pollutants of incineration. Waste is loaded from waste loading door, after preheating using kerosene oil as supplementary fuel. After burning of infectious waste in the primary combustion chamber, the toxic gases move to the secondary combustion chamber; there, further oxidation reduces the amount of dioxin and furans and, as a result, the atmosphere receives less polluting flue gases. This Waste Disposal Unit (WDU) will allow the Health Facilities to dispose of approximately 6-7 kg of infectious waste per hour; it can be operated for two hours daily, five days a week, following the best operation practices.

De Montfort 8 incinerators is recommended by WHO⁵, and is used worldwide especially in the least developed countries. It has been installed in Yemen using fund from different donors and implementing agencies, including UNICEF⁶. In addition, it contributes to the Project compliance with the principles of ESS3 on waste management and is consistent with WBG-EHS Health Care facility guidelines and the WBG-EHS general guidelines ⁷, specifically those related to air emission.

Based on the above considerations, in the framework of the EHNP, UNICEF finalized the construction of 7 incinerators – 5 in Sana’a and 2 in Aden –, which were built in April-May 2022 under EHNP. Some key updates on the achieved activity, following UNICEF technical monitoring visits, are the following: wood and diesel are used as supplementary fuel; the temperatures reached are between <700->900 degree Celsius (higher in Aden); they are utilized to burn the content of safety boxes (sharp objects) and hard

⁵ Findings on an Assessment of Small-scale Incinerators for Health-care Waste, World Health Organization 2004, WHO/SDE/WSH/04.07

⁶ UNICEF hired a consultant to evaluate and assess this type of incinerator in order to give better understanding on its functionality, its safety of operation and the environmental and social impact (including health impacts on staff and surrounding community of resulting residual materials after incineration process, against existing standards of its operation based on the detailed technical specification provided).

⁷ www.ifc.org/EHSGuidelines

materials; the HFs management and HWs believe incinerators are useful and help them to safely dispose of the waste, mainly sharp objects. Among the recommendations, already addressed or which are currently being addressed by UNICEF: shelter/roofs to be installed to protect the personnel from dust, sun, rain, etc.; appropriate PPEs to be provided; additional training (on-the-job) to be organized to improve the HWs capacity on how to operate incinerators; small operation and maintenance costs remain uncovered.

Building on the acquired experience, under AF 1, UNICEF recruited 8 consultancy firms to assess the most suitable sites for the construction of additional incinerators, according to a longlist agreed upon with the MoPHP both in Sana'a and Aden. 248 targeted HFs were assessed for the construction of the incinerators through site visits and stakeholders' consultations. Once the information was collected, UNICEF Safeguarding Unit screened the findings and identified 116 HFs as suitable for the implementation of the activity. MoPHP approved the design, the technical specifications, and the shortlisted locations in the Southern and Northern Governorates. The donor cleared the related ESMPs and, at the time of writing, the procurement process for the construction of 90 incinerators in the Northern Governorates and 17 in the Southern Governorates is ongoing.

In the framework of AF 2, UNICEF will continue supporting the target HFs through the maintenance and correct operation of the existing incinerators, through the capacity building of health personnel and other key stakeholders on environmental and social safeguarding, including on medical waste management, and through the provision of supplies and materials for medical waste management.

3.3 Training and Awareness Raising

Health care staff will continue **being** trained and made aware of good practices and procedures of waste management and infection control, as outlined in the section on standards and guidelines in Annex 2. This includes training on reporting of incidents and accidents associated with the waste management as well. Medical waste management practices and procedures will be disseminated to the health care facilities to be implemented as part of the project activities through the following actions:

- Training on medical waste management and infection prevention and control will continue being integrated into all pre-service and in-service trainings for health and nutrition workers and volunteers. UNICEF will continue working with the MPHP to design training materials for various cadres and on various technical topics, including environmental and social safeguarding standards and a medical waste management component.
- Through Integrated Supportive Supervision, GHO and DHO staff will continue supervising MWM and Infection Prevention and Control (IPC) practices in health facilities and providing on-the-job coaching, identifying and overseeing corrective measures, and regularly following up on recommended improvements.
- Integrated in the UNICEF continued support to the roll out of the Integrated Primary Health Care (PHC) Micro-Plan, that was established at health facility level and is being implemented EHCP projects. The PHC Micro-Plan includes guidance to Primary Health Care Facility (PHCF) managers on MWM and IPC needs for their health facility, and how to plan for the needed resources.
- Operational costs provided to health care facilities through the EHCP-AF2 will continue including a line-item allocation for cleaning and hygiene materials, and another for minor rehabilitation to

upgrade disposal infrastructure and practices as needed. UNICEF staff will continue sensitizing GHOs, DHOs, and health facility staff on the intended uses of these resources.

- Distribution of the relevant visibility (leaflets and booklets of good practices/procedures for waste management) for displaying at the health units/facilities. UNICEF will continue working with the MOPHPs to identify gaps in availability of printed guidelines and protocols in health facilities, and support printing and distribution of these as needed.
- Provision of the relevant training to the third-party waste management service providers in collaboration with authorities as needed

3.4 Supply (Equipment & Materials)

Health Care Facilities will continue being equipped with proper equipment and materials required for performing appropriate and safe medical waste handling and management. The list includes:

- Appropriate color-coding containers, safety tools and PPEs as per the need and requirement;
- Mobile garbage bins, bags, drums or other containers, including liquid waste containers;
- Proper hygiene kits (cleaning tools & material and sanitizers);
- Others as required.

Other gaps and needs will be assessed through TPM and other mechanisms and provided accordingly.

