

Report on the Review of the Kenya National Guidelines for Safe Management of Health Care Waste, Injection Safety and Safe Disposal of Medical Waste National Communication Strategy and Health Care Waste Management Standard Operating Procedures (SOPs)



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For the project
Sound chemicals Management Mainstreaming and UPOPs reduction in Kenya,
Ministry of Environment and Natural Resources

Acknowledgement

The review of the Kenya National Guidelines for Safe Management of Health Care Waste, Injection Safety and Safe Disposal of Medical Waste National Communication Strategy and the HCWM Standard Operating Procedures has been achieved through the collaboration and commitment of various individuals and organizations. Special thanks go to the UPOPs Project Management Unit (PMU) for being steadfast in providing leadership and supporting the review process at all times. The team members – Mr. Francis Kihumba, Ms Julia Saino, Mr. Gamaliel Omondi, Mr. Bosco Lolem, Mr. Michael Mwanja, Ms Mercy Kimani and Ms Nancy Narasha all deserve a pat on their back. The process also received support from the leadership of the Department of Multi-lateral Agencies, Ministry of Environment and Natural Resources, and the Department of Environmental Health, Ministry of Health – for which I am thankful. Finally, my sincere gratitude goes to the Health Leadership of the four Counties where the UPOs Project is being implemented, namely - Nairobi, Nakuru, Kisumu and Mombasa and the UNDP Kenya Country Program team, led by Mr. Washington Ayiamba and Mr. Fred Obade who provided all the logistical support I needed for my field work.

Abbreviations

- BATs - Best Available Technologies
- BEP - Best Environment Practices
- GEF - Global Environment Facility
- HCF - Health Care Facility
- HCW - Health Care Waste
- HCWM- Health Care Waste Management
- ToR - Terms of Reference
- I-RAT - Individualized Rapid Assessment Tool
- MENR - Ministry of Environment and Natural Resources
- MoH - Ministry of Health
- SOPs - Standard Operating Procedures
- UNDP - United Nations Development Program
- UNEP - United Nations Environment Program
- UPOPS - Unintentionally Produced Persistent Organic Pollutants
- WHO - World Health Organization
- EMCA – Environmental Management and Coordination Act
- NEMA – National Environment Management Authority of Kenya
- PPE – Personal Protective Equipment
- PPP – Public Private Partnership
- PMU – Project Management Unit
- UoN - University of Nairobi
- RoK - Republic of Kenya
- BCC – Behavior Change Communication

Definition of Terms

Policy – WHO defines a health policy as decisions, plans and actions that are undertaken to achieve specific health care goals within a society? It defines the vision for the future and helps to establish targets. It outlines priorities and expected roles of different stakeholders

Guidelines – Guidelines help health workers to uniformly implement set regulations. The guidelines standardize practices and serve as the basis for evaluating quality.

SOP – An SOP is defined as a method for accomplishing policy. It represents the action plan for achieving policy.

Best Environmental Practices – means the application of the most appropriate combination of environmental control measures and strategies including putting in place and implementing a system for managing health care waste together with the basic elements within the system.

Best Available Technologies – These are alternative technologies to incinerators or burn-technologies. The technologies use less polluting non-burn methods for treating health care waste. Examples include steam sterilization (autoclaving), dry heat sterilization, alkaline hydrolysis and microwave treatment.

Pharmaceutical Waste:

This includes all expired, unused, spilled and contaminated pharmaceutical products, drugs and vaccines. It also includes all sera and bottles with residues of drugs, and all drugs and equipment used for mixing and administration of cytotoxic drugs, gloves, masks, connecting tubing and drug vials. A sub-category of pharmaceutical waste is “genotoxic waste” (also known as anti-neoplastic drugs) and includes primarily cytotoxic drugs.

Radioactive Waste:

Waste emanating from radiology departments, CT scanners, nuclear medicine services, laboratories that use unsealed radioactive sources for diagnostic, therapeutic or research purposes, can be classified as radioactive waste. All radioactive waste from a Nuclear Medicine department is effectively disposed of by decay in storage methods, provided the radionuclides have a half-life of less than 65 days.

Hazardous Chemical Waste:

All discarded solid, liquid and gaseous chemicals, for example from diagnostic and experimental work, and cleaning, housekeeping and disinfecting procedures. Examples of chemicals used include formaldehyde, glutaraldehyde, organic compounds in disinfectants, oils and pesticides and inorganic compounds in acids, caustic and ammonia solutions.

Sharps:

All sharps such as syringe needles, scalpels, infusion sets, knives, blades and broken glass that have been in contact with potentially infectious waste should be treated as sharps whether contaminated with infectious material or not. This does not include non-clinical glass such as broken bottles of cool drink, for example.

Anatomical (Pathological) Waste:

All recognisable body parts, organs, and body tissue such as placentas, non-viable foetuses, amputations etc. fall into this category and are treated as infectious.

Infectious Waste:

This category forms the largest component of health care risk waste generated in health care facilities and consists of discarded materials arising out of activities on humans that have the potential of transmitting infectious agents to humans. These include:

- ❖ Discarded materials or equipment from the diagnosis, treatment and prevention of disease that have been in contact with body fluids.
- ❖ Wastes from infection and isolation wards such as cultures, stocks, tissues, dressings, excreta, swabs or other items soaked with blood.
- ❖ Soiled nappies, blood bags
- ❖ Incontinence material
- ❖ Waste that has been in contact with infected patients undergoing haemodialysis (e.g. dialysis equipment such as tubing and filters, disposable towels, gowns, aprons and gloves)
- ❖ Any other utensils and materials having been in contact with infected persons and animals.

This category also includes infectious liquid waste such as faeces, urine, body secretions (such as sputum or lung secretions) from infected patients usually found in isolation wards or ICU (intensive care units). When there is any doubt as to the condition of the patient, the body secretions are considered as infectious.

Heavy Metals:

Mercury is a particular hazard in health care facilities due to its prevalent use in literally hundreds of devices. It is found in diagnostic devices such as thermometers, blood pressure meters, oesophageal dilators and Miller Abbot/Cantor tubes. It is also present in fluorescent light tubes and batteries.

Pressure Cans:

Pressure cans include pressurised gas cylinders, cartridges and aerosol cans containing many different hazardous substances. Some, like gas cylinders, are reusable and others, like aerosol cans, are disposable. Some of the more common hazardous substances found in health care facility are nitrous oxide, volatile halogenated hydrocarbons, and ethylene oxide.

Health Care:

Includes any medical activities such as diagnosis, monitoring, treatment, prevention of diseases or alleviation of handicaps, in humans or animals, including research performed under supervision of medical, dental or veterinary practitioners.

Health Care Waste:

Is defined as the total waste stream from health care and includes health care risk waste and health care general waste.

Health Care Risk Waste (HCRW):

Health Care Risk Waste (HCRW) is also sometimes referred to as **biohazardous waste**. The term **medical waste** is more commonly known in most health care facilities. The more accurate and internationally accepted term **health care risk waste** is used in this document.

Health Care Risk Waste is broken into the following components:

- ❖ Infectious waste
- ❖ Sharps
- ❖ Anatomical (pathological) waste
- ❖ Hazardous chemical waste
- ❖ Genotoxic/cytotoxic waste
- ❖ Pharmaceutical waste
- ❖ Radioactive waste
- ❖ Pressurised containers
- ❖ Waste with high content of heavy metals

Health Care General Waste (HCGW):

Waste can only be considered **general** if it contains no products or potential properties that are known to have either a reactive or toxic effect, either to humans or the environment. It is generated during the administrative and housekeeping functions of the health care facility and includes food preparation, cleaning and sweeping, repair and replacement, clerical and office services, packaging, cardboard, damaged containers, discarded flowers, bags, tins, wrappings and plastics. Segregation of materials that are able to be reused or recycled greatly reduces the impact of this waste stream.

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Executive Summary

Globally, about 13 million people die from conditions related to pollution, half of these in Africa. The health sector, in particular, is known to produce significant amounts of pollutants such as Unintentional Persistent Organic pollutants (UPOPs) and mercury. To protect the public and the global environment from the effects of hazardous and toxic wastes, WHO, in collaboration with the United Nations Development Program (UNDP) and other development partners in health has been assisting several countries in the development of best health care waste management practices.

At local level, the desire to reduce UPOPs produced from different sectors of the country's developmental activities has been prioritized by the Kenya government. The government received a grant from UNDP/GEF program to execute interventions aimed at reducing releases of UPOPs and mercury from the unsound management of HCW. As part of the project, capacity of HCWM players at the national, county and HCF levels will be built in order that they may be competent enough to employ the Best Available Technologies (BATs) and Best Environmental Practices (BEPs). The Project further intends to draft and disseminate relevant technical guidelines on HCWM, strengthen legislative and policy framework governing HCWM and mercury at national and county levels and also improve HCWM awareness and education. In preparation for wide dissemination of the technical guidelines, standard operating procedures and the related communication strategy, a Consultant was hired to identify gaps and update content as necessary so as to meet the recommended standards.

The overall objective of the consultancy was to review and align the three national technical and communication guiding documents on HCWM to the WHO Blue Book and other global standards and recommendations. The specific objectives of the assignment were ; to establish how well aligned the Kenya Healthcare Waste Management Guidelines, 2011, are to the WHO Blue Book on healthcare waste management, global recommendations and other global conventions on environmental protection; to establish the extent to which the Kenya Injection Safety and Safe Disposal of Medical Waste National Communication Strategy is aligned to the National Health Communication Guidelines, 2013; to determine the extent to which the current Standard Operating Procedures are aligned to the best available technologies (BAT) and best environmental practices (BEP) and international practices; and to assess current health care waste management practices at the health facilities supported by the GEF project. The Consultant was to generate content to bridge identified gaps which was to be by shared as additional recommendations for stakeholder validation with a view to improving broader aspects of HCWM.

The assignment was executed through a mixture of methodology which included document review of the target documents against the global standards and recommendations which included WHO Blue Book, WHO 2015 Injection Safety Policy and UNEP guidelines for protecting

the environment. Special effort was made to capture flow and application of the international Best Available Technologies and Best Environmental Practices provided for under the global conventions and treaties, such as the Stockholm, Minamata, Basel and Rotterdam conventions and the SAICM Strategy, with the Injection Safety and Safe Disposal of Medical Waste National Communication Strategy being reviewed against the Kenya National Health Communication Guidelines, 2013, and the “Field Guide for developing health communication strategies” developed by the John Hopkins University. Health facility assessment was conducted using a standardized Individualized Rapid Assessment Tool (I-RAT) to examine current levels of adherence to HCWM standards among health service providers. Key informant interviews were conducted to understand factors underlying observed practices while capturing the health care workers recommendations on how the system can be improved.

The review work came up with several findings. The Kenya National Guidelines for Safe Management of Health Care Waste had gaps in several areas as follows; guiding principles on resource mobilization and financial investment were not addressed; strategies were mainly short term in nature, lacking long term vision; the legal framework did not take into consideration cultural aspects related to management of health care waste therefore posing a risk, especially in situations of epidemics where unsafe handling of dead bodies can pose serious consequences e.g. in viral hemorrhagic fever outbreaks. There was lack of streamlined system for managing HCW across levels of care with roles and responsibilities of technical staff at national, county and sub-county levels missing. Planning for health care waste management was not well integrated in facility plans and guidelines for budgeting making it difficult for health managers to implement developed plans. Although considered to be a new area of expertise, there was very limited guidance provided on procedures for identifying, selecting, specifying, procuring and installing new waste treatment technologies.

Guidance provided on building capacities of HCWM staff was very limited thus posing uncertainty regarding minimum knowledge and skills required of the staff. The provided guidelines lacked information on management of electronic and electrical, chemical, asbestos and pharmaceutical waste. Although guidance was provided on setting up a plan for monitoring, actual monitoring activities by level of care and their frequencies were not elaborated on and indicators not mentioned. The guidelines mention waste segregation as one of the best environmental practices that needs to be promoted but rationale for waste segregation information on what would motivate health workers to comply was not given. Very limited guidance was provided on processes for storing different categories of waste.

Review of the standard operating procedures revealed that the existing HCWM standard operating procedures were, to a good extent, addressing some of the gaps identified in the guidelines. The SOPs were mainly targeting health facility staff with roles of staff working at higher levels not clarified. The SOPs mention a need for public awareness but without indicating

how exactly the public will be reached. Review of the Injection safety and safe disposal of medical waste national communication strategy revealed that HCWM concerns beyond sharps waste were not well addressed with more focus being put on improving injection practices. The SOPs were also recommending use of technologies that cannot meet recommended temperature and smoke emission requirements such as small-scale incinerators. While it is highly recommended by WHO that guidelines provide information on harmonized systems for assessing risks associated with HCWM including impacts of chemicals on health and the environment, the Kenya HCWM guidelines were silent on these aspects.

Review of the Injection safety and safe disposal of medical waste national communication strategy revealed that communication issues and objectives captured were focusing mainly on injection safety concerns with very little on broader aspects of HCWM. The review revealed very little on preferred channels and languages. There was general lack of information to inform planning for strategic communication, a situation which compromised the ability of the technical working group to focus better on target interventions. Most of the studies were to be conducted as part of implementation of the communication strategic plans but this never happened.

Since the development of the communication strategy, new policies and strategies governing injection safety have been released by WHO. In 2015, WHO launched a new injection safety policy requiring all to switch to auto-disable needles and syringes, syringes with re-use prevention features and syringes with sharps injury prevention features. New communication issues, especially advocacy packages, need to be incorporated in the injection safety communication strategy and implemented.

It is however important to note that the communication strategy was never launched and therefore not disseminated. The strategy was never implemented hence performance outcomes not evaluated; this was confirmed by the consulted stakeholders who were not knowledgeable on its content at all.

The review concluded that a lot has been done in Kenya to provide guidance on how best health care waste should be managed. The guiding documents are to a good extent aligned with the WHO blue book and other global recommendations but with gaps that need to be bridged to ensure full compliance with BEPs/BATs. Where there are gaps in the HCWM guidelines, good effort has been made to develop SOPs that provide more detailed guidance on how to complete tasks. The SOPs to a good extent integrate BEP/BAT but with a lot of room for improvement, especially in the area of chemical waste. Assessment of current HCWM practices at selected health facilities shows that there is some progress made in translating provided HCWM guidance into action but a lot more still needs to be done to improve the situation as a good proportion of facilities are so far failing to cope with the situation. Through stakeholder support, efforts are

ongoing to introduce BAT for use at health facilities in the country. The Injection safety and safe disposal of medical waste national communication strategy is, to a large extent, in line with global standards and was found to be comprehensive enough to achieve communication objectives aimed at improving the injection safety situation. The strategy, however, does not address broader HCWM concerns and was never implemented.

As part of this consultancy, missing content was developed/drafted and is available for review by the MoH and once approved will be used to revise the guidelines, SOPs and communication strategy to ensure full compliance with expectations from the global community. Full compliance will significantly improve ability of the HCWM program to better protect health workers, patients, communities and the environment against adverse effects that would result from using unsafe and inappropriate approaches to managing health care waste.

The review came up with several recommendations, both short term and long term, which if implemented would greatly improve the management of health care waste in Kenya. The recommendations are specific to each of the documents reviewed as well as the HCWM practices at the health facilities. They include the MoH adopting and operationalizing critical guiding principles especially around resource mobilization (such as WHO core principles for managing health care waste) to increase resources available to support implementation of HCM activities, including allocation of sufficient budgets for meeting costs of HCWM ; development of medium and long term strategies, including updating the national HCWM strategic plan; the MoH specifying and organizing for minimum training requirements for staff engaged in managing health care waste management; and incorporating missing content in areas of e-waste, chemical waste, pharmaceutical waste and management of asbestos that has been drafted into the guidelines. The MoH should streamline the system for monitoring HCWM activities, including a sub-system for conducting joint risk assessment and work towards providing proper guidance on processes for possible public private partnerships especially in setting up centralized waste treatment facilities. Also recommended is the incorporation of a comprehensive section on health care waste management including sharps waste communication issues into the communication strategy.

SECTION ONE: BACKGROUND

1.1 Introduction

Poor management of health care waste poses risk of exposure and subsequent transmission of infections; results in pollution of air, water and land and significantly contributes to adverse effects on human and animal health as well as the environment. Improvements in health care waste management cannot be achieved sustainably to national scale without the government making deliberate efforts to actively intervene. The government therefore has a responsibility to describe changes needed to achieve desired impact through a national health care waste management system, usually by implementation of an appropriate policy. Such policy is always intended to drive decision making. This is achieved through providing guiding principles, setting clear objectives, stating desirable improvements that should be achieved, giving strategic direction for achieving set goals, and highlighting areas for legislation. The policies are expected to take into consideration global agreements, treaties and conventions that govern management of health care waste in the countries such as the Basel convention that implements the principle of prior informed consent, the Stockholm convention that bans production of persistent organic pollutants, the Minamata convention that calls for elimination of mercury from health care settings and the SAICM strategy that calls for use of chemicals in ways that minimize significant adverse effects on human health and the environment.

Based on developed policies, a legal package is developed specifying regulations for the treatment of the different categories of health care waste and the regulations provide an opportunity for clearly defining hazardous waste and their associated legal obligations.

To make it easy for health workers and other stakeholders to implement legislation, guidelines are developed specifying roles and responsibilities of authorities. In addition, recommended safe practices, especially in the areas of waste minimization, segregation, handling, storage, treatment, transportation and disposal are articulated.

The government of Kenya, through the Ministry of Health, has in the past developed health care waste management legislation, policies, guidelines and a communication strategy to guide all concerned to achieve sustainable improvements at national scale. The Ministry would like to review these documents to improve their comprehensiveness, appropriateness and levels of compliance and to align them to the current global recommendations with main focus on how well persistent organic pollutants and mercury elimination are addressed. Effort will be made to align them to current economic status and practices in the country.