4. Monitoring the Medical Waste Management Plan

4.1 Monitoring Objectives

The aim of the monitoring is to measure the implementation of this plan and of any relevant ESMP against the established appropriate criteria to address potential negative impacts of medical waste generated through the project, to ensure that unforeseen risks and impacts are prevented and managed, and to implement adequate mitigation measures at an early stage. Specific objectives of the monitoring plan are to:

- appropriately address any additional impacts;
- check the effectiveness of the recommended mitigation measures, as presented in annex 2;
- propose adequate mitigation measures;
- demonstrate that medical waste management is being implemented according to plan and existing regulatory procedures; and
- provide feedback to implementing agencies in order to make modifications to the operational activities where necessary.

4.2 Monitoring Arrangements

Monitoring mechanisms in the EHCP-AF2 will continue including UNICEF staff and consultant program / site visits, supervision conducted by GHOs and DHOs, and Third Party Monitoring. Terms of Reference were prepared for the third-party monitoring service, including tasks on monitoring the implementation of the medical waste management plan. Details on Third Party Monitoring TORs and data collection tools is included in the Project Operations Manual (POM).

The ESMPs monitoring plan and related indicators will apply with reference to the HF were incinerators were built/will be built.

4.3 Monitoring Indicators

Considering the type of interventions implemented by this project that are anticipated to have limited, site specific impacts, the following will be used to monitor progress in implementing the medical waste management plan:

- Existence of human resource capacity in health care units and facilities with basic knowledge to deal with medical waste;
- Existence of records on waste generation; and
- Development of mechanisms for proper and safe medical waste management and disposal.

The monitoring of environmental effects is necessary to ensure that predicted impacts are addressed effectively and efficiently through the mitigating measures indicated. Specific monitoring indicators for consideration include the following:

Internal Packaging and Storage

- Separation of waste (at point of generation)
- Storage bins / bags
- Frequency of removal

External Packaging and Storage

- Segregation of waste

- Storage area
- Frequency of waste removal
- Amount of waste generated per day

Transportation (if required)

- Identification of waste management contractor (accredited or certified)
- Conditions for transportation
- Equipment/vehicles (to prevent scattering, spillage, odour nuisance and leakage)

Treatment and Disposal

- Incineration
- Sterilization by heat
- Sanitary landfill

Administration

- Each health institutions shall keep records on:
 - The type and volume or weight of waste generated
 - The means of transportation, type and volume transported
 - Commissioned waste contractor (company name, type of license, treatment and disposal)
 - Disposal method - volume incinerated, volume treated and disposed, disposal method and location

Annex 3 includes a questionnaire for monitoring medical waste management.

4.4 Cost of Implementing the Medical Waste Management Plan

The cost associated with the implementation of the arrangements, practices and measures suggested in this plan is included in the overall cost of implementing the project (components 1 and 3).

Annex 1: Major Categories of Medical Waste

Waste type	Description
1. Infectious waste	Infectious wastes are susceptible to contain pathogens (or their toxins) in sufficient concentration to cause diseases to a potential host. Examples include discarded materials or equipment used for the diagnosis, treatment and prevention of disease that has been in contact with body fluids (dressings, swabs, nappies, blood bags etc.). It also includes liquid waste such as faeces, urine, blood, or other body secretions.
2. Pathological and anatomical waste	Pathological waste consists of organs, tissues, body parts or fluids such as blood. Anatomical waste consists of recognizable human body parts, whether they are infected or not.
3. Hazardous pharmaceutical waste	Pharmaceutical waste includes expired, unused, and contaminated pharmaceutical products, drugs, and vaccines. This category also includes discarded items used in the handling of pharmaceuticals like bottles, vials and connecting tubing.
4. Hazardous chemical waste	Chemical waste consists of discarded chemicals (solid, liquid, or gaseous) that are generated during disinfecting procedures. They may be hazardous (toxic, corrosive, flammable or reactive) and must be used and disposed of according to the specification formulated on each container.
5. Waste with a high content of heavy metals	Waste with high contents of heavy metals and derivatives are highly toxic (e.g., cadmium or mercury from thermometers or manometers).
6. Pressurized containers	Pressurized containers consist of full or emptied containers or aerosol cans with pressurized liquids, gas, or powdered materials
7. Sharps	Sharps are items that can cause cuts or puncture wounds (e.g., needle stick injuries). They are highly dangerous and potentially infectious waste. They must be segregated, packed, and handled specifically within the HF to ensure the safety of the medical and ancillary staff.
8. Highly infectious waste	This includes microbial cultures and stocks of highly infectious agents from medical laboratories. It also includes body fluids of patients with highly infectious diseases.
9. Genotoxic/cytotoxic waste	Genotoxic waste includes all the drugs and equipment used for mixing and administration of cytotoxic drugs. Cytotoxic drugs or genotoxic drugs are drugs that have the ability to reduce the growth of certain living cells and are used in chemotherapy for cancer.
10. Radioactive waste	Radioactive waste includes liquids, gas and solids contaminated with radio nuclides whose ionizing radiations have genotoxic effects. These include x- and g-rays as well as a- and b- particles.

Source: *Safe Management of Wastes from Health-Care Activities, WHO 1999*

Annex 2: Standards and Guidelines for Medical Waste Management

The safe and sustainable management of medical waste is a public health imperative to mitigate the risk to human beings and the environment. Improper management of medical waste poses a significant risk to patients, health-care workers, the community and the environment (water, soil and air pollution). This problem can be solved by the right investment of resources and commitment, which will result in a substantive reduction of disease burden and corresponding savings in health expenditures.⁸

The effective management of medical waste is an integral part of a national health-care system, and as such is integrated in this project. A holistic approach to medical waste management should include a clear delineation of responsibilities, occupational health and safety programs, waste minimization and segregation, the development and adoption of safe and environmentally-sound technologies, and capacity building.