1.2 Statement of the problem

WHO in collaboration with United Nations Development Program (UNDP) and other development partners in health has assisted several countries in the development of best health care waste management practices (15) It aims to protect the public and the global environment from the effects of hazardous and toxic wastes in the following ways: establishing model facilities and programs to - exemplify best practices in health care waste management; deploying and evaluating commercially available, non-incineration health care waste treatment technologies appropriate to the needs of each country; developing, testing, manufacturing and deploying affordable, small-scale non-incineration technologies for use; introducing and evaluating the use of mercury free devices in model facilities; establishing or enhancing training programs to build capacity for the implementation of best practices and technologies both within and beyond the model facilities and programs; reviewing and updating relevant policies; disseminating project results and best practices to stakeholders for dissemination and scaling-up regionally and globally.

The desire to reduce UPOPs produced from different sectors of the country's developmental activities has always been an utmost priority of the Kenya government. It is on this basis that the government, through its relevant agencies, received with gratitude and happiness the grant from UNDP/GEF program to execute the long-time desire.

Following the release of the grant, the MOENR, which is the Implementing Agency, working closely with the MoH, has developed an implementation plan, indicating broad and specific objectives and respective outcomes. From a broad perspective, the GEF project in Kenya, in respect to HCWM, aims at protecting human and environmental health by reducing releases of UPOPs and mercury from the unsound management of HCW, particularly the sub-standard incineration and burning of HCW. To make this work, the Project will build capacity of HCWM players at the national, county and HCF levels in order that they may be competent enough to employ the Best Available Technologies (BATs) and Best Environmental Practices (BEPs), which use will be propagated by the Project, moving forward, to improve the management of HCW. The Project further intends to draft and disseminate relevant technical guidelines on HCWM, strengthen legislative and policy framework governing HCWM and mercury at national and county levels and also improve HCWM awareness and education.

1.3 Justification

Kenya is the most industrially developed country in East-Africa, with manufacturing accounting for about 14% of the GDP. Due to urbanization, the industrial and manufacturing sectors have become increasingly important to the Kenyan economy, with industrial activity being concentrated around the largest urban centres within the country, and is dominated by agro/ food processing industries. To remain competitive at global and regional levels, the country needs to export its agricultural production. Pest control is one of the strategies being used to boost the production.

In addition, the country has a rapidly growing population demanding for quality health services. The services are also extended to health care seeking residents from other countries in the East-African region and beyond. Health service delivery requires use of chemicals and generates ever increasing volumes of health care waste. A good proportion of the waste is contaminated with biologicals and chemicals. If not well managed, health care waste, especially chemical waste poses risks of air, water and land pollution and exposes humans and other plant lives to adverse effects. Global studies show that over 11 million people die annually from conditions related to air pollution, half of these in Africa.

Several conventions such as the Stockholm, Basel, Minamata, and SAICM strategy have been developed at global level to safeguard the environment and human health from risks posed by unsafe handling of health care waste including chemicals. Kenya ratified/signed the stated conventions as commitment to taking action in respect to implementation of the recommended best practices.

Based on the country situation and future development plans, the enforcement against flaws for management of chemicals and other types of hazardous waste is critical calling for corrective measures to be designed and implemented. Priority interventions involve integrating environmental concerns into national development policies, plans and programs. The Health sector waste management program is targeted for intervention and it is on this basis that the MoH, working in partnership with MENR, commissioned the review of the guiding documents relevant for the management of health care waste.

The global community has updated global guidance on management of health care waste and has summarized updated recommended practices in the “WHO Blue Book” and Kenya has developed and disseminated guidance on health communication. The new guidance requires countries to pay special attention to a need to integrate BETs and BATs at all levels of guidance with major focus on uptake of these practices at health facility/institutional levels. The guidance also calls for better engagement of the public and private sectors.

The GEF project in Kenya, as part of its objective of protecting human and environmental health by reducing releases of UPOPs and mercury from the unsound management of HCW, will build capacity of HCWM players at the national, county and HCF levels in order that they may be competent enough to employ the Best Available Technologies (BATs) and Best Environmental Practices (BEPs), which use will be propagated by the Project, moving forward, to improve the management of HCW. The project would like to bench-mark current status of affairs in lieu of previous interventions, new global recommendations and on-going country efforts to continue improving waste management systems. Information generated will be used to inform project strategic plans including focusing areas where support should be directed. Major emphasis will

be put on reducing releases of UPOPs and mercury from the unsound management of HCW. Communication for social and individual behavior change will be given due priority.

1.4 Overall Objective

The objective of this consultancy was to review the current healthcare waste management guidelines, injection safety and medical waste communication strategy and standard operating procedures on healthcare waste management.

1.4.1 Specific objectives

- i. To establish how well aligned the Kenya Healthcare Waste Management Guidelines, 2011, are to the WHO Blue Book on healthcare waste management, global recommendations and other global conventions on environmental protection.
- ii. To establish to what extent the Kenya Injection Safety and Safe Disposal of Medical Waste National Communication Strategy is aligned to the National Health Communication Guidelines, 2013.
- iii. To determine how well aligned are the current Standard Operating Procedures to the best available technologies (BAT) and best environmental practices (BEP) and international practices.
- iv. To assess the current health care waste management practices at health facilities supported by the GEF project.

1.5 Review questions

- i. How well aligned are the Kenya National Guidelines for Safe Management of Healthcare Waste, 2011, to the WHO Blue Book on healthcare waste management, global recommendations and other global conventions on environmental protection and/ or health care waste management and do they recommend best environmental practices?
- ii. How well aligned is the Kenya Injection Safety and Safe Disposal of Medical Waste National Communication Strategy to the National Health Communication Guidelines, 2014, and does the communication strategy capture key communication issues and channels and properly address critical stakeholders?
- iii. How well aligned are the current Standard Operating Procedures to the best available technologies (BAT) and best environmental practices (BEP) and international practices?
- iv. What are the current health care waste management practices among health workers and do they conform to the recommended best practices? What are the underlying factors behind the less than optimal conformity, if any?

1.6 Hypothesis of the Review (Null hypothesis)

- The health care waste management guidelines, policies, SOPs and other such related documents in use in Kenya have huge gaps that make them deficient in content and application.

1.7 Scope of Work

To answer the above questions, a scope of work was generated requiring;

- Review of the current Kenya Injection Safety and Safe Disposal of Medical Waste National Communication Strategy and rating it against guidance provided in the National Health Communication Guidelines 2013 – 2017 and checking completeness and relevance of key messages, content of materials and effectiveness of utilized channels;
- Review of the current Kenya National Guidelines for Safe Management of Healthcare Waste in line with WHO Blue Book on healthcare waste management ;
- Review of the current Kenya Healthcare Waste Management Guidance and Standard Operating Procedures in line with WHO Blue Book on healthcare waste management;
- Using the I-RAT tool and other structured tools to collect information on levels of adherence to waste management guidelines among health care workers while identifying factors/challenges that affect adherence.

The reviews aimed at identifying the existing gaps at different levels for the three documents, suggest key areas for amendments, and suggest the methodologies, materials and resources required for the amendments to be effected.

As part of the processes, the following was required of the consultant:

- Generate and submit an Inception report detailing the understanding/ interpretation of the TORs; the methodology of carrying out the assignment; work plan and implementation schedule as agreed upon with UNDP/MENR and MOH.
- Conduct specific field visits to make observations of current practices, interview key informants, conduct focus group discussions with targeted teams and conduct stakeholder consultations for input.

1.7.1 Deliverables

The following were the key deliverables for the assignment

- Plan of work by week 1
- Inception report submitted 3 days after signing of contract.
- Final agreed upon inception report by week 1
- Presentation of the identified gaps and suggested inputs to stakeholder validation meeting 25 days after signing the contract.
- Reviewed Injection Safety & Safe Disposal of Medical Waste National Communication Strategy, National Guidelines for Safe Management of Healthcare Waste and Standard Operating Procedures, both hard and soft copy documents.

- Review pre-tested Injection Safety and Safe Disposal of Medical waste Communication Strategy toolkit.

SECTION TWO: LITERATURE REVIEW

2.1 Review of global guiding documents on management of health care waste

2.1.1 Guiding principles for managing health care waste as provided in the WHO blue book and other global reference documents

Review of the WHO Blue Book revealed that the following global guiding principles are recommended for managing health care waste and it is advised that these guiding principles be incorporated in national policies and guidelines to guide in daily decision making:

- The **“polluter pays”** principle which implies that all producers of waste are legally and financially responsible for the safe and environmentally sound disposal of the waste they produce. This principle also attempts to assign liability to the party that causes damage.
- The **“precautionary”** principle is a persuasive principle governing health and safety protection. It was defined and adopted under the Rio Declaration on Environment and Development (UNEP, 1972) as Principle 15: “Where there are threats of serious or irreversible damage to the environment, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation”.
- The **“duty of care”** principle stipulates that any person handling or managing hazardous substances or wastes or related equipment is ethically responsible for using the utmost care in that task. This principle is best achieved when all parties involved in the production, storage, transport, treatment and final disposal of hazardous wastes (including health-care waste) are appropriately registered or licensed to produce, receive and handle named categories of waste.
- The **“proximity”** principle recommends that treatment and disposal of hazardous waste take place at the closest possible location to its source to minimize the risks involved in its transport. Similarly, every community should be encouraged to recycle or dispose of the waste it produces, inside its own territorial limits, unless it is unsafe to do so.
- The **“prior informed consent principle”** as embodied in various international treaties is designed to protect public health and the environment from hazardous waste. It requires that affected communities and other stakeholders be apprised of the hazards and risks, and that their consent be obtained. In the context of healthcare waste, the principle could apply to the transport of waste and the siting and operation of waste-treatment and disposal facilities.
- The **“WHO core principles for managing health care waste”** require that; donors and development partners make provisions within their assistance program to support safe management and disposal of waste generated from their program activities; governments provide budgets for sound systems for managing health care waste, require all stakeholders concerned with provision of health services to provide budgets for managing health care

waste and build health worker capacities while protecting communities and the environment; private sector to reduce toxicity of waste generated from their production activities and services, NGOs to advocate for health management and all concerned to advocate for incorporation of waste management requirements within the plans and budgets.

2.1.2 Desirable improvements to be achieved by health care waste management policy documents

It is desirable that several improvements should be considered when setting up policy and legislation. These include- setting a national budget to ensure the regulations are fully complied with and that individual establishments do the same; continually improve the mandatory standards of health-care waste management; create an organized system of enforcement of the legislation; create a national system of training and assessment of technical competence in the management of health-care waste; create a system of awareness raising, training and regular assessment of sustainable development in the management of all waste produced in health-care facilities.

- **Setting national budgets:** WHO came up with core principles for managing health care waste. The principles require that donors make provisions within their development health programs to support management of health care waste, governments should require development partners to support health care waste management activities related to the programs that they support, managers are required to incorporate waste management budgets within the planning and budgeting activities and all those concerned manage waste through all recommended processes without posing harm to downstream handlers as a duty of care.
- **Creating an organized system for legislation:** A national policy document should outline the rationale for the legislation, taking account of international agreements and conventions that the country may be a signatory to, plus a set of national goals to be achieved and the steps necessary to achieve them. Kenya is a signatory to the following conventions; Stockholm, Basel, Minamata etc. Descriptions of management responsibilities within and outside health-care facilities should be stated to avoid ambiguity in taking action.
- **Classification of waste according to category of risk, warning against risks and rationalizing practices:** A policy document may contain definitions of the various waste streams produced in health-care facilities; promotion of the advantages of sustainable segregation and storage techniques for the different waste streams; descriptions of the health and safety risks resulting from mismanagement of health-care waste; reasons for sound, sustainable and safe health-care waste-management practices in health-care establishments; listing of approved methods of treatment and disposal for each waste category; warning against unsafe practices, such as disposing of hazardous health-care waste in an uncontrolled manner.

- **Planning for safe management of health care waste:** assessment of the costs of health-care waste management based on key steps to implement in health-care waste management: minimization, separation, handling, transport, treatment and final disposal; technical specifications for commodities and other materials required for the implementation of each step (described in separate technical guidelines); quantifying requirements and mobilizing resources to make these available. Roles and responsibilities for these processes should be clarified.
- **Data needs:** Descriptions of record keeping and documentation should be clarified including indicators that will be used to track progress.
- **Training requirements:** Key topics that need to be covered, competencies expected of cadres of staff, skills and use of protection should be clarified.
- **Health worker safety:** Rules governing the protection of workers' health and safety.

2.1.3 International Agreements that should be taken account of when developing health care waste management policies

Several international agreements need to be considered when developing health care waste management policies, for purposes of ensuring sustainable development and protection of the environment. These include;

- The **Stockholm convention** is a global treaty protecting humans and the environment from harmful effects of persistent organic pollutants such as dioxins and furans. These toxic pollutants are mainly generated by medical incinerators. The treaty requires countries to use alternative technology or incinerators that meet temperature and smoke emission requirements.
- **The Minamata convention** is a global treaty to safeguard human health and the environment from the unsafe effects of mercury. Mercury is a chemical of concern because of its long-range atmospheric transport, its persistence in the environment once anthropogenically introduced, its ability to bio-accumulate in environment and its significant adverse effects on human health and the environment. The treaty requires countries to put a ban on new mercury mines, phase out existing ones, phase out and phase down mercury use in a number of products and processes, control measures on emissions to air and on releases to land and water, and the regulation of the informal sector of artisanal and small-scale gold mining. The Convention also addresses interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury as well as health issues (*UNEP, 2013; www.mercuryconvention.org*)

- **The Strategic Approach to International Chemicals Management (SAICM)**
SAICM is a global policy framework adopted in 2006 that guides efforts to achieve the 2002 Johannesburg goal of implementation that by 2020 chemicals will be produced and used in ways that minimize significant adverse effects on human health and the environment. Three documents constitute the SAICM; the Dubai declaration on international chemicals management, the overarching policy/strategy, and the Global Action Plan. General objectives of the SAICM include; risk reduction, providing sufficient information on chemicals and their management, putting in place governance structures to address policy, laws, transparency and accountability issues, capacity building, technical cooperation and preventing illegal international trafficking in toxic, hazardous, banned and severely restricted chemicals.
- The **Basel convention** on trans-boundary movement of hazardous waste; the convention applies the principle of prior informed consent. The convention requires policies to provide for punishing illegal traffic in hazardous waste. The convention recommends that waste is treated as close to source as possible.
- The **Bamako Convention** on trans-boundary movement of hazardous waste prohibits importation of hazardous waste into African countries.
- **United Nations Committee of Experts on the Transport of Dangerous Goods**
The model regulations cover principles of classifying and defining classes; listing the principal dangerous goods; general packing requirements; testing procedures, marking, labeling or placarding; and transport documents. In addition, special requirements relate to particular classes of goods. With this system, carriers, consignors and inspecting authorities' benefit from simplified transport, handling and control, and from a reduction in time consuming formalities.
- **ISWA policy document on health-care waste management**
Emphasizes minimizing resource use where possible, reusing items when appropriate medically, maximizing the recycling of materials, and taking account of sustainable development issues in the management of wastes. The policy requires health facilities to have waste management plans and all staff are trained to segregate and manage waste.

2.2 Review of Kenya National Policies, Laws and Regulations on HCWM

2.2.1 Review of the Kenya National Policy on Injection Safety and Medical Waste Management for compliance with global policy recommendations:

The Kenya National Policy on Injection Safety and Medical Waste Management is a February 2007, copy-righted document developed by the MoH with the objective of ensuring safe injection practices and proper management of medical waste in order to safeguard the patient, health care provider, the community and the environment. The objective is to be achieved ***through communication for behavior change, provision of adequate supplies for injection equipment and proper waste management.*** The document has 11 sections organized as follows; Background, Situation Analysis, Mission, Overall Goal, Policy Objectives, Guiding Principles, Policy Strategy, Specific Guidelines, Institutional Framework, Monitoring and Evaluation, and Research.

The guiding principles reflected in the Kenya Injection safety and health care waste management policy are not well aligned to global recommendations. For example, the provided principles aim at; increasing access to information and training of health workers, setting up organizational structures, protecting the environment through use of appropriate waste disposal methods, ensuring full supply of required commodities, minimization of risks to patients, health workers, communities and the environment through application of safer devices and disposal methods, observation of professional ethics and involvement of stakeholders. By comparison global guiding principles focus on; duty of care, the polluter pays, precautionary principle, prior informed consent, proximity and requirements of different stakeholder groups to make budgetary provisions for supporting management of health care waste.

- **Policy objectives:** The global recommendations for policy objectives include; setting a national budget to ensure that the regulations are fully complied with, and require that individual establishments do the same; continually improve the mandatory standards of health-care waste management; create an organized system of enforcement of the legislation; create a national system of training and assessment of technical competence in the management of health-care waste; create a system of awareness raising, training and regular assessment of sustainable development in the management of all waste produced in health-care facilities.

The Kenya policy objectives are more skewed towards achieving safe injection practices and not clearly articulate objectives for safe and appropriate health care waste management.

- **International agreements, treaties and conventions**
The Kenya policy ***does not adequately emphasize international agreements, treaties and conventions that should be taken consideration of when developing policies for managing health care waste*** although the country is a signatory to a good number of these documents.

- **Strategies**

The Kenya Injection safety and medical waste management policy has the following strategies; capacity building, financial allocation and mobilization, strengthening of the logistics management system, advocacy and behavior change communication, strengthening information system, monitoring and evaluation and private public sector collaboration.

WHO recommends several strategies for achieving injection safety and safe health care waste management. The strategies are categorized into short term, medium term and long term.

Ensuring full supply of injection devices and related materials including selecting appropriate devices (re-use prevention, auto-disable, and sharps injury prevention). The devices should be free of vinyl chlorine and preferably made of one type of recyclable plastic.

Proper sharps waste disposal: The short term health care waste management strategies include; waste minimization, segregation, handling and storage, transportation and safe disposal. Under minimization, WHO recommends making choices that favor recycling of materials such as plastics, glass, paper and metal; researching and adopting alternative technology for waste treatment and disposal to small scale incineration; accepting large scale incineration that meets temperature and smoke emission requirements as a recognized option until other methods become available.

Medium term strategies include; reducing volumes of waste by reducing unnecessary injections, researching into exposures to health care waste and to dioxins and furans and their outcomes.

- Long term strategies include; scaling up non-incineration technology; supporting countries to develop national guidance manuals, plans, policies, standards and legislation on health care waste; promoting global conventions (Basel, Minamata, Stockholm etc.), treaties and other recommendations and supporting allocation of resources to safely manage health care waste. WHO core principles for managing health waste provide further guidance on how resources can be mobilized.

While both Kenya and WHO strategies emphasize strengthening the logistics system and advocacy and behavior change, the areas emphasized diverge after that, for example, Kenya policy prioritizes capacity building and developing information systems including the M & E system while WHO strategies stress **waste minimization, recycling, innovating non-incineration technology, and conducting research into risk factors for exposures and their outcomes** as the better priority strategies for achieving safe injections and appropriate waste treatment and disposal

2.2.2 Review of Kenyan Laws and Regulations on healthcare waste management and how these relate to global standards

WHO recommends that each country should put in place a legal package addressing health care waste management concerns. This legal “package” should specify regulations on the treatment of different waste categories by specifying how each category should be segregated, collected, stored, handled, disposed of and transported. The laws should also state responsibilities and training requirements. Resources and facilities available in the country concerned and any cultural aspects of waste handling should be taken into account. A national law on health-care waste management may stand alone, or constitute part of more comprehensive legislation. The Kenya legislation for managing health care waste was reviewed against global recommendations and the findings are summarized in table 1 below.

Table 1: Findings of comparison and contrast between recommended global legislation countries are supposed to have in place to guide management of health care waste and what the government of Kenya has provided for

	Global recommendations on areas where legislation is required	Areas where the Kenya government has put in place appropriate legislation
1	A law on managing all forms of hazardous wastes, where the application to health-care waste is stated explicitly;	Legal Notice No. 121 Waste Management Regulations 2006 – focus on the management of solid waste, industrial waste, hazardous waste, pesticides and toxic substances, biomedical wastes and radioactive substances. Provide details on responsibility of the waste generator, adoption of cleaner productions principles, waste handling, transportation, treatment and disposal. E-Waste Management Guidelines, 2011 – provide framework for collection and recycling and sets standards to ensure that safety aspects of the people involved in the operations are protected. Minimizes effects of emissions and waste emerging from such operations.
2	Specify regulations on the treatment of different waste categories by specifying how each category	Legal Notice No. 121 Waste Management Regulations 2006.

	Global recommendations on areas where legislation is required	Areas where the Kenya government has put in place appropriate legislation
	should be segregated, collected, stored, handled, disposed of and transported	
3	Roles and responsibilities of stakeholders including their training requirements	Occupational Safety and Health Act, 2007 – applies to all work places in which any person is either temporarily or permanently and lawfully at work. The Act also protects other persons not at work against risks to safety and health that may arise out of or in connection with activities of persons at work. The Act deals with general duties of the occupier, machinery safety, health general provisions, safety general provisions, chemical safety and welfare general provisions, among others.
2	A law on hospital hygiene and infection control, where a specific section should be devoted to health-care waste.	Occupational Safety and Health Act, 2007
3	A national law should include the following elements:	
	<ul style="list-style-type: none"> • A clear definition of hazardous health-care waste and its various categories; 	<p>The Public Health Act, Chapter 242 Laws of Kenya</p> <p>The Environmental Management and Coordination Act, 199 (EMCA 1999)</p>
	<ul style="list-style-type: none"> • A precise indication of the legal obligations of the health-care waste producer regarding safe handling and disposal; 	The Public Health Act, Chapter 242 Laws of Kenya
	<ul style="list-style-type: none"> • Specifications for record keeping and reporting; 	Where there are no national laws, global standards are adopted.
	<ul style="list-style-type: none"> • Establishment of permit or licensing procedures for systems of treatment and waste handling; 	The Environmental Management and Coordination Act, 1999 (EMCA 1999)

	Global recommendations on areas where legislation is required	Areas where the Kenya government has put in place appropriate legislation
	<ul style="list-style-type: none"> Specifications for an inspection system and regular audit procedures to ensure enforcement of the law and for penalties to be imposed for contravention; 	<p>The Public Health Act, Chapter 242 Laws of Kenya</p> <p>The Environmental Management and Coordination Act, 1999</p> <p>Legal Notice No. 101 Environmental Impact Assessment and Audit regulation , 2003</p>
	<ul style="list-style-type: none"> Designation of courts responsible for handling disputes arising from enforcement of, or non-compliance with, 	
	<ul style="list-style-type: none"> Cultural aspects of waste handling 	Not well covered
	<ul style="list-style-type: none"> Resources and facilities available in the country 	The Environmental Management and Coordination Act, 1999

2.3 Review of approaches to developing guidance on health care waste management and how the guidance is cascaded to regional and country levels for adoption

2.3.1 Review of global approaches: It is common practice for stakeholders to sit at global level either as member states, scientists with common interest, or selected working groups charged with the responsibility of finding lasting solutions to global health and environmental threats. The stakeholders deliberate and reach consensus on what the real issues are, who is most affected, what needs to be done including assessing and evaluating feasible interventions. High impact interventions are then prioritized for wide scale-up across countries. Positions reached are then communicated as policies, guidelines, resolutions, conventions, agreements or best practices for adoption by countries.

The Countries then review the most current global guidance to pick out the most pressing issues, recommended approaches to addressing the issues and types of support available to countries. The guidance is scrutinized for relevance, appropriateness, and suitability to the prevailing situation; and picked to serve as the major reference for analyzing country level documents for

alignment, conformity and compliance. Documents of interest, which can be used for benchmarking include; the WHO blue book on managing health care waste, WHO 2015 injection safety policy, the compendium for waste treatment technologies; the Basel, Stockholm and mina Mata conventions and the SAICM strategy among others.

2.3.2 Review of regional recommendations: Regional structures such as the WHO African Regional Office (AFRO) and the East African community review global recommendations and make attempt to customize these to regional situations. This level of review makes it easier for countries within the region to adapt more applicable options when designing interventions at individual country level. The regions can however lag behind other regions in accelerating uptake of global recommendations to the extent that some of the key issues fall through the cracks. Periodic review of regional guidance helps in picking out modifiable approaches in the context of the African region. The review also provides a basis for making a comparison with country level documents.

2.3.3 Review of national policies and regulations: National level position documents are developed based on prevailing global guidance and need to be reviewed from time-to-time to ratify and implement international agreements and determine whether earlier provided guiding principles and objectives are still relevant. The review also aims at establishing improvements that need to be achieved, preferred strategies, mandate, roles and responsibilities and legal obligations and whether locally preferred approaches, best practices comply and remain well aligned to global recommendations. Where gaps are identified, these need to be captured and tabled for discussions with the relevant Government Agency, such as the MoH, and other stakeholders before updating. Documents of special interest would include the National Environment policies, laws and regulations applicable to the health sector; National Policy, Standards and Guidelines for Injection Safety and Medical Waste Management and related standard operating procedures.

2.3.4 Field visits: To establish the extent to which the guidance has been institutionalized as well as assess levels of uptake of best practices in managing health care waste (based on provided policies, laws, regulations, guidelines and SOPs), field visits to health facilities are recommended during which interactions are made with health workers to observe their practices and reasons behind those practices; understand the environment in which they work, their needs, expectations and challenges, values and beliefs. Feedback from the health workers is critical when making next updates as it helps in tailoring selected approaches to the real working contexts of the health workers. Information on the current practices when administering injections as well as those related to generation, handling, storage, treatment and disposal of waste and the technologies in use is obtained through this process.

2.4 Review of Standard Operating procedures and how they relate to Best Environmental Practices (BEPs), Best Available Technologies (BAT) and International standards

2.4.1 Review of guidelines and Standard Operating procedures: Guidelines and standard operating procedures are aimed at standardizing practices across health facilities in the country regardless of the level of health facility and ownership. The guidelines need to be current and evidence based but also tailored to local situations and environments within which health workers operate. They should be simple to understand, catering for different categories of health workers. Documents of interest include; the National Guidelines for Safe Management of Healthcare Waste, Health Care Waste Management Guidance and Standard Operating Procedures (SOPs) and the National Infection Prevention and Control Guidelines for Health Care Services in Kenya.

The guidelines and SOPs need to be reviewed from time to time to establish whether they are current, relevant, easy to understand and cater for all categories of health facilities. Gaps identified should be captured and discussed with concerned authorities. Recommendations should then be made regarding best practices that need to be adopted to bring the guidelines up-to-date with global expectations. As part of this process, specifications for injection devices and related materials, waste management commodities and technologies for treating waste should be reviewed and summarized for ease of understanding by both health managers and health workers.

2.4.2 Standard Operating Procedures (SOPs)

An **SOP** is defined as a method for accomplishing policy. As a procedural document, it provides instructions on how to carry out the policy expressed in the National Guidelines. In effect, SOPs represent the action plan for achieving policy. A predominant difference between a SOP and a Guideline is the level of detail. An effective SOP communicates who will perform the task, what materials are necessary, where the task will take place, when the task shall be performed, and how the responsible person will actually execute the task.

The details in an SOP standardize the process and provide step-by-step instructions that enable anyone within the system to perform the task/procedure in a consistent and correct manner. The SOP also serves as an instructional and reference resource. The step-by-step written procedure further contributes to the concept of accountability because staff expectations and health care facility procedures are documented and activities can be measured against the SOP. Communicating procedures that anyone in the system can follow with consistent results will ensure that the health care facility continually provides a minimum quality of service. An SOP

usually informs a work instruction downstream, which forms part of a staff member's scope of work and job description.

2.4.3 Best Environmental Practices

The Term Best Environmental Practices (BEP) means the application of the most appropriate combination of environmental control measures and strategies including putting in place and implementing a system for managing health care waste together with the basic elements within the system. According to the WHO Blue Book, the basic elements of a medical waste management system include the following: Waste classification, Waste segregation, Waste minimization, Containerization, Colour coding, Labeling and Signage, Handling, Transport, Storage, Treatment and Final disposal. Making collection and disposal systems available to the public involves; assessment of the waste streams and existing environmental practices, evaluation of waste management options, development of plans, Promulgation of institutional policies and guidelines, including roles and responsibilities of personnel, allocation of human and financial resources, establishment of a waste management organization, Implementation of plans and actions, Periodic training and Monitoring, evaluation and continuous improvement. In addition, it is globally recommended that the following range of best environmental practices/measures should be considered when developing SOPs:

1. Providing information and education to the public and to users about environmental consequences of choice of particular activities, their use and ultimate disposal.
2. Emphasizing the need to develop an application of codes of good environmental practices which covers all aspects of an activity/procedures that has impact on the environment.
3. Calling for the application of labels informing users of environmental related risks related to a product, its use and ultimate disposal.
4. Creating awareness regarding a need to save resources including energy.
5. Requiring managers to avoid hazardous substances/products and generation of hazardous waste.
6. Stressing recycling, recovery and re-use.
7. Ensuring the application of economic instruments to activities, products or groups of products.
8. Catering for the establishment of a system of licensing and imposing penalties.

2.4.4 Best Available Technologies (BATs)

Incineration used to be the method of choice for most hazardous healthcare waste and is still widely used. However, recently developed alternative treatment methods are becoming increasingly popular. WHO mentions five basic processes for treatment of hazardous components in health care waste; thermal, chemical, irradiation, biological and mechanical. According to WHO, the final choice of a waste treatment system should be made carefully,

on the basis of various factors, many of which depend on local conditions: disinfection efficiency; health and environmental considerations; waste characteristics, quantity of waste for treatment and disposal, capability of the health facility to handle the quantity of waste, types of waste for treatment and disposal, technological capabilities and requirements, local availability of treatment options and technologies, capacity of the system, treatment efficiency, volume and mass reduction, installation requirements, available space for equipment, infrastructure requirements, operation and maintenance requirements, skills needed for operating the technology, environmental and safety factors, environmental releases, location and surrounding of the treatment site and disposal facility, occupational health and safety considerations, public acceptability, options available for final disposal, regulatory requirements, cost considerations, equipment purchase cost, shipping fees and customs duties, installation and commissioning costs, annual operating costs, including preventive maintenance and testing, cost of transport and disposal of treated waste and decommissioning.

The alternative technologies are steam sterilization, advanced steam sterilization, microwave treatment, dry heat sterilization, alkaline hydrolysis and biological treatment (WHO blue book).

2.4.5 Why the need to integrate BEP and BATs into SOPs?

SOPs serve as framework for providing direction and structure in the proper management of HCW, thereby supplementing the National Guidelines on Health Care Waste Management. As aforementioned, they complement the National Guidelines by providing further procedural detail for subjects that are not catered for. SOPs provide the user with: Written documentation of best practice; relates the what, how, when, why, and who; provides a foundation for: job descriptions / work instructions; staff training; corrective action and discipline; and performance review. Integrating BEP and BATs therefore increases uptake of these best practices into lives of health workers and daily decision-making processes thereby creating a multiplier effect in protecting health workers, patients, communities and the environment. The higher the levels of integration, the more likely health workers are to institutionalize these best practices.

SECTION THREE: METHODOLOGY

3.1 Study Subjects

The review work involved document review, in which several national health care waste management and injection safety guiding documents, including policies, guidelines and strategy documents were to be reviewed against the WHO Blue Book, WHO [Policy on Injection Safety, Compendium of health care waste treatment technologies and other international standards. Further to these, health facilities of various levels, within the four Project Counties, were to be assessed to determine current practices related to health care waste management, using the individualized rapid assessment tool (I-RAT).

3.2 Study Design

This was a descriptive, exploratory study, executed through literature/ document review and the health facility rapid assessment processes, with the aim of determining the existing gaps in the current HCWM guiding documents in Kenya as well as the current practices involving HCWM in the health facilities.

3.3 Data Collection Methods

A mixture of quantitative and qualitative methods were applied in collecting data. An individualized Rapid Assessment tool (I-RAT), a structured questionnaire for health facility rapid assessment in respect to health care waste management, was used to collect data on current HCWM practices at the health facilities. Complementing this tool were the Key Informant Interview guide and the Focus Group Discussion guide, both of which were used to collect data on the current practices of health care waste management and injection safety in the health facilities. Interviews were held with key informants in the health facilities, who included the Medical Superintendents/ Facility In-charges, Nursing Officer In-charge, Laboratory Technologist In-charge, Health Care Waste Management Officer and the Health Administrative Officer, where applicable. Focus group discussions were held with waste handlers in the various health facilities with the aim of picking their views and suggestions in so far as improvement of HCWM interventions is concerned. At the same time, document review was used, in which the earmarked national guiding documents on HCWM and Injection Safety were reviewed against WHOI Blue Book, WHO Policy on Injection Safety, Compendium of health care waste treatment technologies and other international standards.

3.4 Sampling Method

All the 13 health facilities (census) supported by the UPOPS project were purposively selected for Health Facility Rapid Assessment.

In the same note, purposive sampling was employed to determine the individuals to participate in the Focused Group Discussions, Key Informant Interviews and Questionnaire administration. Individuals in positions or with roles and responsibilities in managing health care were

purposively selected. Focus group discussions were held with waste handlers and the health workers found on duty on the day of the assessment.

3.5 Sample Size Determination

Given the small size of the sampling frame, all the thirteen (13) health facilities supported by the Project were studied.

Table 2: Summary of targeted data sources

No.	Name of health facility	Level of care	I-RAT Tool	Key informant interviews					Focus Discussions		Group
				Medical Superintendents/ Facility in-charges	Nursing officers in-charge of Facility	Laboratory in-charge	HCWM focal person	Total Key informant interviews	Waste handlers	Representatives of nurses, lab technologists and public health officers	
1	Rift valley Provincial county Hospital	5	1	1	1	1	1	4	1	1	2
2	Coast Provincial General Hospital	5	1	1	1	1	1	4	1	1	2
3	Portreitz Sub-county Hospital	4	1	1	1	1	1	4	1	1	2
4	Mlaleo Health Centre	3	1	1	1	1	1	4	0	0	0
5	Molo Sub-county Hospital	4	1	1	1	1	1	4	1	1	2
6	Naivasha County Hospital	5	1	1	1	1	1	4	1	1	2
7	Likoni Sub-county Hospital	4	1	1	1	1	1	4	1	1	2
8	Mathare National Teaching and Referral Hospital	5	1	1	1	1	1	4	1	1	2
9	Bagathi County Hospital	5	1	1	1	1	1	4	1	1	2
10	Mama Lucy Kibaki Sub- county Hospital	4	1	1	1	1	1	4	1	1	2
11	Jaramogi Oginga Odinga Teaching and Referral Hospital	5	1	1	1	1	1	4	1	1	2

No.	Name of health facility	Level of care	I-RAT Tool	Key informant interviews					Focus Discussions		Group
12	Kisumu County Hospital	5	1	1	1	1	1	4	1	1	2
13	Ahero Sub-county Hospital	4	1	1	1	1	1	4	1	1	2
	Total		13	13	13	13	13	52	12	12	24

3.6 Document review:

In all the levels of review, the purpose was to identify the existing gaps and make recommendations on areas that need updates/ better alignment to the WHO Blue Book, BATs, BEPs and other approved international practices as deemed necessary.