Medical waste refers to the entirety of waste generated by health care and medical research facilities and laboratories. Though only 10-25% of medical waste is considered hazardous, posing various health and environmental and social risks, it is essential that a comprehensive plan be developed to prevent and mitigate these risks.⁹

Health care providers and personnel are exposed to infectious waste particularly blood-borne pathogens, AWD/Cholera, COVID-19 and other potential infectious materials (OPIM) during care and treatment, as well as during collection, handling, treatment, and disposal of health care waste. The following measures are recommended to reduce the risk of transferring infectious diseases to health care providers:

Storage of Consumable Materials and Vaccinations

Medical products need storage in an access-controlled environment. It is important to identify products that are at risk of theft or abuse or have the potential for addiction, and to provide increased security for those items. This includes products that are in high demand or have the potential for resale (black market value). As this plan deals with medical waste, the focus on the following section will be on the handling and storage of vaccines.

Vaccine Storage and Handling

Exposure of vaccines to temperatures outside the recommended ranges can decrease their potency and reduce the effectiveness and protection they provide. Storage and handling errors can cost thousands of dollars in wasted vaccine and re-vaccination and create medical waste. Vaccine management, including proper storage and handling procedures, is the basis on which good immunization practices are built. Vaccines must be stored properly from the time they are manufactured until they are administered. Assuring vaccine quality and maintaining the cold chain is a shared responsibility among manufacturers, distributors, public health staff, and health-care providers. A proper cold chain is a temperature-controlled supply chain that includes all equipment and procedures used in the transport and storage and handling of vaccines from the time of manufacture to administration of the vaccine. By following a few

⁸ http://www.who.int/water_sanitation_health/facilities/waste/hcwprinciples.pdf?ua=1;

⁹ Yves Chartier, Jorge Emmanuel, Ute Pieper, Annette Prüss, Philip Rushbrook, Ruth Stringer, William Townend, Susan Wilburn, Raki Zghondi, eds, *Safe management of wastes from health-care activities* (Malta: World Health Organization, 2014), page 3.

simple steps and implementing best storage and handling practices, providers can ensure that patients will get the full benefit of vaccines they receive.

Storage and Handling Plans

Every facility should have detailed written protocols for routine and emergency vaccine storage and handling and they should be updated annually. These policies and procedures should be available in writing as a reference for all staff members and easily accessible. A routine storage and handling plan provides guidelines for daily activities, such as:

- Ordering and accepting vaccine deliveries
- Storing and handling vaccines
- Managing inventory
- Managing potentially compromised vaccines

Every facility should also have an emergency vaccine retrieval and storage plan. The plan should identify a back-up location where the vaccines can be stored. Considerations when choosing this site include appropriate storage units, temperature monitoring capability, and a back-up generator that can maintain power to the vaccine storage units. Potential back-up locations might include a local hospital, pharmacy, long-term care facility, or the Red Cross. There should be an adequate supply of packing materials and portable refrigerators and freezers or qualified containers and packouts on hand. Power outages or natural disasters are not the only events that can compromise vaccines. Forgotten vials of vaccine left out on the counter or doses of vaccine stored at improper temperatures due to a storage unit failure are other examples of how vaccines can be potentially compromised. Contact the local or state health department immunization program, vaccine manufacturer(s), or both for appropriate actions or guidelines that should be followed for all potentially compromised vaccines. Do not discard vaccines unless directed to by the immunization program and/or the manufacturer.

Medical Waste Management Procedures

As highlighted by WHO recommendations¹⁰, the first step in medical waste management is to minimize waste. To this end, a standardized assessment tool should be developed to identify gaps in the management process, including occupational health issues. Though all staff are responsible for managing waste, the MOPHP and GHOs should coordinate the medical waste management system and be supported by the health facility management. In addition, the roles and responsibilities of key personnel engaged in waste management activities should be defined during all phases (i.e., generation, segregation, transportation, and final disposal).

*Medical Waste Segregation, Collection, and Transport*¹¹

Waste generated in waiting areas of health-care facilities can be classified as non-hazardous and should be disposed in strong black bags and closed completely before collection and disposal (for more details see annex 1 and annex 3). All those who handle health-care waste should wear appropriate PPE (boots, long-sleeved gown, heavy-duty gloves, mask, and goggles or a face shield) and perform hand hygiene after removing it. A programmed routine activity for biomedical waste collection should be established as part of the medical waste management plan at the facility level. Waste should be separated into categories and placed in designated color-coded containers (i.e., covered buckets) as soon as it is generated in the

¹⁰ http://apps.who.int/iris/bitstream/10665/85349/1/9789241548564_eng.pdf

¹¹ <https://www.ifc.org/wps/wcm/connect/960ef524-1fa5-4696-8db3-82c60edf5367/Final+-Health+Care+Facilities.pdf?MOD=AJPERES&CVID=jqeCW2Q&id=1323161961169>

treatment room or department¹². Health care workers are responsible for appropriately disposing of the waste. The number of places where patients and visitors can dispose of waste should be minimized (e.g. using designated containers in communal areas). WHO recommends that small amounts of chemicals can be collected with infectious waste.

Medical waste storage and packaging

1. A temporary waste storage area, inside the waste zone, should be set aside to store soft waste until it can be incinerated. Storage of medical waste should be for the minimum possible time, 24-48 hours in hot countries, 48-72 hours for cold countries (WHO).
2. Biomedical waste other than sharps and bulk liquids must be packaged in sealed in bags which are leak-proof and rip-resistant.
3. Sharps shall be placed in rigid leak and puncture resistant containers.
4. Bulk liquids to be transported off-site shall, in addition to the above requirements, be placed in rigid containers.
5. All medical waste must be stored in a secure area designated for this material.
6. Pathological waste stored anywhere for more than 24 hours must be refrigerated. Storage of biomedical waste may need to be stored at the facility of origin until a large enough quantity is accumulated to warrant on-site treatment, or until transport to an offsite treatment facility is scheduled.