3.6.1 Review of the Kenya National Guidelines for Safe Management of health care waste

The assignment involved thorough review of the Kenya national guiding documents on Injection Safety and Health Care Waste Management including; the Kenya National Guidelines for Safe management of Health Care waste (2011), the Kenya Injection Safety and Safe Disposal of Medical Waste National Communication Strategy (2010) and the Kenya Health Care Waste Management Guidance and Standard Operating procedures (SOPs, 2015). Guidance provided was rated against key global guidance as provided in the **WHO Blue Book**, the WHO 2015 Injection Safety Policy and other global Best Available Technologies, Best Environmental Practices and approved International Practices in HCWM. Special effort was made to capture flow and application of international guidance provided under global conventions and treaties, e.g. the Stockholm, Minamata and Rotterdam Conventions as well as the SAICM Strategy. The management of mercury waste, which is given very little space in some of the existing guidelines and policies and actually no mention at all in others, was given special focus in the guidance documents by the Reviewer.

The Reviewer covered all the national level healthcare waste management and Injection Safety guidelines, policies and Standard Operating Procedures and examined information provided in terms of completeness, relevance and accuracy as measured against what is recommended in the global guidance using a comparison and contrasting approach.

3.6.2 Review of Injection Safety and Safe Disposal of Medical Waste National Communication Strategy against the Kenya National Health Communication Guidelines, the John Hopkins Field Guide to Designing a Health Communication Strategy and other International Standards

A global standard entitled - “*A field Guide to Designing a Health Communication Strategy*”, developed by the Population Communications Services Department of John Hopkins Bloomberg School of Public Health was used to bench-mark national documents. This guide was selected because it is widely used globally and has produced reliable outcomes for over 30 years.

The first level of review involved assessing the Kenya National Health Communication Guidelines, 2013, to determine conformity to recommended processes for developing national communication guidelines in the area of communication strategy, scope of guidance, content and technical soundness. The national guidelines were found to be, to a large extent, well aligned with the selected global guidelines. The Kenya Injection Safety and Safe Disposal of Medical Waste National Communication Strategy was then reviewed to establish level of alignment and compliance with recommendations provided in the Kenya National Health Communication Guidelines, 2013. Because success in implementing the strategy heavily depends on stakeholder buy-in, special focus was put on the processes followed when developing the strategy. Analysis was done to establish whether key communication issues, channels and critical message content are well addressed. Effort was made to establish whether the strategies proposed would be able to achieve intended objectives.

Further review was done by subjecting the Kenyan document to a comprehensive comparative analysis against the John Hopkins ‘Field Guide to Designing a Health Communication Strategy’ so as to identify any gaps therein.

3.6.3 Review of the Kenya Health Care Waste Management Guidance and SOPs

Review of SOPs was based on the understanding that SOPs complement the National Guidelines by providing further procedural detail for subjects that are not well catered for in the guidelines. The Kenya National Guidelines for Safe Management of health care waste were reviewed to identify areas where there were significant information gaps, thus calling for development of SOPs. The national SOPs were then reviewed to address the identified information gaps as appropriate.

To appreciate guidelines on best available technologies (BATs) and provisional guidance on best environmental practices (BEP) relevant to article 5, Annex C of the Stockholm Convention on Persistent Organic Pollutants, UNEP (2006) guidelines on this subject were reviewed in addition to guidance provided in the **WHO Blue Book**. In addition, global guidance on international management of chemicals was obtained through a focused review of various relevant resources including the SAICM Strategy (UNEP, 2016) and WHO Fact Sheet on Mercury (WHO, 2005b; UNEP,

2012). Guidance provided at global level was then compared and contrasted with what is available in the Kenya Health Care Waste management Guidance and Standard Operating procedures (SOPs), 2015, under chapter 7 on Chemical Waste Management.

3.7 Health Facility Rapid Assessment

Health facility assessment was conducted to examine current levels of adherence to acceptable health care waste management practices, as prescribed by the relevant health care waste management guidelines and policies, among the health care workers. This was done by use of key informant interviews, focus group discussions and observation as methods of collecting data. The assessment also aimed at establishing the factors underlying the less than optimal adherence, wherever they were, while capturing proper recommendations regarding how the system could be improved. Several data collection methods and tools used are elaborated here-below:

3.7.1 Individualized Rapid Assessment Tool

The Individualized Rapid Assessment Tool (I-RAT) for capturing data on current waste management practices was administered by well trained and experienced team of Research Assistants at the 13 government owned health facilities supported by the UPOPS Project. Areas assessed by the tool included;

- General administrative information
- Organization of Health Care Waste Management Services
- Availability and application of policy and HCWM planning
- Training of health workers
- Occupational Health and Safety
- Monitoring and Evaluation of health care waste management activities and taking corrective action
- Financing of health care waste management activities/technology
- Ability to classify and segregate health care waste
- Keeping waste generation data
- Collection and handling
- Color coding and labeling
- Posters and signage
- Transportation inside health establishment
- Storage
- Hazardous chemical, pharmaceutical and radioactive waste
- Treatment and disposal methods
- Management of waste water

For more details on information captured by the I-RAT tool, please check appendix 1.

3.7.2 Key Informant Interviews

Four categories of officers with unique positions/roles in managing health care waste, who are therefore expected to have privileged information were identified and targeted for key informant interviews; and these included; health facility managers (medical Superintendents at higher level facilities and facility in-charges at lower level facilities), nursing officers in-charge of health facilities, health care waste management focal persons and laboratory in-charges. A standardized key informant interview guide was used (see appendix 2) to establish facts in the following areas of interest in health care waste management;

- General questions related to injection safety and health care waste management
- Roles and responsibilities
- Availability of guidance on Injection safety and health care waste management practices and ease of adherence
- Sources and adequacy of financing for HCWM
- Types of waste treatment technologies in use
- prevalence of incidents and accidents and their management
- Community concerns in HCWM
- Recommendations for improving the health care waste management system.

3.7.3 Focus Group Discussions

Focus group discussions (composed of 8 members each) were held, using a focus group discussion guide, at each health facility (i.e. levels IV and above) with two different groups of representatives of health workers. One group was composed of waste handlers while the second group was composed of a mixture of representatives of nurses, midwives, laboratory technologists and public health officers. Effort was made to ensure gender balance.

Discussions were aimed at gaining insight into - levels of group knowledge, practices, attitudes and perceptions of health workers in respect to the existing systems for managing health care waste. Focus was put on learning from health workers experiences regarding what works, enablers and challenges, information needs, general understanding of workers of international conventions as well as national policies and guidelines. In addition, participants provided information on waste management commodity security, availability and use of guidelines, SOPs, alternative sources of technical information, workplace safety and vaccination of health workers against hepatitis B, HCWM straining status and needs and levels of compliance with environmental requirements. Recommendations on how the system can be improved were captured.

3.7.4 Collecting information on preferred characteristics and content for a HCWM handbook for health workers

Health care workers were interviewed on their opinions regarding an appropriate handbook on HCWM to serve as quick reference during day-to-day service delivery, with the focus of inquiry being on the desired physical features and themes to be captured as well as the target audience. Themes of interest were probably those cross cutting areas where there were information gaps. Under target audience, the interviewers were interested in learning whether designing of the handbook would require developing special sections for different cadres of staff or taking an approach where information is generalized for all cadres of staff but with clear referencing where additional information for specific cadres of staff is called for. The said handbook, if developed, would be disseminated to all concerned for purposes of guiding proper management of health care waste among health workers.

It was envisaged by the Reviewer that based on the outcome of the review work done and on correcting the gaps identified there-from the review and coming up with updated versions of the relevant different HCWM policy documents and guidelines, there could be need to come up with a summarized and consolidated handbook of HCWM to serve as reference material for the health workers.

3.8 Limitations to the Review Exercise

The period allocated for the exercise was grossly inadequate considering the amount of work involved. From practical professional experiences with this kind of engagement in the past, the Consultant is convinced that a thorough review of all the ear-marked HCWM and Injection Safety documents together with all such other related documents currently in use in Kenya, all the relevant publications at the regional and global levels, as well as a critical go through the global conventions on environmental protection would require a longer period to undertake.

- Given the general elections that were going on in Kenya, and basing on the experience of previous political tension and emotions during general elections and strikes among health workers, the execution of the assignment was adversely affected, leading to some delay.
- The Reviewer was not provided with the strategy implementation Performance progress report to enable him determine the strategies that worked and those that never worked thus requiring re-designing. Note that performance evaluation is normally done by a joint performance evaluation team.
- It was not possible for the Reviewer to determine the best practices from the strategy implementation since the Reviewer was not provided with the minutes of the stakeholder engagement meetings which would have outlined the extent of stakeholder buy-in;

determined what the different stakeholders promised to undertake/ support and the outcome of the said support; what worked and what did not work, among other things.

SECTION FOUR: FINDINGS

4.1 Achieved sample size

Table 3. Sample size attained

S/N	Area for sampling g/data collection	Targeted sample	Achieved sample	Comments
1	Total health facilities visited	13	13	Target met
2	IRAT- tool	13	13	Target met
3	Key informant interviews	52	52	
4	Focus group discussions	13	13	Target met
5	National guiding documents reviewed	3	3	Target met
	Reference documents reviewed	15	15	Target met

4.2 Findings from Review of Documents

4.2.1 Review of HCWM Technical Guidelines:

4.2.1.1 Purpose of Technical Guidelines as recommended by WHO

According to the WHO Blue Book on safe management of health care waste (second edition), technical guidelines are intended to guide the implementation of legislation. The guidelines should outline the legal framework and specify the following; responsibilities of public health authorities; how hospital hygiene, occupational health and safety should be improved, assessment of needs, rationale for health care facility level safe practices for waste minimization; segregation, handling, storage and transport of health-care waste; treatment and disposal methods for each category of health-care waste and for wastewater and limits of emission of atmospheric pollutants and measures for protection of water resources. WHO Blue Book further recommends that guidance provided should stress the following objectives of planning; clarifying on how the legal and regulatory framework for HCWM will be achieved, development of specific investment and operational resources dedicated to HCWM, the need to launch capacity building and training measures, and setting up a monitoring plan.

4.2.1.2 Kenya National Guidelines for Safe Management of Health Care Waste

The Kenya National Guidelines for Safe Management of Health Care Waste is a copy-righted January, 2011, document established as a framework for guiding management of health care waste for purposes of protecting human and environmental health. The guidelines advocate for training of health care providers and increasing public awareness as essential elements in safe management of health care waste. The document is intended for use by all health care providers, manufacturers of pharmaceutical products, medical training institutions, medical research laboratories, public health managers, and local authorities charged with the responsibility of waste management and any other stakeholders within the broader health care industry.

The guidelines were developed through a consultative process and are composed of 18 chapters as follows; Introduction, Health effects of Health care waste management, Characteristics of health care waste, Legislative Framework, Guiding principles and strategies, Health care waste management planning, Waste minimization, recycle and re-use, Handling, Labelling and containment. The guidelines clearly outline the legal framework, provide findings on assessment of needs, provide some guidance on the responsibilities of Public health officers for health facility/ institutional level in chapter six (healthcare waste management planning), elaborate on setting up a monitoring plan, give guidance on how to reduce pollution associated with HCWM and make good attempt at rationalizing waste management practices within health care facilities.

The guidelines , however, are not clear on roles and responsibilities for different officers working at national, county and sub-county levels, do not explicitly show how legal and regulatory requirements should be achieved, and lack specific guidance on priorities for financial investment. Allocation of resources to operationalize HCWM activities is not guaranteed; for example, section 6.2.3 under planning does not provide for direct allocation of resources to health care waste management activities, including recommending the creation of a budgetary code/ vote head for these activities, thus making the health service managers unable to plan for these activities at county, sub-county and facility levels. The guidance provided on launching capacity building and training measures is inadequate.

For purposes of ensuring compliance with the WHO 2015 Injection Safety Policy, some of the guidance provided in the Kenya National Guidelines for safe management of health care waste under waste minimization recommending re-use of sharps should be revised to ban any form of re-use of sharps (see page 27).

Table 4: Gap analysis on the Kenya National Guidelines for Safe Management of Health Care Waste in Comparison to recommendations of the WHO Blue Book

Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
Recommend that the guidelines should outline the legal framework	Legal frame work is clearly outlined in Chapter 4 focusing on four major laws and the e-waste management guidelines of July, 2011. The laws include; the Public Health Act, Chapter 242, Laws of Kenya; the Environmental Management and Coordination Act, 1999, with its three regulations - Legal Notice No. 101 on Environmental (Impact Assessment and Audit) Regulations, Legal Notice No. 121 covering waste management regulations, and Legal Notice No. 120 covering water quality regulations; the Occupational Safety and Health Act, 2007; and the Food, Drugs and Chemical Substances Act, Cap. 254 Laws of Kenya.	The Kenya National Guidelines for Safe Management of Health Care Waste provide very limited guidance on management of Electronic and Electrical Wastes (see Chapter 10; Section 10.9). There is need to provide more content to beef up this section.
Recommend conducting needs assessment	Provide findings on assessment of needs	There is need to standardize frequency of conducting needs assessment to remain current.
Recommend that roles and responsibilities of public health authorities be clarified	Chapter 5 of the guidelines provides general guiding principles for health care waste that imply roles and responsibilities for waste generators and health managers at different levels of care and these include; right to a clean healthy environment as provided for by the constitution of Kenya; preventing health risks associated with exposure to health	Roles and responsibilities of officers at national, county and sub-county levels need to be well defined

	Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
		<p>care waste by promoting sound management policies; compliance with EMCA, 1999 Act and accompanying regulations; supporting global efforts to reduce the amount of noxious emissions , duty of care principle, sustainable development, precautionary approach, rational utilization of resources, responsibility of waste generator, polluter pays principle, and proximity principle.</p> <p>Chapter 6 provides detailed guidance on the responsibilities of Public health officers for health facility and institutional level in (healthcare waste management planning) but the chapter does not provide adequate guidance to national level officers on their roles and responsibilities.</p>	
	<p>Emphasize a need to provide guidance on setting up a plan for monitoring safe management of health care waste at the different health care levels</p>	<p>Chapter 15 section 15.6 defines monitoring as an activity undertaken to provide specific information on the characteristics and functioning of environmental and social variables in space and time with the aim of comparing impacts to what is predicted; ensuring that limits are not exceeded, and providing warning of potential environmental/health damage. Guidance is provided on principles, objectives, types of monitoring, selection of indicators</p>	<p>There is very little guidance on how to plan for the actual monitoring.</p> <p>There is need to draw a substantive monitoring plan, with complete details of parameters to be monitored.</p>

	Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
		and format and content of a monitoring report.	
	Recommend that guidance is provided on how hospital hygiene, occupational health and safety should be improved	Guidelines require health facility management to be responsible for providing a safe, healthy workplace and safe systems of work. Chapter 11 of the guidelines provides guidance on how hospital hygiene, occupational health and safety should be improved and this involves; risk assessment, specifying best practices, making provisions for the continuous monitoring of practices, training of health workers, providing personal protective equipment, vaccination of health workers and putting in place pre and post exposure management programs. Putting in place an occupational health and safety committee is highly recommended.	In compliance
	Require that rationale for health care facility level safe practices is explained	Covered in chapter 7 of the Kenya National Guidelines for Safe Management of Health Care Waste	In compliance
	Recommend that waste minimization is prioritized - hierarchy of waste management (Reduce, Reuse, Recycle), and that waste minimization options and management best practices are provided/stated.	Covered in section 7.1 and 7.2. All recommended key information - hierarchy of waste management, waste minimization options provided and management best practices is provided in the Kenya guidelines.	It would be good to provide additional information on how to identify recyclable items and proper procedures for segregating them; e.g. use of symbols for identifying plastic bottles for recycling.

Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
<p>Segregation: Global recommendations require that health workers are;</p> <ul style="list-style-type: none"> • provided with information explaining why waste segregation is important, and that there is need to; • Explain how a facility can begin waste segregation, • Describe the recommended segregation system, • Specify who should be trained in waste segregation, • Explain what containers are needed and where they should be placed, • Specify frequency of waste collection and who is responsible to make sure that this is done correctly. 	<p>Guidance on waste segregation is covered in section 7.3.</p> <p>The importance of waste segregation is mentioned in 7.1.4 under minimization.</p> <ul style="list-style-type: none"> • Color coding accompanied by biohazard symbols is the recommended system for use when segregating health care waste (see annex 2 for specifics) • Containers that should be used and where they should be placed are well explained. • 	<ul style="list-style-type: none"> • The health workers are not guided on how to start waste segregation. • The section is silent about importance of training health workers and who should be trained. • Responsibility of making sure that waste if segregated is put on the waste generator. • Frequency of waste collection is not mentioned in the section. <p>It is therefore recommended that the MoH should;</p> <ul style="list-style-type: none"> • Provide more information on the importance of waste segregation. • Provide guidance on how to start waste segregation. • Provide more guidance on training of health workers including who should be trained. • Mention minimal frequency of waste collection from each waste generation point. • Information provided is scanty and does not motivate managers and health workers to segregate waste.

	Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
	<p>Handling including labelling: it is recommended that managers make sure that used biohazard bags are of recommended color codes and have appropriate symbols indicating type of hazard.</p> <p>It is also recommended that once waste bags are ¾ full, they should be tied and labelled with date, types of waste and point of generation for purposes of tracking</p> <p>Symbols should be used to warn handlers of the type of hazard related to the category of waste being handled</p>	<p>Chapter 8 Section 8.1 requires each health care facility to have a core team of well-trained waste handlers to undertake the handling and internal transportation, spill management, blood and bodily fluid exposure management and storage requirements of the health facility.</p> <p>Annex 2 shows minimum labeling expected.</p> <p>Chapter 8 provides information on handling and labelling under sections 8.3, 8.4 and 8.6.</p>	<p>All recommendations are met hence the guidelines are in compliance.</p>

Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
<p>Storage: Global guidelines recommend that national or local regulations are put in place that provide information on;</p> <ul style="list-style-type: none"> • acceptable storage, • whether storage will be on-site or off-site by use of collection service providers, • where storage should be if on-site, • who undertakes off-site collection, • Mitigation measures to reduce risks to human and animal health and the environment. 	<p>Chapter 4 section 4.2.2 references Legal Notice No. 121 on waste management regulations that provide details on waste handling, transportation, treatment and disposal. Chapter 8 gives more details on how to achieve these regulations to make it easy for different stakeholder groups to comply.</p> <p>Acceptable storage is explained in chapter 8 section 8.7. Acceptability is defined in terms of location of storage facility (inside the health care establishment), time periods for storage (not more than 48 hours during cool season and not more than 24 hours in hot period if there is no refrigeration), the need to separate out waste with special toxicities (e.g. cytotoxic and radioactive waste), mitigation measures against specific hazardous waste that can arise during storage (e.g. storing radioactive waste in lead barriers) and best practices in setting up and maintaining the storage facility. The provided best practices are well aligned to global recommendations.</p>	<p>Provide more explanation in chapter 8 expounding on how Legal Notice No. 121 should be executed in handling, storing and transporting health care waste.</p> <p>Providing better illustrative images showing how different categories of waste can be stored in a storage facility, especially with regard to arrangement for storing chemicals in a manner that minimizes risk of cross reaction, could add value.</p>
<p>Collection: Global recommendations require that;</p> <ul style="list-style-type: none"> • the routine program for waste collection is described, 	<p>Organization for waste collection is covered under chapter 8 sections 8.1 and 8.9 of the Kenya National Guidelines for Safe Management of Health Care Waste.</p>	<p>External waste collectors are not mentioned as an option and payment for waste collection is not mentioned.</p>

Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
<ul style="list-style-type: none"> • workers are given information/SOPs on what to do when containers are full; the person responsible for internal waste collection is stated and if applicable • who the external waste collector will be, • payment arrangements, 	<p>Section 8.1 requires each health care facility to have a core team of well-trained waste handlers to undertake the handling and internal transportation, spill management, blood and bodily fluid exposure management and storage requirements of the health facility.</p> <p>Section 8.9 recommends putting in place a routine program for waste collection during planning. The section requires that waste is collected at least once a day from generation points but collection can be more frequent according to needs. The section requires nursing and clinical staff to tightly close/seal bags when $\frac{3}{4}$ full and label them.</p> <p>Removed waste bags must be replaced immediately hence a requirement to have stocks for at least three months.</p>	<p>There is need to provide more guidance to health facilities that use external waste collectors; Specifically:</p> <p>Advice should be provided on preferred payment arrangements for waste collection.</p> <p>Providing an annex of available licensed HCWM service providers could add value.</p>
<p>Transport of health-care waste: it is required that guidelines;</p> <ul style="list-style-type: none"> • explain national or local regulations • define acceptable transport • put in place a regular system for monitoring transport and storage conditions 	<p>Chapter 4 section 4.2.2 references Legal Notice No. 121 on waste management regulations that provide details on waste transportation</p> <p>Transportation is covered in chapter 8 sections 8.2, 8.10, 8.11, and 8.12 of the Kenya National Guidelines for Safe Management of Health Care Waste.</p>	<p>Provide more guidance on how to put in place a regular system for monitoring transport and storage conditions.</p>

	Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
		<p>Guidance on acceptable waste transportation is covered in terms of optimizing processes, selecting routes for the transportation, need for licensing, and specifications for transport means and types of equipment to be used, precautions to be taken during transportation and infection prevention and control measures.</p> <p>Section 8.12 requires waste producers to put in place proper systems for documentation and tracking generated waste up to final waste disposal.</p>	
	<p>Treatment: It is recommended that guidelines provide information on the following;</p> <ul style="list-style-type: none"> • purpose of waste treatment, • forms of treatment available, • variables to consider when selecting waste treatment technology, • overview of the different waste treatment technologies, • how to operate waste treatment equipment, • training of users, • how to ensure proper treatment, • safe-guards needed for the land burial of health care waste, • budgets (initial costs, preventive maintenance, operational costs) 	<p>Treatment and disposal of health care waste is addressed in chapter 9 of the Kenya National Guidelines for Safe Management of Health Care Waste.</p> <p>Section 9.1 provides guidance on treatment and disposal options.</p> <p>The section provides information on purpose for treating health care waste (to ensure protection from potential hazards posed from these wastes).</p> <p>Common forms of treatment that are available are stated and these include; incineration, steam sterilization, chemical disinfection, autoclaving, and microwave irradiation. In addition, information is provided on other methods that can be used such as encapsulation, inertization,</p>	<p>Should consider expounding on the purpose for treating health care waste e.g. Epidemiological, economic, social, health and environmental dimensions for the benefit of different stakeholder groups.</p> <p>Consider generating content for SOP on how to select waste treatment technology. The SOP should include a table summarizing parameters to evaluate e.g. characteristics of the waste, availability and cost of utilities and consumables, initial, operational and preventive maintenance costs, skills among staff etc. and how</p>

	Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
		<p>shredding, maceration and grinding. Preferred options are mainly non-burn-technologies.</p> <p>Section 9.1 mentions that treatment methods should be chosen according to national and local situation. This statement falls far short of providing detailed information on variables that facilities and institutions should consider when selecting waste treatment technology.</p> <p>There is lack of general information on processes for treating health care waste making it unlikely that managers will be in position to plan, supervise and maintain selected equipment efficiently.</p> <p>Although information is provided on suggested options that can be used to treat/dispose of health care waste, details provided under each method do not provide sufficient step-by-step information to users of the guidelines. There is need to revisit this chapter with the aim of increasing on guidance provided in areas of waste treatment selection, using different types of technology, how to ensure proper treatment, benefits and shot comings of the different types of technologies.</p>	<p>these relate to the different treatment technologies.</p> <p>Section on treatment of health care waste needs to be revisited as in current form it leaves out a lot of recommended information that should be available in national guidelines.</p>
	<p>Disposal: Several disposal methods are recommended for each category of health-care waste</p>	<p>Although the National Health Care Waste Management Guidelines provide some information on waste disposal, the information is not</p>	<p>There is need to provide more details on processes for disposing of waste using</p>

Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
<p>Sharps waste should be destroyed on-site using mechanical needle destroyers; the plastic parts should be shredded; burying the metal pieces in sharps pits; re-melting the plastics for recycling; using centralized autoclave facility and burying in special landfill trenches; burying in concrete vaults and burying in pots with clay or cement floors.</p> <p>Anatomical, pathological, placenta and contaminated carcasses should be disposed of by intermittent burial in cemeteries, or special burial sites or through cremation. New options include alkaline digestion, burial in placenta pit.</p> <p>Pharmaceutical waste should be; returned to donor or manufacturer; encapsulated and buried in a sanitary landfill; chemical decomposition in accordance with manufacturer's recommendation; dilution in large amounts of water and discharge into the sewer.</p> <p>Cytotoxic waste should be returned to the original supplier, incinerated at high temperature, or subjected to chemical degradation in accordance with manufacturer's instructions.</p> <p>Chemical waste: It is recommended that highly toxic chemical waste should be replaced with environment friendly alternatives. Chemicals can be returned</p>	<p>comprehensive enough and lacks details on processes for completing waste disposal tasks.</p>	<p>different recommended methods.</p>

Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
<p>to original supplier; outdated disinfectants can be used for cleaning toilets. Sugars, amino acids and certain salts can be disposed of with municipal waste or discharged into sewers; recover silver from photo-chemicals can be recovered. Usually chemicals need sophisticated methods.</p> <p>Radioactive waste should be allowed to decay in storage, return to supplier, or long term storage at an authorized radioactive waste disposal site.</p>		
Wastewater and limits of emission of atmospheric pollutants	Chapter 4 on legislative framework provides information on Legal Notice No. 120 on water quality regulations that provide effluent discharge control standards for both surface and underground water. Chapter 18 provides guidance on how to reduce pollution associated with HCWM.	Limits of emission of atmospheric pollutants not provided.
Measures for protection of water resources	Chapter 18 provides details on collection and disposal of waste water from health care establishments. Areas covered include; characteristics and hazards of waste water from health care establishments, waste water management, connection to municipal sewerage treatment plant, on-site and off-site or pre-treatment of waste water, sludge treatment, re-use of waste water and sludge in	Concur

	Areas for health care waste management guidance as provided in the WHO Blue Book - Purpose of HCWM guidelines	Kenya National Guidelines for Safe Management of Health Care Waste	Gaps, Comments and Recommendations
		agriculture and aquaculture, operations for establishments that apply minimal waste water management programs, minimal safety requirements for sewerage treatment, sanitation and safe management of waste from health care activities.	
	Recommend that guidelines should provide information on strategies for securing resources for establishing sound health care waste management systems.	There is lack of specific guidance on financial investment and operational resources dedicated to HCWM and the chapter on planning (section 6.2.3) does not provide guidance on clear delineation of responsibilities of funding that takes place at the planning stages across levels of care (national, county, sub-county levels) .	Based on guidance provided under the WHO core principles for safe and sustainable management of health care waste establish, effort should be made to put in place sound systems/strategies for resource mobilization and allocation to waste management activities/plans.
	Recommend that guidance is provided on launching of capacity building activities	The guidance provided on launching capacity building in chapter 20 and training measures is limited but it is clearly stated that only trained persons shall be deployed in health care waste management.	There is need to develop and roll out standardized HCWM courses for different cadres of staff involved in managing health care waste

4.2.2 Review of the Kenya Injection safety and Safe Disposal of Medical Waste National Communication Strategy, 2010, against standards for communication as reflected in the Kenya National Health Communication Guidelines 2013 – 2017

The review of this strategy was preceded by reviewing the Kenya National Policy on Injection Safety and Medical Waste Management. This was done basing on the fact that the communication strategy was aimed at aiding implementation of the policy, especially the

objective on ‘behavior change communication among health workers to appropriately reduce risks, increase safety and minimize need for injections’, hence prior clear understanding of the content of the policy was paramount as it would define the process of reviewing the strategy. The Policy was thoroughly reviewed against the WHO Blue Book and other global standards as shown here-below (Refer to Section 2 on Literature Review).

The Kenya Injection safety and Safe Disposal of Medical Waste National Communication Strategy is a 2010 copy-righted document comprising of 6 chapters; Introduction, Situation analysis, the Communication Strategy, Strategy Implementation Plan, Monitoring and Evaluation and Annexes.

The Kenya National Communication Guidelines 2013 – 2017 recommend that to ensure effective health communication interventions, a process which is planned and evidence based needs to be followed. The process involves three major steps; planning and designing of health communication interventions, implementation of health communication interventions and Monitoring and Evaluation. Planning and designing of health communication interventions focuses on gathering evidence to support development and implementation of the strategy. It involves the following key steps; analysis of the problem, analysis of people affected by the problem, context analysis, understanding the partners, allies and gatekeepers, designing a health communication strategy, developing and pre-testing concepts, messages and materials. Below is a summary showing levels of compliance of the Kenya Injection Safety and Safe Disposal of Medical Waste National Communication Strategy with the national communication guidelines.

Table 5: Gap analysis on the Injection Safety and Safe Disposal of Medical Waste National Communication Strategy in comparison to the guidance and recommendations of the Kenya National Health Communication Guidelines, John Hopkins Field Guide for Development of Communication Strategy and other global guidance on Communication Strategy

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
1	Stakeholder consultative process	Three regional communication stakeholder workshops were held in Kisumu, Mombasa and Nyeri.	Communities were engaged in the process of developing the communication strategy.

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
		A national workshop was held to build consensus on major issues that needed to be addressed.	
2	Situation analysis	Was done as elaborated on here-below:	In concurrence
2.1	Defining core Health Issue	High demand for unnecessary injections in the community as measured against patient preference for injections. HIV transmission by injections estimated at 2.5%.	The document only covers injection safety core issues but nothing on broader aspects of health care waste management.
2.2	Understanding predisposing factors	Factors predisposing to identified core health issues were not well captured in the situation analysis.	Predisposing factors not well documented.
2.3	Bringing out underlying causes and effects of the problem	<ul style="list-style-type: none"> • Community and individual beliefs that injections are stronger than alternative options. • Belief that peers have effective influence on what is preferred by individuals. • Belief that prescriber knows better. • Lack of understanding of guidelines by prescribers • Desire to meet needs and wants of clients (client/patient centeredness). • Complacency among policy makers and law enforcement officers/regulators. 	These reasons are not well quantified to help predict outcomes of interventions hence there is need for a more reliable, quantitative assessments as well as good interventional studies to back up strategies proposed in the communication strategy.
2.4	Review the epidemiology of the health issue - who is affected,	Global and local data was used to highlight the demand for unnecessary	In concurrence

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
	geographical areas most affected.	injections, high preference for injections and failure in complying with treatment guidelines by prescribers in attempt to please their clients	
2.5	Identify problem audience and their demographic characteristics, the groups influencing them, the information they are already receiving and its correctness, ability to act, values, beliefs, attitudes and what motivates them.	<p>A social ecological model was used to define primary, secondary and tertiary audiences. This model helps in analyzing how individuals are influenced by their peers, family, communities and overall enabling environment as well as how the individual behavior is influenced by the information that is received, motivation and ability to take action.</p> <p>Primary audience most affected by unsafe injections includes; patients, clients and injecting drug users. Secondary audience consists of health workers, specific family members and community leaders. Tertiary audience is composed of policy makers and program managers</p> <p>Waste handlers working at health facility and community levels were identified to be most at risk of exposure to hazardous health care waste. Secondary audience is composed of public health officers and community outreach health workers while tertiary audience includes policy makers and program managers.</p>	<p>The audiences were identified through stakeholder meetings and review of literature about barriers that impede successful implementation of injection safety and safe disposal of medical waste.</p> <p>There may be need to verify whether barriers that were identified are still relevant today.</p> <p>It is not well documented as to how secondary and tertiary targets were derived. For example, there is lack of evidence that peers, families, and other groups are influencing demand for injections.</p> <p>Therefore there is need for newer studies on influencers of demand for injections and exposure to hazardous health care waste.</p>

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
2.6	Understanding allies and those against the change including their underlying reasons.	Many stakeholders were consulted as part of communication strategy development but specific roles assigned, interests and those against change cannot be established from available information.	Inability to access information on allies and those against change has presented a serious gap; hence there will be need to review minutes of stakeholder engagement meetings done then to get more details on interested stakeholders and those who were against change. The information will help in updating the strategy.
2.7	Identification of change necessary to solve the problem	<p>Change necessary to solve the problem was identified in three main areas; injection safety, promoting alternative routes of medication and safe disposal of medical waste. The necessary changes were tailored against identified gaps in best practices. Changes were centered around;</p> <ul style="list-style-type: none"> • Communities not demanding for injections. • Communities demanding for safe injections when injectables are deemed necessary with special attention to use of a new needle and syringe from a sealed pack. • Communities seeking health care from qualified/licensed health workers. • Communities accepting use of alternative treatment options such as oral medicines. • Health workers not prescribing injections if not recommended by treatment protocol. 	The identified changes focus more on improving the injection safety situation and less on improving health care waste management practices.

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
		<ul style="list-style-type: none"> • A need for health workers to segregate waste that they generate according to category of risk and by color coding. • A need for health workers to provide only safe injections and use new needles and syringes for each injection and drug reconstitution. • Managers removing unnecessary injections from treatment protocols. • Managers training health workers in safe and appropriate use of injections including sharps waste disposal • Managers supplying adequate quantities of injection devices 	
2.8	Audience segmentation (Primary, secondary, tertiary)	<p>“Social Ecology Model” was used to define target audiences and the following key participants were prioritized; individuals, social networks, communities and policy makers.</p> <p>Individuals were the primary audience (most affected and whose behavior we hope to impact) and these included; patients, care takers of minors, clients and Injecting Drug users.</p> <p>Secondary audiences were made of three groups of influencers;</p> <ul style="list-style-type: none"> • Family and their partners/spouses (social networks) and community 	<p>The document at some section mentions that Injecting Drug Users (IDU) will not be a major focus for the communication strategy – which is a wrong and untrue position.</p> <p>This anomaly needs to be corrected.</p>

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
		<p>members that may influence recipients and clients to or not to demand for unnecessary injections, clean environment and quality services.</p> <ul style="list-style-type: none"> • Prescribers and administrators of injections who can influence a decision to give or not give injections and can influence safety and quality of services. • Tertiary audience included policy makers (responsible for resource allocation, policy formulation); program managers (to fix information and communication gaps), coordinators, trainers, lecturers and media (to ensure accurate information and balanced reporting) that indirectly influence the individuals by creating an enabling environment. 	
2.9	Develop desired change	Communicated in annex 1 (Poor current practices and expected good practices)	Targeted practices are many therefore a need to phase priorities to make it easy for implementers to focus their efforts.
2.10	Identification of barriers/obstacles to the adoption of desired change	<p>Summarized below;</p> <ul style="list-style-type: none"> • Lack of knowledge on dangers associated with unsafe and unnecessary use of injections. • Lack of knowledge on efficacy of alternative formulations. 	In concurrence

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
		<ul style="list-style-type: none"> • Lack of understanding among prescribers. • Desire to please and retain clients by prescribers. • Essential medicines lists that favor providing injections. • Stock-outs of oral formulations. 	
2.11	Develop communication objectives	<ul style="list-style-type: none"> • Reducing the number of unnecessary injections. • Reducing the number of unsafe injections administered. • Promoting alternative methods of treatment. • Facilitating safe disposal of medical waste. 	<p>The Field guide for developing a health communication strategy (John Hopkins Bloomberg University) recommends that objectives are directed at individual target audiences so that outcomes of interventions are better managed.</p> <p>The generated objectives are not directed at any specific target audiences.</p> <p>Some objectives e.g. No. 4 are not SMART and may be difficult to measure.</p> <p>Based on new global guidance, the following objectives should be considered for incorporation;</p> <ul style="list-style-type: none"> • Increase uptake of injection safety and health care waste management? By general and referral Hospitals as integral components of IPC through strengthening IPC committees' roles across all levels of care. • Empower communities to demand for quality health services and a clean and safe environment.