The following general guidelines apply to typical medical waste storage, transfer, and collection areas:

1. Store medical/infectious waste in a designated area located at or near the treatment site or the waste pickup point.
2. Areas used to store medical/infectious waste should be durable, easily cleanable, impermeable to liquids, and protected from vermin and other potential mechanisms that might spread infectious agents.
3. The manner of storage should maintain the integrity of the containers, prevent leakage of waste from the container, provide protection from the weather, and maintain the waste in a non-putrescent, odorless state (this may require refrigeration).
4. Storage areas should have adequate ventilation systems.
5. Access should be securely controlled and limited. Due to the hazardous nature of some medical waste, appropriate methods of storing waste will help to prevent accidents and infections. Storage locations should be accessible, exclusive, secure, hygienic and sanitary, located as far as possible from patient treatment areas. Storage locations should be integrated with the physical and architectural infrastructure of the healthcare facility.

Transport to External Facilities

- Transport waste destined for off-site facilities according to the guidelines for transport of hazardous wastes / dangerous goods in the General EHS Guidelines;
- Transport packaging for infectious waste should include an inner, watertight layer of metal or plastic with a leak-proof seal. Outer packaging should be of adequate strength and capacity for the specific type and volume of waste;
- Packaging containers for sharps should be puncture-proof;

¹² This is recommended by the WHO guidelines, Safe management of wastes from health-care activities / edited by Y. Chartier et al. – 2nd ed.

- Waste should be labeled appropriately, noting the substance class, packaging symbol (e.g. infectious waste, radioactive waste), waste category, mass / volume, place of origin within hospital, and final destination;
- Transport vehicles should be dedicated to waste and the vehicle compartments carrying waste sealed.

Disposal of Contaminated Waste

In facilities that have a waste zone, this is the final disposal site of the medical waste. A fully functional waste zone should have the following components:

1. An incinerator or burner for treatment of soft waste.
2. An ash pit for disposal of residues from the incinerator or burner and a covered pit with a hatch lid.
3. A sharps pit for disposal of sharps containers. A sealed, covered pit with a 1m length of pipe incorporated in the top to prevent access to the contents.
4. An organics pit for disposal of human tissue and other biological waste.
5. An infiltration facility or sewer for the disposal of liquids.

The waste zone should be kept locked at all times. The waste manager has the responsibility for its correct management. Kitchen waste and general waste from patients and visitors is not classified as medical waste and should be managed as part of the municipal wastes.

Types of medical waste are in annex 1. Table 1 below provides the common medical waste and recommended treatment/disposal methods.

Table 1: Common medical waste and disposal methods^{13, 14}

Classification	Waste Item*	Waste Collection ¹⁵	Storage	Treatment/Disposal
Sharps	Needles, ampoules, scalpels, broken glass and vials	Puncture-resistant container marked SHARPS	No	Sharps pit
Organic/ Anatomical	Needle caps, syringes (w/o needles), masks, gloves, paper and dressings	Yellow plastic container with lid (puncture resistant, leak proof)	Temporary	Incinerator/ash pit
Hazardous/chemical	Human body tissue, blood and fluids	Follow specific in-country and WHO guidelines and advice of specialist	No	Organics pit
Infectious (MSF* class as Soft)	Wastewater	Yellow plastic container with lid (puncture resistant and leak proof)	No	Sewer/infiltration facility
General Waste (MSF* class as Soft and handle as per Infectious waste)	Domestic waste	Black colored containers	No	Domestic waste pit

*MSF: Médecins Sans Frontières (Doctors Without Borders)

¹³ <https://www.ifc.org/wps/wcm/connect/960ef524-1fa5-4696-8db3-82c60edf5367/Final+-Health+Care+Facilities.pdf?MOD=AJPERES&CVID=jqeCW2Q&id=1323161961169>

¹⁴ Yves Chartier, Jorge Emmanuel, Ute Pieper, Annette Prüss, Philip Rushbrook, Ruth Stringer, William Townsend, Susan Wilburn, Raki Zghondi, eds, *Safe management of wastes from health-care activities* (Malta: World Health Organization, 2014), page 3.

¹⁵ *Safe management of wastes from health-care activities* / edited by Y. Chartier et al. – 2nd edition 2014. WHO Library Cataloguing-in-Publication Data

Good International Industry Practices (GIIPs) for the Disposal of Liquid Contaminated Wastes

Liquid contaminated waste (e.g., human tissue, blood, feces, urine and other body fluids) requires special handling, as it may pose an infectious risk to healthcare workers who come into contact or handle the waste. Steps for the disposal of liquid contaminated waste are the following:

- Wear PPE (utility gloves, protective eyewear and plastic apron)
- Carefully pour waste down a utility sink drain or into a flushable toilet and rinse the toilet or sink carefully and thoroughly with water to remove residual waste. Avoid splashing.
- If a sewage system does not exist, dispose of liquids in a deep, covered hole, not into open drains. This should be located at a safe distance from water sources.
- Decontaminate specimen containers by placing them in a 0.5% chlorine solution for 10 minutes before washing them.
- Remove utility gloves (wash daily or when visibly soiled and dry).
- Wash and dry hands or use an antiseptic hand rub.

Acids and alkalis should be diluted; pH neutralized and disposed of to the sewer with water. Neutralization can be done with lime, which is cheap and effective.