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
			<ul style="list-style-type: none"> • Increase appreciation of injection safety and health care waste management concerns by the private sector. • Advocate among policy makers for proper planning including providing dedicated budgets to ensure full supply of injection devices and related materials as well as budgets for establishing sound systems for managing health care waste. • Increase levels of interest among local manufacturers in producing auto-disable, re-use prevention and sharps injury prevention needles and syringes. • Support managers to take preventive action to reduce prevalence of accidental needle stick injuries through continuous learning.
2.12	Identify strategic approach	<p>The following strategic approaches were selected;</p> <ul style="list-style-type: none"> • Capacity strengthening in injection safety and safe disposal of medical waste. • Development of targeted evidence based and contextualized information tools and materials. 	<p>Capacity strengthening is a good strategy for improving knowledge and skills of health workers but segmentation of health workers would improve targeting; for example, prescribers would be targeted to adhere to treatment protocol while injection providers would be targeted to give safe injections and waste handlers to use PPE when handling waste.</p>

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
		<ul style="list-style-type: none"> • Media awareness to raise awareness and promote accurate analytical coverage. • Outreach to influencers at community and health care delivery systems to include injection safety and medical waste management in their agenda. • Policy advocacy among decision makers to allocate resources and build institutional commitment. 	<p>Media awareness was not raised as major health issue but was captured as a communication issue.</p> <p>Underlying causes were not well developed therefore lack of clarity on justification for the selected strategies as these are not backed up by contextual studies/literature. For example, there was no mention of gaps in communication capacity among policy makers and program implementers as major issues to justify a major strategy that will reduce demand for unnecessary injections. This view is supported by the fact that there was no capacity needs assessment done to back-up the intervention.</p>
2.13	Identify positioning – how the campaign will stand out compared to other competing priorities.	A phased approach was selected with different levels of linked coordination (national, regional and local levels). Communication was planned to be delivered from a branded platform with themes, logos and slogans.	Positioning was not done according to provided guidelines which requires that you select a long term image that you would like the program to be remembered for in a positive way and a promotional image which stands out from others calling for action.
2.14	Develop content of the communication strategy	<p>Capacity strengthening among health workers;</p> <p>Focused on two main target audiences - health workers and policy makers:</p>	Audiences need to be better targeted; for example health workers are lumped together but among them are prescribers, injection providers, waste handlers, informal

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
		<p>The strategy was to be guided by a needs assessment.</p> <p>Development of evidence-based targeted information tools and materials;</p> <p>Media advocacy to promote accurate analytical coverage;</p> <p>Out-reach to influencers in the community to include injection safety and waste management in the agenda items;</p> <p>Policy advocacy among decision makers to raise profile and mobilize resources;</p>	<p>practitioners, private sector workers etc.</p> <p>Key behaviors that must be monitored do not come out clearly when matched against target audience; for example, the need to observe and/or insist that a new needle and syringe comes from a sealed pack (recipient) or a need to use a new needle and syringe for each injection (injection provider).</p>
	<p>Messages: it is recommended that health messages have the following seven(7) characteristics;</p> <ul style="list-style-type: none"> • A key fact that if addressed will lead to desired behavior. • Have a promise to the audience that motivates them to take action. • Have a supporting promise explaining why the message should be believed. • Have competition for the message. • Create a lasting impression. • Have a desired user profile. 	<p>Messages prioritized were in three main areas; reduction of demand for injections, promoting alternative routes of treatment, and safe disposal of medical waste.</p> <p>Messages for reducing unnecessary injections</p> <ul style="list-style-type: none"> • Risks associated with unnecessary injections • Myths and facts around injections <p>Messages on alternative routes of treatment;</p> <ul style="list-style-type: none"> • Cost effectiveness of alternative formulations. 	<p>Messages that were generated can be improved on to reflect the 7 characteristics that each message needs to have.</p> <p>Review examples of messages below on promotion of alternative routes of treatment - <i>“Alternative routes of treatment have lower health risks than injections”.</i></p> <p><i>Alternative routes of treatment are just as effective.”</i></p> <p><i>[Issue – messages are incomplete, have facts, lack a promise, compete with injections, do not have lasting</i></p>

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
	<ul style="list-style-type: none"> Included in all messages. 	<ul style="list-style-type: none"> Other routes of treatment are convenient for patients. <p>Messages for improving medical waste management;</p> <ul style="list-style-type: none"> Segregate medical waste. 	<p><i>impression and lack user profile]. The messages do not call for action].</i></p> <p>Compare with message 1 from SIGN below;</p> <p>The WHO/SIGN communication toolbox proposes the following six key behaviors for three key groups (injection prescribers, injection providers and injection recipients):</p> <ol style="list-style-type: none"> 1. Prescribe oral medications wherever possible because they are just as effective as injections and have lower health risks (prescribers); 2. If an injection is prescribed, ask if oral medication can be given instead as these carry lower health risks and are just as effective as injections(recipients) 3. When about to receive an injection, demand that the syringe and needle for administering the injection be taken from a new, sealed and undamaged package to avoid risk of a hospital acquired infection (recipients); 4. When providing an injection, use a sterile syringe and needle for every injection (providers); 5. After administering an injection, place the used syringes and needles in a safety box (at arm’s length)

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
			<p>immediately after use without recapping (providers);</p> <p>6. Always manage injection waste safely and appropriately (health worker).</p> <p>The next step is to identify the specific obstacles as well as enabling factors.</p>
2.15	Identify channels, activities and materials	Well identified but effectiveness of the selected to reach specific target audiences was not backed up with evidence.	Good attempt made at initial stage but it became difficult to measure success of the identified channels, materials and activities in the long run.
3	Draft Implementation plan	<p>The implementation plan was not well analyzed to guarantee that planned activities would be able to achieve intended objectives.</p> <p>Most strategies require baseline assessment findings which would be used to shape the program.</p> <p>Implementation of some strategies like strategy 2 on - “Development of evidence based targeted information, tools and materials” requires collection of evidence for communication materials and findings could affect the rest of the strategies calling for re-designing of the whole strategic document.</p>	Annual performance reviews should focus on reviewing coherence of the plan following successful completion of the planned assessments. In case of need to re-design, this activity should be prioritized to avoid uncoordinated implementation.

	Recommended areas as given in the National Communication Strategy development guidance document	Compliance	Gaps, Comments and Recommendations
4	Develop a monitoring plan including tools that will be used during monitoring	A joint monitoring and evaluation plan was not developed	Since the communication strategy is intended to bring together different stakeholders around common injection safety and safe medical waste management health issues, there is a strong need to develop a joint M & E framework that will serve as the instrument for keeping stakeholder groups well-coordinated.
5	Draft an evaluation plan	The M & E plan was not well developed.	There is need to work on the M&E Plan

4.2.2.2 New Global Guidance on communication for injection safety and health care waste management

The WHO 2015 Injection Safety Policy has continued to prioritize communication for behavior change targeting communities to reduce demand for unnecessary injections and targeting prescribers not to prescribe unnecessary injections. This is to be achieved through interactional discussions. The policy brings out several new areas for Advocacy and Communication and Behavior Change such as;

- Calling upon countries to switch to using Auto-disable syringes with re-use prevention and syringes with sharps injury prevention features.
- Calling upon donors to fund within supported programs use of syringes with re-use prevention features for administering therapeutic injections, auto-disable needles and syringes for immunization and family planning injections and syringes with safety features to minimize risks of accidental needle stick injuries.
- Calling upon manufacturers to switch to manufacturing syringes with re-use prevention and safety features to meet demand from countries
- Bundling of injectable medicines with accompanying reconstitution and drug administration needles and syringes as well as safety boxes for use when disposing of the resulting sharps waste.

The 2009 WHO core principles for sustainable safe management of health care waste require that;

- Donors and development partners make provisions within their assistance program to support safe management and disposal of waste generated from their program activities;
- Governments provide budgets for sound systems for managing health care waste, require all stakeholders concerned with provision of health services to provide budgets for managing health care waste and build health worker capacities while protecting communities and the environment;
- Private sector to reduce toxicity of waste generated from their production activities and services, NGOs to advocate for health care waste management and
- All concerned to advocate for incorporation of waste management requirements within their program plans and budgets.

All the above new recommendations need to be adopted and incorporated into the new communication strategy reflecting additional targets and objectives.

4.2.2.3 Summary Findings on the Review of the Injection Safety and Safe Disposal of Medical Waste National Communication Strategy against the Kenya National Health Communication Guidelines, 2013 – 2017.

Table 6: Gap analysis on the Injection safety and Safe Disposal of Medical Waste National Communication Strategy in comparison to the Kenya National Health Communication Guidelines 2013 – 2017.

	Guiding Principles for communication as recommended by the Ministry of Health, Republic of Kenya National Health Communication Guidelines (2013 – 2017)	Findings in the Injection safety and Medical Waste Management Communication Strategy
1	Recommends following a systematic approach which is research based, interactive and planned aimed at changing social conditions and individual behaviors	The adopted model is the “ Communication for Social Change ”, which stresses the role of dialogue and collective action to bring about a set of shared objectives. The approach however does not recommend identification of individuals to be targeted for change but to rather develop relationships among relevant participants who through cooperative action are able to bring about relevant change.

	Guiding Principles for communication as recommended by the Ministry of Health, Republic of Kenya National Health Communication Guidelines (2013 – 2017)	Findings in the Injection safety and Medical Waste Management Communication Strategy
2	Keeps focus on the audience. Calls for having very clear target audiences and developing communication that resonates around them.	There is good effort to focus on the target audience and communication that was developed resonates around the audience therefore concurs
3	Using a participatory approach, where partners and communities are involved through-out the process. This must include social groups defined as marginalized.	Participatory approach is emphasized and marginalized groups are mentioned but some of them such as IDU are excluded on the understanding that they will be catered for under the HIV MARPs.
4	Using multiple channels and materials which are mutually enforcing at all levels	The strategy recommends using a multi-channel approach and messages that are communicated against each objective are provided.
5	Considering social context where social norms as well as individual behaviors are targeted. Individual behavior must be looked at as a product of overlapping social and environmental influences	Social norms are not well captured
6	Expands beyond ad hoc activities to a coordinated social movement. Behavior which is usually the target of health communication is a gradual process and thus health communication activities are a series of well-coordinated usually interactive processes.	Implementation of the strategy covers a period of three years and there is room for improving sequencing of activities to indicate when the expected knowledge, skills, belief, attitude and behavior change will be realized. Immediate, intermediate and long-term achievements do not come out clearly.
7	Linking communication activities to services and products that people can access. This linkage can greatly improve uptake of services. On the other hand if services and products are not available, the communication efforts become ineffective and people may not trust the messages activities.	Linkages of communication activities to services are generally not well highlighted.
8	There is need to harmonize interventions to deliver effective coordinated communication using harmonized messages at all levels. Coordination	Messages that are communicated against each objective are provided

	Guiding Principles for communication as recommended by the Ministry of Health, Republic of Kenya National Health Communication Guidelines (2013 – 2017)	Findings in the Injection safety and Medical Waste Management Communication Strategy
	reduces duplication and inconsistencies to ensure efficient use of resources.	
9	Choose result oriented interventions that are based on sound epidemiological, social and media theories	Although some references are provided, the basis for epidemiological, social and media theories used is not clarified
10	Health communication should be consistent with national policies, priorities and guidelines	There is good effort to align the strategic plan with national policies, priorities and guidelines but as stated in this column (against each guiding principle, there is still room for improvement).
11	Utilized the effective and efficient channel with the most “reach” to the target audience	
12	Have clear communication objectives to which comprehensive evaluation plan is founded	Communication objectives are well stated but some of them are not achieved by communication per se. There is need to tease out and refine what is more fitting in what is achievable through communication (see 4.4 below).
13	Incorporates operational research to provide an evidence base for future interventions.	Operational research although mentioned is not well provided for.

4.2.2.4 The Role of Health Communication as prescribed by the Kenya National Health Communication Guidelines

The Kenyan document recognizes the fact that communication can realistically achieve the following:

- Increase in intended audience’s knowledge and awareness of a health issue, problem, solution
- Influence perceptions, beliefs, and attitudes that may change social norms
- Increase demand or support for health services
- Prompt action
- Demonstrate or illustrate healthy skills
- Reinforce knowledge, attitudes or behavior
- Refute myths and misconceptions

- Show the benefit of behavior change.

4.2.3 Review of the Kenya HCWM SOPs in relation to incorporation of BEPs, BATs and International recommendations

As highlighted in the background section, there are several areas where application of BEPs/BATs/other international practices are assessed and these are; putting in place and implementing a system for managing health care waste together with the basic elements within the system; providing information and education to the public and to users about environmental consequences of choice of particular activities, their use and ultimate disposal; emphasizing the need to develop an application of codes of good environmental practices which covers all aspects of an activity/procedures that has impact on the environment; calling for the application of labels informing users of environmental related risks related to a product, its use and ultimate disposal; creating awareness regarding a need to save resources including energy; requiring managers to avoid hazardous substances/products and generation of hazardous waste; use of best available technologies and promoting best environmental practices; stressing recycling, recovery and re-use; ensuring the application of economic instruments to activities, products or groups of products and catering for the establishment of a system of licensing, involving a range of restrictions.

Review of the Kenya Health Care Waste management Guidance and Standard Operating procedures (SOPs) reveals that the SOPs were developed in 2015 with the purpose of reducing the **risk of transmission of infections** likely to be acquired from poor HCWM practices. The guidance provided in the SOPs covers all aspects of HCWM ranging from developing policies and plans, management oversight, procedures for appropriately auditing facility waste management systems, technical aspects related to waste management such as waste segregation, handling, storage, transportation, treatment and disposal. Capacity building, budgeting procedures, awareness creation, occupational health and safety, management of special types of waste and guidance on technical specifications for waste treatment equipment and housing.

4.2.3.1 Incorporation of Best Environmental Practices within the SOPs.

Examination of the Kenya Health Care Waste management Guidance and Standard Operating procedures (SOPs), 2015, for compliance with the recommended BEPs revealed the following;

- **Compliance with establishing a waste management system**

The Kenya Health Care Waste management Guidance and Standard Operating procedures (SOPs) address establishment of a waste management system addressed mainly under chapter 2 (Management and oversight for HCWM). The guidance requires health facilities to have in place the waste management oversight committee to coordinate, assess and review health facility compliance with legal, facility and other requirements relevant to the management of health care

waste. The section provides steps required to establish and maintain the waste management oversight committee of the health facility. It gives guidance on membership, roles and responsibilities

- **Compliance with International Best Environmental practices in managing health care waste/ codes of good environmental practice**

Chapter 1 clause “a” recommends that waste generated should be segregated, handled safely, treated effectively and disposed of according to Hospital procedures, subject to national guidelines, laws and regulations. Clause “C” of the same chapter explains risk for non-compliance including a risk of exposure to patients, health workers, and community to released infectious or toxic substances into the environment. Clause “e” item ii makes it the responsibility of staff to ensure that waste produced is segregated and disposed of correctly by following laid down procedures. Item “iii” on specific individual responsibilities requires the waste management coordinator to ensure that daily waste management and disposal operations are conducted in accordance to stipulated procedures and guidelines. The same clause further requires the Hospital Administrator, Chief Medical officer, Nursing Director, Heads of Departments and other Supervisors to ensure that there are sufficient numbers of trained human resource, adequate supplies and equipment, and system for waste management coordination which ensures that the coordinator is made aware of any problem areas and action taken to improve performance.

Chapters 6 and 7 provide detailed SOPs on how to achieve best practices when managing health care waste by elaborating on steps that need to be followed to achieve waste minimization, segregation, handling, storage, transportation and treatment and disposal of different types of health care waste. Chapter 7 provides a series of SOPs for managing special wastes including; cytotoxic, amalgam, sharps, sanitary towels, radioactive, and chemical. The SOPs effectively communicate who will perform the task, what materials are necessary, where the task will take place, when the task shall be performed, and the responsible person who will actually execute the task. While a good proportion of aspects of the SOP are well addressed, the **SOPs are weak in explaining how exactly the responsible person should execute the task.** ,

- **Compliance with providing information and education to the public and to users about environmental consequences of choice of particular activities, their use and ultimate disposal**

Chapter 1 on General Policy Statement recognizes protection of the environment as essential for a healthy community and enhances safety and well-being of the Hospital staff and patients. The chapter also in clause “f”, second bullet requires the Hospital to ensure that all staff take appropriate precautions against any potential or actual risk posed by patient or specimen contact

and that staff receive information, instruction and training to this effect. There is scanty information on how the public can be kept informed of risks.

- **Compliance with the application of labels informing users of environmental related risks related to a product, its use and ultimate disposal**

There is good effort in chapter 7 recommending use of labels/symbols to identify special types of health care waste that pose a risk of exposure such as radioactive and chemical waste. **Labelling recommended does not comprehensively cover the different symbols that can be used to inform users of environmental risks** e.g. biological and different types of chemical waste.

- **Compliance with creating awareness regarding a need to save resources including energy**

Chapter 1 under guidance for waste minimization and recycling incorporates activities to prevent unnecessary waste generation, reduce amount and toxicity of waste generated, re-use non-infectious waste that has been generated and promotes recycling where feasible. To be successful, it is recommended that staff are trained in waste minimization, a tracking is put in place to monitor progress and tangible reports are generated.

- **Compliance with avoiding hazardous substances/products and generation of hazardous waste**

Compliance with the Basel convention

Review of the Basel convention reveals that it aims at; reduction of generation of hazardous waste while promoting adoption of environmentally sound management of hazardous waste; restriction of trans- boundary movement of hazardous waste except where it is perceived to be in accordance with principles of environmentally sound management; and putting in place a regulatory system applying to cases where trans-boundary movements are permissible.

Table 7: Gap analysis on the Kenya HCWM SOPs in comparison to the recommended best practices in the Basel convention

	Area assessed as provided for in the Basel Convention	Findings as reflected in Kenya HCWM SOPs	Comments
	Requires countries to have in place strong control from generation to storage,	Kenya SOPs require managers to put in place proper systems	In concurrence

	Area assessed as provided for in the Basel Convention	Findings as reflected in Kenya HCWM SOPs	Comments
	transport, reuse, recycling, recovery and final disposal	for managing health care waste	
	Requires that shipments of hazardous waste must have written consent from export, transit and import countries	Not well covered	Not in concurrence
	Requires that countries adopt technical guidelines on the environmentally sound management of bio-medical and other types of hazardous health care waste	Kenya adopted the WHO guidelines for safe and appropriate management of HCW as provided in the “WHO Bluebook”	In concurrence
	Recommends classification of waste according to risk	Waste classified according to risk	In concurrence
	Imposes penalties on concerned countries if waste is transported illegally	EMCA Act and regulations require transporters to be licensed and to follow adopted standards including standards for trans-boundary movement of waste	In concurrence
	Recommends that waste is treated and disposed of as close to the source as possible	Guidance provided in the SOPs on waste treatment and disposal favors on-site management	In concurrence

Compliance with BEPs and BATs under the Stockholm convention

Under the best practices, the SOPs on use of incinerator was reviewed to assess alignment with the best available technologies provided by UNEP and WHO Blue Book under best practices in relation to use of incinerators as analyzed under the Stockholm convention . The global guidance is provided under several themes including; general guidance, organizational measures, primary measures, secondary measures, and management options. A comparison was made with what is provided for in the Kenya SOPs. Table 8 below summarizes findings:

Table 8: Gap analysis on the Kenya HCWM SOPs in comparison to the best available technologies recommended under the Stockholm convention

	Area assessed as provided for in the global guidance under the Stockholm convention	Findings as reflected in Kenya HCWM SOPs	Comments
	<p>Under general guidance, it is recommended that waste is segregated, alternative waste treatment processes to incineration are considered, and incinerators that meet environmental requirements are selected.</p> <p>The general guidance further recommends that managers should ensure that toxic chemicals such as halogens and radioactive waste is not incinerated. The guidance calls for provision of appropriate storage and transportation (secure) and use of centralized systems as opposed to on-the site treatment of hazardous waste.</p>	<p>Kenya SOPs recommend segregating health care waste and exploring use of alternative technologies such as autoclaving. Some of the recommended incinerators (small scale) cannot meet environmental requirements.</p> <p>Kenya SOPs restrict what should be incinerated such as certain chemicals and radioactive materials and provide advice on storage. The SOPs however do not emphasize use of centralized facilities.</p>	<p>Small scale incineration should be discouraged</p> <p>Use of centralized systems should be promoted</p>
	<p>Organizational measures required mention a need to have well trained personnel, providing periodic maintenance, regular measurement of pollutants, making audit reports, providing good ventilation and infrastructure, conducting ESIA, and good engagement with communities.</p>	<p>Kenya SOPs concur with recommended organizational provisions and in chapter 9 call for putting into consideration cultural and societal acceptability.</p>	<p>In concurrence</p>
	<p>Primary measures aimed at reducing production of POPs include; introducing waste when temperature is 850°C, installing auxiliary burners, avoiding start-up-stop-start-up, providing sufficient oxygen, ensuring adequate resident time in secondary chamber, using higher</p>	<p>The SOPs in chapter 7 gives step by step guidance on how to operate an incinerator and the details concur with what is recommended as primary measures. No guidance is</p>	<p>In concurrence but special requirements for chlorinated waste are not mentioned.</p>

	Area assessed as provided for in the global guidance under the Stockholm convention	Findings as reflected in Kenya HCWM SOPs	Comments
	temperature > 1100 for highly chlorinated waste, and ensuring high turbulence of exhaust gases.	however provided on how to treat highly chlorinated waste.	
	Secondary measures recommended in global guidelines against formation of POPs include; avoiding deposition by soot cleaners, mechanical rappers, sonic or steam soot blowers etc.; effective dust removal and use of adsorption unit with activated charcoal.	The Kenya SOPs do not provide guidance on secondary measures against formation of POPs.	This is an information gap that needs to be bridged.
	Recommended management options include; catalytic oxidation, fabric filter coated with catalyst, different types of wet and dry adsorption methods and fixed bed reactor adsorption with charcoal and appropriate fly and bottom ash and waste water treatment. All the recommended options are however not common with health care waste, cater for only gaseous waste, are of low levels of efficiency to be meaningful. Some like the fly and bottom ash and waste treatment form toxic sludge.	The Kenya SOPs are silent about management options and since most are not appropriate or not efficient enough for health care waste, there is need for the global community to come up with applicable options.	Needs more research.

Compliance with BEPs under Minamata convention

The Minamata convention requires countries to; put a ban on new mercury mines, phase-out existing ones, phase out and phase down mercury use in a number of products and processes, control measures on emissions to air and on releases to land and water, and the regulation of the informal sector of artisanal and small-scale gold mining. The Convention also addresses interim storage of mercury and its disposal once it becomes waste.

The Kenya SOPs cover management of Amalgam waste in chapter 5. This SOP is based on guidelines for amalgam waste management developed by the American Dental Association (American Dental Association, 2012).

A comparison was made between recommendations of the Minamata convention and what is provided for in the Kenya SOPs. Table 9 below summarizes findings:

Table 9: Gap analysis on the Kenya HCWM SOPs and the best environment practices recommended under the Minamata convention

	Area assessed as provided for in the global guidance	Findings as reflected in Kenya HCWM SOPs	Comments
	Recommends putting a ban on new mercury mines	This is beyond the mandate of the health sector	Other relevant Government Agency, i.e. Ministry of Mining, has responsibility over this.
	Recommends phasing-out of existing mines	This is beyond the mandate of the health sector.	Other relevant Government Agency, i.e. Ministry of Mining, has responsibility over this.
	Recommends phasing out and phasing down of mercury use in a number of products and processes	The Kenya HCWM SOPs require Hospital management to strive to make health facilities be mercury-free.	Information provided is very scanty hence there is need to provide more detailed guidelines/SOPs on proper procedures for phasing out mercury.
	Requires that control measures on emissions to air and on releases to land and water are put in place	<ul style="list-style-type: none"> • <i>Requires that amalgam is stocked as capsules.</i> • <i>Requires use of high velocity when finishing, polishing or removing amalgam restorations.</i> • <i>Requires workers to use personal protective equipment.</i> • <i>Requires that amalgam waste is stored in a covered plastic container labeled “Amalgam for Recycling”.</i> • <i>Requires that amalgam waste containers are transported to designated areas that are secure and lockable.</i> 	<p>The health sector has a wider range of products containing mercury such as blood pressure measuring machines and thermometers that are not addressed in the HCWM SOPs.</p> <p>Make SOP on how to clean-up mercury spills available.</p>

	Area assessed as provided for in the global guidance	Findings as reflected in Kenya HCWM SOPs	Comments
		<ul style="list-style-type: none"> Require that amalgam waste is handed over to a licensed recycler. 	
	Recommends that the informal sector of artisanal and small-scale gold mining be regulated	This is beyond mandate of the health sector.	Recommendation to be shared with the relevant Government Agency.
	Recommends that mercury should be disposed of once it becomes waste.	<i>Responsibility of capturing amalgam waste is put on dentists, nurses and support in the dental departments.</i>	

Additional requirements

Other requirements for fulfilling the Minamata Convention include; promoting the development and implementation of strategies and programs to identify and protect populations at risk, adopting science-based health guidelines relating to the exposure to mercury and mercury compounds, setting targets for mercury exposure reduction, and public education. Countries are also required to promote the development and implementation of science-based educational and preventive programs on occupational exposure to mercury and mercury compounds; put in place appropriate health-care services for prevention, treatment and care for populations affected by the exposure to mercury or mercury compounds; and establishing and strengthening institutional and health professional capacities for the prevention, diagnosis, treatment and monitoring of health risks related to the exposure to mercury and mercury compounds.

The treaty recommends the following information standards to be implemented; generating and sharing scientific, technical, economic and legal information concerning mercury and mercury compounds, including toxicological, Eco-toxicological and safety information; creating awareness on activities and processes that emit or release mercury or mercury compounds; including information on the health and environmental risks and economic and social costs and benefits of replacing mercury containing products with alternatives.

Most of the additional requirements have not been well addressed by the SOPs.

Compliance with BEPs under the SAICM Strategy

The SOPs for managing chemicals are found in chapter 5 of the Kenya HCWM SOPs, 2015. The Kenya SOPs were reviewed to establish compliance with BEPs in line with the SAICM Strategy under six major actionable areas; risk reduction, strengthening knowledge and information, governance, capacity building, addressing illegal international traffic and improved general practices. Table 10 below summarizes the findings.

Table 10: A summary of findings on the review of compliance of the Kenya HCWM SOPs, 2015, with the BEPs recommended by the WHO Blue Book, UNEP and SAICM Strategy

	Area assessed as provided for in the global guidance	Findings as reflected in the Kenya HCWM SOPs	Comments
1	Risk reduction		
	Measures are in place to safeguard the health of women and children against chemical exposures before conception, through gestation, infancy, childhood and adolescence	Not reflected in the SOPs	Need to generate information that safeguard the health of women and children against chemical exposures before conception, through gestation, infancy, childhood and adolescence
	Occupational health and safety concerns are addressed through establishment of national inspection systems	The Chapter on management and oversight has an SOP on Inspection, by which inspectors are required to review accident and incident reports.	It is not clear how much the inspection systems caters for management of chemicals and occupational health and safety
	There is adequate implementation of occupational health and safety standards	Covered under a section of the SOPs on management of chemical waste. Requires use of PPE, maintaining inventory, training of personnel and require that material safety data sheets are secured for all chemicals used. Recommend discharge of decontaminated liquid waste into sewer.	Concur to some extent but with gaps. There is need to review the guidance recommending discharge of chemicals into a sewer

	Area assessed as provided for in the global guidance	Findings as reflected in the Kenya HCWM SOPs	Comments
	There is a list of prioritized chemicals for assessment	A list of stored chemicals is generated	The country should generate a list of prioritized chemicals for assessment
	The country has national policies and plans	These are covered under HCWM SOPs	In concurrence
	There is awareness raising and protection of handlers	The SOPs provide information to handlers on risks posed by different types of hazardous chemicals Information is provided on appropriate protective clothing	The country should consider developing a comprehensive package for raising awareness and protection of waste handlers dealing with chemical waste
	The country has identified contaminated sites and remediation measures are in place	Not reflected in the SOPs	The country needs to identify chemically contaminated sites and remedial measures put in place
	There is a plan for phasing out toxic substances	The SOPs require Hospital management to strive to have a mercury free facility.	In concurrence
	There is capacity strengthening to deal with poisoning and other chemical incidents	There are SOPs for dealing with spillages but actual capacity strengthening efforts are difficult to judge from the SOPs	The country needs to design a program for strengthening capacity to deal with poisoning and other chemical incidents
2	Strengthening knowledge and information		
	There are on-going improved education, training and awareness raising activities aimed at those who may be exposed	The SOPs provide information to handlers on risks posed by different types of hazardous chemicals.	In concurrence

	Area assessed as provided for in the global guidance	Findings as reflected in the Kenya HCWM SOPs	Comments
		<p>Health units are required to keep an inventory/ list of stored chemicals and related functional storage groups.</p> <p>Information is provided on appropriate protective clothes.</p> <p>A safety officer is required to put in place a staff training program.</p> <p>Information is provided on how to clean-up spillages.</p> <p>Precautions that need to be taken when handling specific chemicals are provided under respective chemicals.</p>	
	<p>There is a system for generation and dissemination of data on the hazards of all chemicals in commerce with confidentiality catered for.</p>	<p>Facilities are required to prepare lists of stored chemicals and related functional storage groups.</p> <p>Chemicals are supposed to be accompanied with master safety data sheets.</p> <p>A checklist for transportation and storage requirements.</p>	<p>A proper system should be established for generation and dissemination of data on hazards of chemicals in commerce</p>
	<p>There is system for monitoring impacts of chemicals on health and environment</p>	<p>Not reflected in the SOPs</p>	<p>The country needs to put in place a proper system for monitoring impacts of chemicals on health and the environment</p>
	<p>There is harmonized risk assessment</p>	<p>Not reflected in the SOPs</p>	<p>The country needs to put in place a system for harmonized risk assessment</p>

	Area assessed as provided for in the global guidance	Findings as reflected in the Kenya HCWM SOPs	Comments
	There is implementation of the globally harmonized system of classification and labelling of chemicals	The SOPs recommends this	In concurrence
	The country has developed and published national pollutant release and transfer registers	Some pollution limits are provided within SOPs but the SOPs are silent about a national pollutant release and transfer registers. Pick-up request form are however supposed to be kept for review	The country should develop and publish national pollutant release and transfer registers
3	Governance		
	The country has reviewed national legislation to ratify and implement international agreements	Review of legislation not reflected in the SOPs; however, some international agreements have been ratified and are being implemented.	Partly in concurrence
	The country has policies, guidelines and SOPs to reflect intent of policies	Some policies are captured in the SOPs (pollution control, elimination of mercury, minimizing risks associated with chemical waste, occupational health and safety	In concurrence
	All stakeholder groups including women are participating in activities		
	Management of chemicals is integrated into strategies for development assistance, sustainable development assistance, sustainable development and poverty reduction	Sustainable development is stressed through the requirement to reduce, recycle and reuse, minimizing use of chemicals, and elimination of hazardous substances like mercury.	More needs to be done by providing guidance on integration of management of chemicals into strategies for development assistance, sustainable development assistance and poverty reduction.

	Area assessed as provided for in the global guidance	Findings as reflected in the Kenya HCWM SOPs	Comments
	There is system for emergency preparedness and response to chemical accidents	Guidance is provided on how to clean up spillages but emergency preparedness aspect is not well covered	More guidance should be provided, especially in respect to emergency preparedness.
	There is provision for training personnel in liability and compensation schemes in relation to damage to human health and environment.	Not reflected in the SOPs	The country needs to put in place mechanisms for training personnel in liability and compensation schemes in relation to damage to human health and environment.
	There is action being taken to prevent illegal trafficking.	Not reflected in the SOPs	The SOPs should be improved on to provide more guidance on preventing illegal trafficking.
	Capacity building		
	There are training programs to equip personnel with knowledge and skills to support implementation approach – strategic planning, risk assessment, management testing and research	In the SOPs, the safety program officer is required to provide training for laboratory staff and the lab is required to carry out appropriate and adequate chemical management practices and staff training.	In concurrence
	There is a system for exchanging information	SOPs recommend staff training	Other methods of information exchange need to be captured.
	Addressing illegal international trafficking		
	There is effective application of international conventions related to trans-boundary movement of chemicals and hazardous waste		
	Improved general practices		

	Area assessed as provided for in the global guidance	Findings as reflected in the Kenya HCWM SOPs	Comments
	Substituting highly toxic chemicals	SOPs recommend the health facilities should be mercury free	Partly in concurrence
	Using minimal concentration		
	Good inventory control	The SOPs recommend that health facilities keep inventory of stored chemicals	In concurrence
	Designing appropriate storage areas	The SOPs provide information on appropriate storage; however, in overall not enough guidance is provided	Guidance provided is less than optimal
	Integrating pest management	Not covered in the SOPs	There is need to integrate pest management in the SOPs for chemical management
	Keeping disinfecting trays covered to avoid evaporation	Not covered in the SOPs	Should be covered
	Developing spill prevention and clean-up procedures	Spill prevention and clean up procedures are covered in the SOPs	In concurrence
	Recovering solvents using fractional distillation	Not reflected in the SOPs	Should be covered
	Avoiding discharging chemicals into sewers	Some guidelines recommend discharge of decontaminated chemicals into sewers	Needs further scrutiny to enable a better researched, evidence-based guidance.
	Safe production	Not well covered in the SOPs	Should be covered exhaustively.
	Responsible industry care programs including corporate social responsibility	Not reflected in the SOPs	There is need to expand SOPs to include coverage for responsible industry care programs including corporate social responsibility.

	Area assessed as provided for in the global guidance	Findings as reflected in the Kenya HCWM SOPs	Comments
	Safe use	Effort is made to provide guidance on safe use of individual chemicals	More needs to be done, with guidance being provided on many more chemicals used in the health sector.
	Better agricultural methods	Not covered in the SOPs	Needs to be captured in so far as they relate to the health sector.
	Labelling	The SOPs provide some general guidelines on labelling but more needs to be done	Improve on SOPs for labeling chemicals.

There is quite a lot that can be done to avoid hazardous substances but not captured in the current SOPs; therefore there is need to either generate additional SOPs or update the existing SOPs with the aim of providing more detailed guidance. Governance is an area that needs urgent attention.

- **Ensure the application of economic instruments to activities, products or groups of products**

Chapter 3 on Health Care Waste Management Budgeting and Guidance provides guidance for development of health care facility budgets and allocation of resources to the facility’s health care waste management plan. The chapter describes steps required to develop a budget for the facility HCWM Plan, highlights key principles to consider, and describes costing tools.