The most contaminated waste water will come from the showers, and kitchen washing area. Waste water from these areas must, therefore, be disposed of in soak pits possibly after first going through grease traps (so that the soak pit does not become clogged). Soakaways must be located at least 30 meters from any groundwater source and the bottom of any soakaway pit needs to be at least 1.5 meters above the water tables.

Good International Industry Practices for the Disposal of Solid Contaminated Wastes

- Solid contaminated waste (e.g. surgical specimens, used dressings and other items contaminated with blood and organic materials) may carry microorganisms and thus pose a threat to human health.

Steps for the disposal of solid contaminated waste are:

- Wear heavy-duty or utility gloves when handling and transporting solid waste.
- Wear glasses if you are working with material that may splash into your face or eyes.
- Dispose of solid waste by placing it in a plastic or galvanized metal container with a tight-fitting cover. Never recap needles after use.
- Collect the waste containers on a regular basis and transport the burnable ones to the incinerator
- If incineration is not available or waste is non burnable, bury it.

Incineration¹⁶

Incineration is a high-temperature process that reduces the volume and weight of waste. This process is usually selected to treat waste that cannot be recycled, reused or disposed of in a sanitary landfill or dumpsite. Medical waste produced under this project will be incinerated at health facilities that are equipped with incinerators. In facilities with no incinerators, waste will be properly collected and safely transported to bigger facilities with incinerators.

¹⁶ See also Guidelines on How to Construct, Use, and Maintain a Waste Disposal Unit. WHO, 2005, and De Montfort Medical Waste Incinerator at <http://www.who.int/management/quality/Waste/en/index2.html?>

Types of incinerators

Incinerators can range from extremely sophisticated, high-temperature ones to very basic units that operate at much lower temperatures. All types of incinerators, if operated properly, eliminate micro-organisms from waste and reduce the waste to ashes. Four basic types of incinerators may be used for treating waste, depending on the size of the facility and the types and volume of waste produced:

- a) Double-chamber, high-temperature incinerators are designed to burn infectious waste.
- b) Single-chamber, high-temperature incinerators are less expensive and are used when double chamber incinerators are not affordable.
- c) Rotary kilns operate at high temperatures and are used for destroying cytotoxic substances and heat-resistant chemicals.
- d) Drum or brick (clay) incinerators operate at lower temperatures and are less effective but can be made locally using readily available materials.

Types of waste that should not be incinerated

While it is possible to incinerate soft waste, the below items SHOULD NOT be incinerated:

1. Pressurized gas containers (aerosol cans)
2. Large amounts of reactive chemical waste
3. Silver salts and photographic or radiographic waste
4. Plastic containing polyvinyl chloride (blood bags, IV tubing or disposable syringes)
5. Waste with high mercury or cadmium content, such as broken thermometers, used batteries and lead-lined wooden panels
6. Ampoules or vials, as molten glass will cause the grate to block up and vials can explode
7. Bottles of chemicals and reagents due to risk of explosion and formation of toxic gases
8. Needles due to the risk of needle stick injury from the metal ash
9. Expired drugs
10. Kitchen waste as this is wet, does not burn and will lower the efficiency.

Solid waste that should not be incinerated will be packaged, transported to and disposed of in Government recognized sanitary landfill.

Burying Waste

Only contaminated and hazardous waste needs to be buried. In healthcare facilities with limited resources, safe burial of waste on or near the facility may be the only option available for waste disposal. The health facilities supported through the EHNP are small primary health care facilities. The types of waste expected to be buried include needles, ampoules, scalpels, broken glass, and vials. To limit health risks and environmental pollution, some basic rules are:

1. Access to the disposal site should be restricted (Build a fence around the site to keep animals and children away).
2. The burial site should be lined with a material of low permeability (e.g. clay), if available.
3. Select a site at least 50 meters (164 feet) away from any water source to prevent contamination of the water table. The site should have proper drainage, be located downhill from any wells, free of standing water and not in an area that floods.
4. Large quantities (over 1 kg) of chemical (liquid) waste should not be buried at the same time; burial should be spread over several days. Safe on-site burial is practical for only limited periods of time (1–2 years), and for relatively small quantities of waste. During the interval, staff should

continue to look for a better, permanent method for waste disposal.

Emergency Preparedness and Response

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

Health-care waste management plans include provision or the continuous monitoring of workers health and safety to ensure that correct handling, treatment, storage, and disposal procedures are being followed. Healthcare worker's exposure risk assessment for the healthcare facilities to assess the gaps and essential occupational health and safety measures include the following:

- proper training of workers;
- provision of equipment and clothing for personal protection;
- establishment of an effective occupational health programme that includes immunization, post exposure prophylactic treatment, and medical surveillance.

Training in health and safety is part of the capacity building program to ensure that workers know of and understand the potential risks associated with health-care waste and the importance of consistent use of personal protection equipment. Workers at risk include health-care providers, cleaners, maintenance workers, operators of waste treatment equipment, and all operators involved in waste handling and disposal within and outside health-care establishments.

Emergency response

In health-care establishments, spillage is probably the most common type of emergency involving infectious or other hazardous material or waste. Response procedures are essentially the same regardless of whether the spillage involves waste or material in use, and should ensure that:

- the waste management plan is respected;
- contaminated areas are cleaned and, if necessary, disinfected;
- exposure of workers is limited as much as possible during the clearing up operation;

The impact on patients, medical and other personnel, and the environment is as limited as possible. Health-care personnel are being trained for emergency response, and the necessary equipment will be provided to handle and readily available at all times to ensure that all required measures can be implemented safely and rapidly. Written procedures for the different types of emergencies were drawn up. For dangerous spills, the clean-up operation will be carried out by designated personnel specially trained for the purpose.

Response to needle-stick injuries

A procedure of response will be established in HFs that prescribes the actions to be taken in the event of needle-stick injuries, including evaluation of Hep-B protection and exposing to other hazardous substances. Staff who handle health-care waste will be trained to deal with injuries. The program includes the following elements:

- bleeding of the wound caused by needle stick, wash the area under clean running water

- immediate first-aid measures, such as cleansing of wounds and skin, and irrigation (splashing) of eyes with clean water;
- an immediate report of the incident to a designated responsible person; retention, if possible, of the item involved in the incident; details of its source for identification of possible infection; additional medical attention in an accident and emergency or occupational health department, as soon as possible;
- medical surveillance;
- Hep-B, blood or other tests if indicated;
- recording of the incident;
- investigation of the incident, and identification and implementation of remedial action to prevent similar incidents in the future.

Reporting accidents and incidents

Accidents or incidents, including near-misses, spillages, damaged containers, inappropriate segregation, and any incidents involving sharps will be reported to the personnel responsible of the HF's manager (if waste is involved) and then to UNICEF. The report should include details of:

- the nature of the accident or incident;
- the place and time of the accident or incident;
- the staff who were directly involved;
- any other relevant circumstances like exposure to COVID-19 patients.

The cause of the accident or incident will be investigated by ESS Specialist (in case of waste), who will also take all possible action to prevent recurrence. The records of the investigation and subsequent remedial measures will be kept.

Annex 3: Medical Waste Management Monitoring Questionnaire

Health Facility (name, location):

Type/Category of Health Facility (tick one):

Hospitals

☐

Tertiary: Specialist, National, Teaching

Sub-HCF Hospital, Private Hospitals

☐

Secondary: Governorate Gen. Hospitals,

☐

Primary; Health Centre, Dispensary

☐

Mobile health care unit

No. of inpatients: _____/day

No. of outpatients: _____/day

No. of beds (total): _____/day

Type of solid waste produced and estimated quantity

(Consult classification and mark X where waste is produced)

Type	Estimated Quantity
Sharps	
Pathological waste	
Infectious waste	
Pharmaceutical waste	
Pressurized containers	

Waste segregation, collection, storage, and handling

Describe briefly what happens between segregation (if any) and final disposal of:

Sharps _____

Pathological waste _____

Infectious waste _____

Pharmaceutical waste _____

Pressurized containers _____

Waste segregation, collection, labelling, transport, and disposal

1. Handling of segregated waste	Sharps	Pathological Waste	Infectious waste	Pharmaceutical waste	Pressurized containers
Indicate by X the type of waste (if any) that is segregated from general waste stream.					
Where is the segregation taking place (i.e., operating room, laboratory, among others)?					
What type of containers/bags (primary containment vessels) are used to segregate waste (bags, cardboard boxes, plastic containers, metal containers, among others)? Describe accurately.					
What type of labelling, colour-coding (if any) is used for marking segregated waste? Describe.					
i. Who handles (removes) the segregated waste (designation of the hospital staff member)?					
ii. Is the waste handler using any protective clothing (gloves, among others) during waste handling? Yes/No.					
What type of containers (plastic bins, bags, cardboard boxes, trolleys, wheelbarrows, safe boxes, metal containers, among others) are used for collection and internal transport of the waste? Describe.					
Where is the segregated waste stored while awaiting removal from the hospital for disposal? Describe.					
Describe briefly the final disposal of segregated waste (taken to municipal landfill, buried on hospital grounds, incinerated (external incinerator, own incinerator), open burned, removed from premises, among others)					
If removed from premises; who is responsible for removal? Health facility/self, private collector, State Environmental Protection Agency					
If removed from premises; what form of transport is used? Enclosed waste track, open waste track, open pick-up, among others					
How often is the waste removed from site?					
Daily					

3 – 4 times per week					
1 – 2 times per week					
Once a week					
Every two weeks					
Once a month					
Less often					

Is safety clothing issued to staff involved in medical waste collection, i.e. gloves, aprons, among others?

☐

Yes

☐

No

If yes, please list the safety clothing/items issued to medical waste collectors and the frequency of issue:

Items issued	Daily	Weekly	Monthly	As Needed
Aprons				
Gloves				
Safety shoes				
Overhauls				
Others (specify)				

Which of these waste collection, handling, transport and disposal activities are undertaken by Health-care staff and which are outsourced? List the party responsible for that activity, where the activity is outsourced and the start and end dates of the contract entered into:

ACTIVITY	RESPONSIBLE PARTY (self/facility, Environmental Protection Agency, Private collector, among others)	NAME OF THE RESPONSIBLE PARTY/PRIVATE COLLECTOR
Collection		
Handling		
Transport		

Incineration		
Disposal		

Personnel involved in the management of Health-care waste

1. (a) Designation of person(s) responsible for organization and management of waste collection, handling, storage, and disposal at the hospital administration level.

- (c) Has he/she received any training on hospital waste management?

Yes

No

If yes, what type of training and of what duration?

☐
☐

Annex 4: Treatment and Disposal Methods for Categories of Health Care Waste

Type of waste	Summary of treatment and disposal options/notes
Infectious waste: Includes waste suspected to contain pathogens (e.g., bacteria, viruses, parasites, or fungi) in sufficient concentration or quantity to cause disease in susceptible hosts. Includes pathological and anatomical material (e.g., tissues, organs, body parts, human fetuses, animal carcasses, blood, and other body fluids), clothes, dressings, equipment / instruments, and other items that may have come into contact with infectious materials.	Waste Segregation Strategy: Yellow or red colored bag/container, marked “infectious” with international infectious symbol. Strong, leak proof plastic bag, or container capable of being autoclaved. Treatment: Chemical disinfection; Wet thermal treatment; Microwave irradiation; Safe burial on hospital premises; Sanitary landfill; Incineration (Rotary kiln; pyrolytic incinerator; single-chamber incinerator; drum or brick incinerator) ^e - Highly infectious waste, such as cultures from lab work, should be sterilized using wet thermal treatment, such as autoclaving. Anatomical waste should be treated using Incineration (Rotary kiln; pyrolytic incinerator; single-chamber incinerator; drum or brick incinerator).
Sharps: Includes needles, scalpels, blades, knives, infusion sets, saws, broken glass, and nails etc.	Waste Segregation Strategy: Yellow or red color code, marked “Sharps”. Rigid, impermeable, puncture-proof container (e.g., steel or hard plastic) with cover. Sharp’s containers should be placed in a sealed, yellow bag labeled “infectious waste”. Treatment: Chemical disinfection; Wet thermal treatment; Microwave irradiation; Encapsulation; Safe burial on hospital premises; Incineration (Rotary kiln; pyrolytic incinerator; single-chamber incinerator; drum or brick incinerator) ^e - Following incinerators, residues should be landfilled - Sharps disinfected with chlorinated solutions should not be incinerated due to risk of generating POPs - Needles and syringes should undergo mechanical mutilation (e.g., milling or crushing) prior to wet thermal treatment
Pharmaceutical waste: Includes expired, unused, spoiled, and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer needed, including containers and other potentially contaminated materials (e.g. drug bottles vials, tubing etc.).	Waste Segregation Strategy: Brown bag / container. Leak-proof plastic bag or container. Treatment: Sanitary landfill^a; Encapsulation^a; Discharge to sewer ^a; Return expired drugs to supplier; Incineration (Rotary kiln; pyrolytic incinerator ^a); Safe burial on hospital premises^a as a last resort. <u>Small quantities:</u> Landfill disposal acceptable, however cytotoxic and narcotic drugs should not be landfilled. Discharge to sewer only for mild, liquid pharmaceuticals, not antibiotics or cytotoxic drugs, and into a large water flow. Incineration acceptable in pyrolytic or rotary kiln incinerators, provided pharmaceuticals do not exceed 1 percent of total waste to avoid hazardous air emissions. Intravenous fluids (e.g., salts, amino acids) should be landfilled or discharged to sewer. Ampoules should be crushed and disposed of with sharps. <u>Large quantities:</u> Incineration at temperatures exceeding 1200 °C. Encapsulation in metal drums. Landfilling not recommended unless encapsulated in metal drums and groundwater contamination

Type of waste	Summary of treatment and disposal options/notes
	risk is minimal.
Genotoxic / cytotoxic waste: Genotoxic waste may have mutagenic, teratogenic, or carcinogenic properties, and typically arises from the feces, urine, and vomit of patients receiving cytostatic drugs, and from treatment with chemicals and radioactive materials. Cytotoxic drugs are commonly used in oncology and radiology departments as part of cancer treatments.	Waste Segregation Strategy: See above for “infectious waste”. Cytotoxic waste should be labeled “Cytotoxic waste”. Treatment: Return expired drugs to supplier; Chemical degradation; Encapsulation^a; Inertization; Incineration (Rotary kiln, pyrolytic incinerator); • Cytotoxic waste should not be landfilled or discharged to sewer systems. • Incineration is preferred disposal option. Waste should be returned to supplier where incineration is not an option. Incineration should be undertaken at specific temperatures and time specifications for particular drugs. Most municipal or single chamber incinerators are not adequate for cytotoxic waste disposal. Open burning of waste is not acceptable. • Chemical degradation may be used for certain cytotoxic drugs – See Pruss et al. (1999) Annex 2 for details. • Encapsulation and inertization should be a last resort waste disposal option.
Chemical waste: Waste may be hazardous depending on the toxic, corrosive, flammable, reactive, and genotoxic properties. Chemical waste may be in solid, liquid, or gaseous form and is generated through use of chemicals during diagnostic / experimental work, cleaning, housekeeping, and disinfection. Chemicals typically include formaldehyde, photographic chemicals, halogenated and nonhalogenated solvents ^d , organic chemicals for cleaning / disinfecting, and various inorganic chemicals (e.g., acids and alkalis).	Waste Segregation Strategy: Brown bag / container. Leak-proof plastic bag or container resistant to chemical corrosion effects. Treatment: Return unused chemicals to supplier; Encapsulation^a; Safe burial on hospital premises^a; Incineration (Pyrolytic incinerator^a; • Facilities should have permits for disposal of general chemical waste (e.g. sugars, amino acids, alts) to sewer systems. • <u>Small hazardous quantities</u>: Pyrolytic incineration, encapsulation, or landfilling. • <u>Large hazardous quantities</u>: Transported to appropriate facilities for disposal, or returned to the original supplier using shipping arrangements that abide by the Basel Convention. Large quantities of chemical waste should not be encapsulated or landfilled
Radioactive waste: Includes solid, liquid, and gaseous materials that have been contaminated with radionuclides. Radioactive waste originates from activities such as organ imaging, tumor localization, radiotherapy, and research / clinical laboratory procedures, among others, and may include glassware, syringes, solutions, and excreta from treated patients.	Waste Segregation Strategy: Lead box, labeled with the radioactive symbol. Treatment: Radioactive waste should be managed according to national requirements and current guidelines from the International Atomic Energy Agency. IAEA (2003). Management of Waste from the Use of Radioactive Materials in Medicine, Industry and Research. IAEA Draft Safety Guide DS 160, 7 February 2003.
Waste with high content of heavy metals: Batteries, broken thermometers, blood pressure gauges, (e.g., mercury and cadmium content).	Waste Segregation Strategy: Waste containing heavy metals should be separated from general health care waste. Treatment: Safe storage site designed for final disposal of hazardous waste. • Waste should not be burned, incinerated, or landfilled. Transport to specialized facilities for metal recovery
Pressurized containers: Includes containers / cartridges / cylinders for nitrous oxide, ethylene oxide, oxygen, nitrogen, carbon dioxide, compressed air and other gases.	Waste Segregation Strategy: Pressurized containers should be separated from general health care waste. Treatment: Recycling and reuse; Crushing followed by landfill

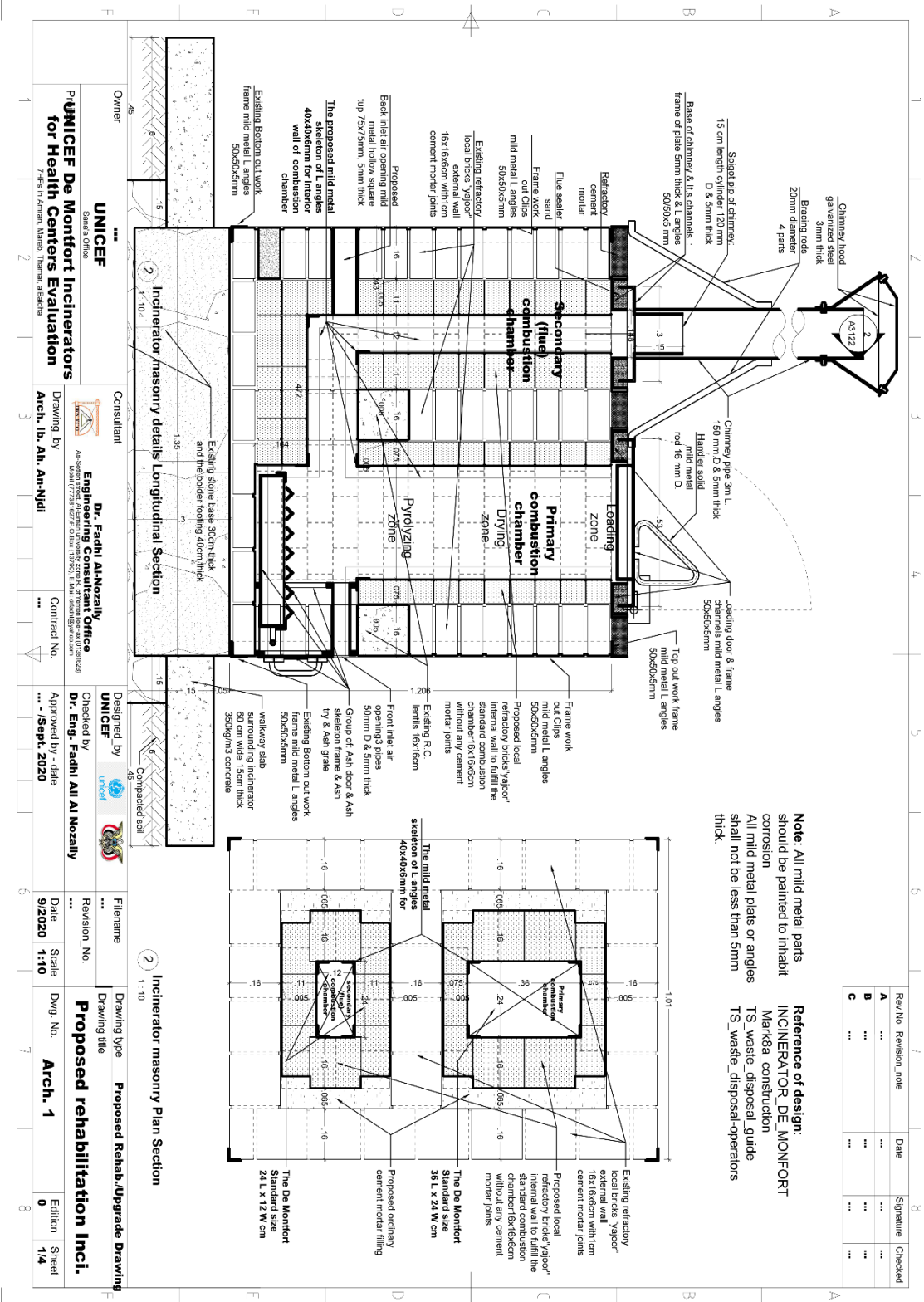
Type of waste	Summary of treatment and disposal options/notes
	- Incineration is not option due to explosion risk - Halogenated agents in liquid form should be disposed of as chemical waste, as above
General health care waste (including food waste and paper, plastics, cardboard).	Waste Segregation Strategy: Black bag / container. Halogenated plastics such as PVC should be separated from general health care facility waste to avoid disposal through incineration and associated hazardous air emissions from exhaust gases (e.g. hydrochloric acids and dioxins). Treatment: Disposal as part of domestic waste. Food waste should be segregated and composted. Component wastes (e.g., paper, cardboard, recyclable plastics [PET, PE, PP], glass) should be segregated and sent for recycling.

Source: Safe Management of Wastes from Health-Care Activities. International Labor Organization (ILO), Eds. Pruss, A. Giroult, and P. Rushbrook (1999)

Notes:

- Small quantities only
- Low-level infectious waste only
- Low-level liquid waste only
- Halogenated and nonhalogenated solvents (e.g., chloroform, TCE, acetone, methanol) are usually a laboratory-related waste stream for fixation and preservation of specimens in histology /pathology and for extractions in labs.
- Note on incinerators. Pyrolytic and rotary kiln incinerators should be used. Use of single-chamber and drum / brick

Annex 4: Design of De Mont Fort Incinerators Categories



Annex 6: UNICEF Proposed Incinerator perspective