- **Catering for the establishment of a system of licensing, involving a range of restrictions**

The SOPs are silent about the system for licensing and does not mention ranges of restrictions.

4.3 Health facility assessment on current practices of Health Workers in Health Care Waste Management

4.3.1 Assessment by Administering Individualized Rapid Assessment Tool (I-RAT)

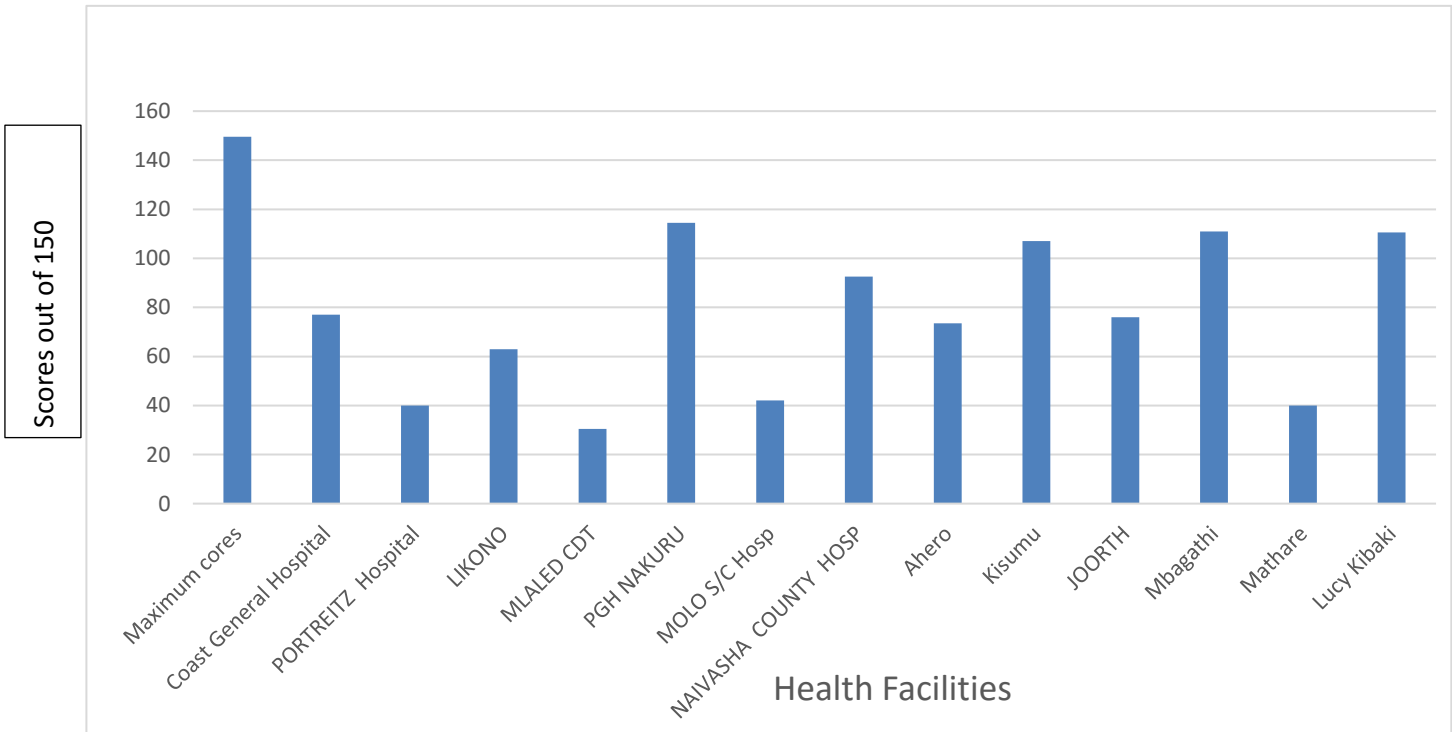
The assessment revealed huge gaps in respect to health care waste management in the sites visited based on the various program areas assessed. The general findings are described here-below:

Table 11: Individual health facility scores by assessed area of health care waste management

		1	2	3	4	5	6	7	8	9	10	11	12	13	
Area Assessed	Maximum cores	Coast General Hospital	PORTREITZ Hospital	LIKONO	MLALED CDT	PGH NAKURU	MOLO S/C Hosp	NAIVASHA COUNTY HOSP	Ahero	Kisumu	JOORTH	Mbagathi	Mathare	Lucy Kibaki	
<u>A</u>	Organization of HCWM	8	5	5	5	1.5	6.5	6.5	8	0	8	8	8	5	8
<u>B</u>	Policy and Planning	11	0	0	0	0	11	0	1.5	0	11	3.5	7	0	9
<u>c</u>	Training	12	0	0	0	0	12	0	8	0	12	12	12	0	12
<u>D</u>	Occupational health and safety	7	3	0	0	0	5	2	3	3	5	4	4	2	7
<u>E</u>	Monitoring and evaluation and corrective action taken	2.5	0	0	0	0	2	0	1	2	2.5	1	2.5	0	2.5
<u>F</u>	Financing	6.5	4	4	0	0	4	0	4	4	4	4	0	0	0
<u>G</u>	Segregation of waste	7	2	7	5	2	5	2	5	7	7	2	7	7	7
<u>H</u>	Waste generation data	1.5	1	0	0	0	1	0	1	0	0	1	1	0	0
<u>I</u>	Collection and handling	19	12	10	13.5	15.5	16	16.5	16.5	18	18	18	18	11.5	17.5
<u>J</u>	Color coding and labelling	6	3	6	4	5	5	6	3	3	3	5	6	6	6
<u>K</u>	Posters or signage	0.5	0	0.5	0.5	0	0.5	0.5	0	0	0	0.5	0.5	0	0.5
<u>L</u>	Transportation inside the health facility	2	0	0	0	0	2	0.5	1	1	1	0.5	2	0.5	1.5
<u>M</u>	Storage	2.5	1.5	0	0.5	2.5	1.5	1	2.5	2.5	2.5	2.5	2.5	0	1.5
<u>N</u>	Hazardous chemical pharmaceuticals and radioactive waste	5	5	4	5	5	4	4	4	0	0	5	4	4	4

		1	2	3	4	5	6	7	8	9	10	11	12	13
Area Assessed	Maximum cores	Coast General Hospital	PORTREITZ Hospital	LIKONO	MALALE CDT	PGH NAKURU	MOLO S/C Hosp	NAIVASHA COUNTY HOSP	Ahero	Kisumu	JOORTH	Mbagathi	Mathare	Lucy Kibaki
Treatment and disposal	55	38.5	3.5	30	1	35	2.5	32.5	33	10	33.	5	1	29.5
Waste water	4	3	0	0	0	4	0	4	0	0	0	3	3	0
Total	149.5	77	40	63	30.5	114.5	42	92.5	73.5	107	76	111	40	110.5

Figure 1: Overall individual health facility performance in Health Care Waste Management



			1	2	3	4	5	6	7	8	9	10	11	12	13
Area Assessed	Maximum cores	Coast General Hospital	PORTREITZ Hospital	LIKONO	MLALED CDT	PGH NAKURU	MOLO S/C Hosp	NAIVASHA COUNTY HOSP	Ahero	Kisumu	JOORTH	Mbagathi	Mathare	Lucy Kibaki	

Figure 2: Individual health facility performance on Organization of the HCWM Program

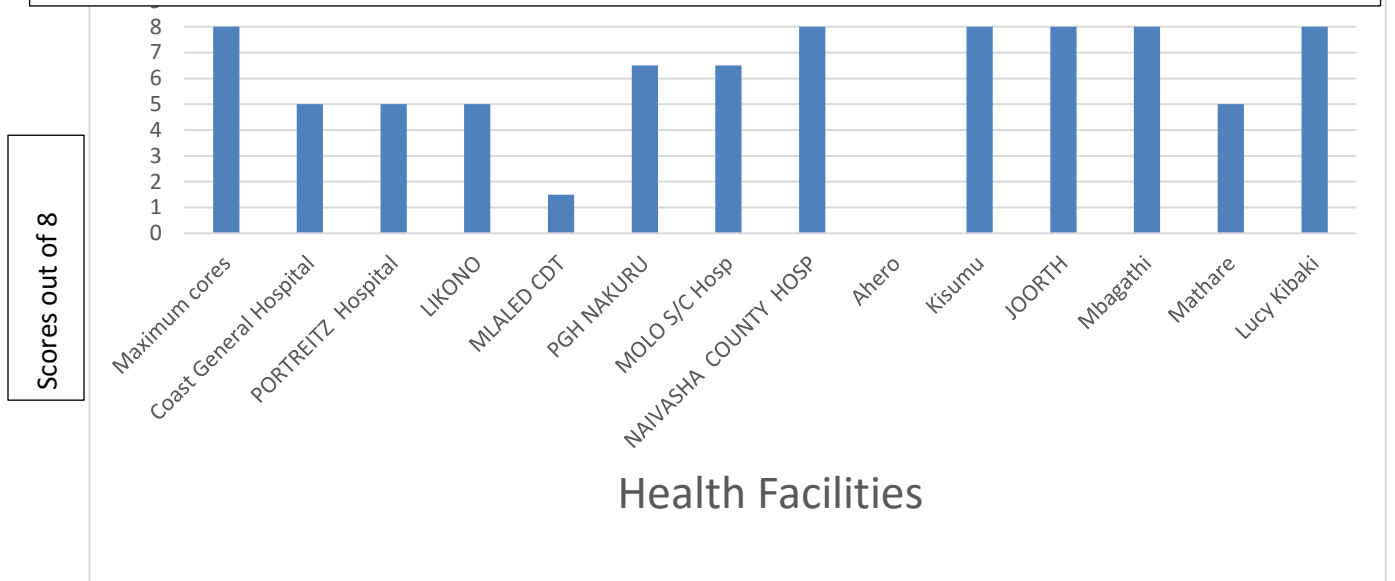
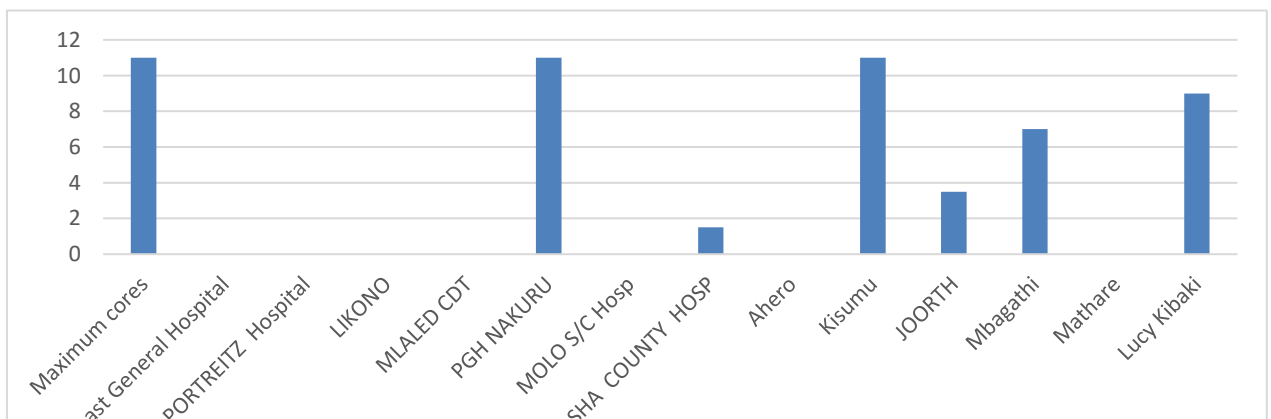


Figure 3: Individual health facility performance On Availability of HCWM Policies and Planning Structures.



Assessed	Maximum cores	1	2	3	4	5	6	7	8	9	10	11	12	13
	Coast General Hospital													
	PORTREITZ Hospital													
	LIKONO													
	MIALED CDT													
	PGH NAKURU													
	MOLO S/C Hosp													
	NAIVASHA COUNTY HOSP													
	Ahero													
	Kisumu													
	JOORTH													
	Mbagathi													
	Mathare													
Lucy Kibaki														

Scores out of 11

Figure 4: Individual health facility performance On Training of Health Workers on HCWM.

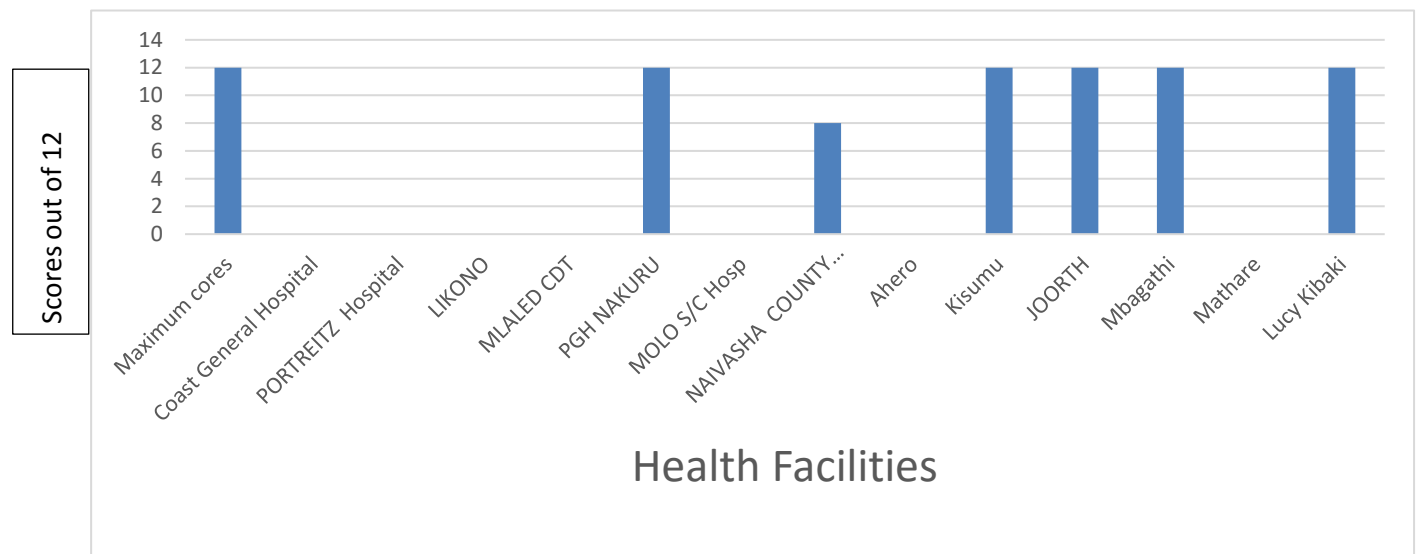
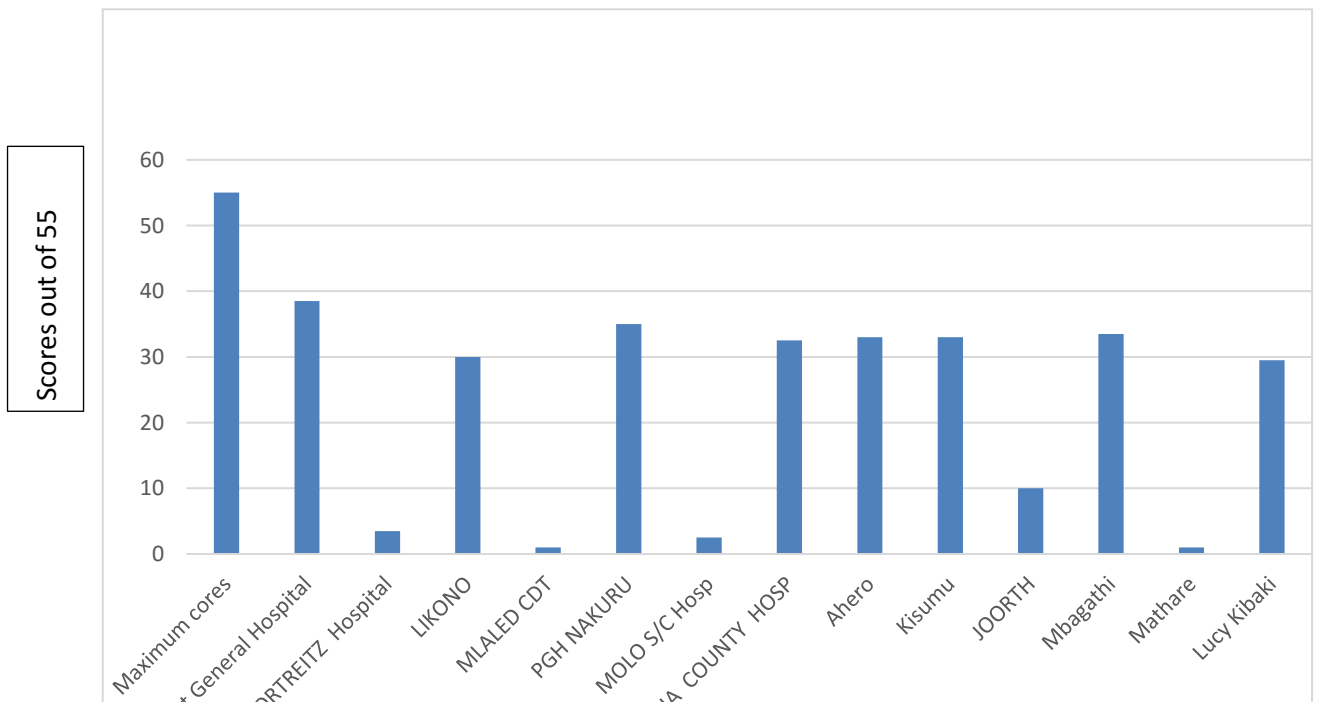
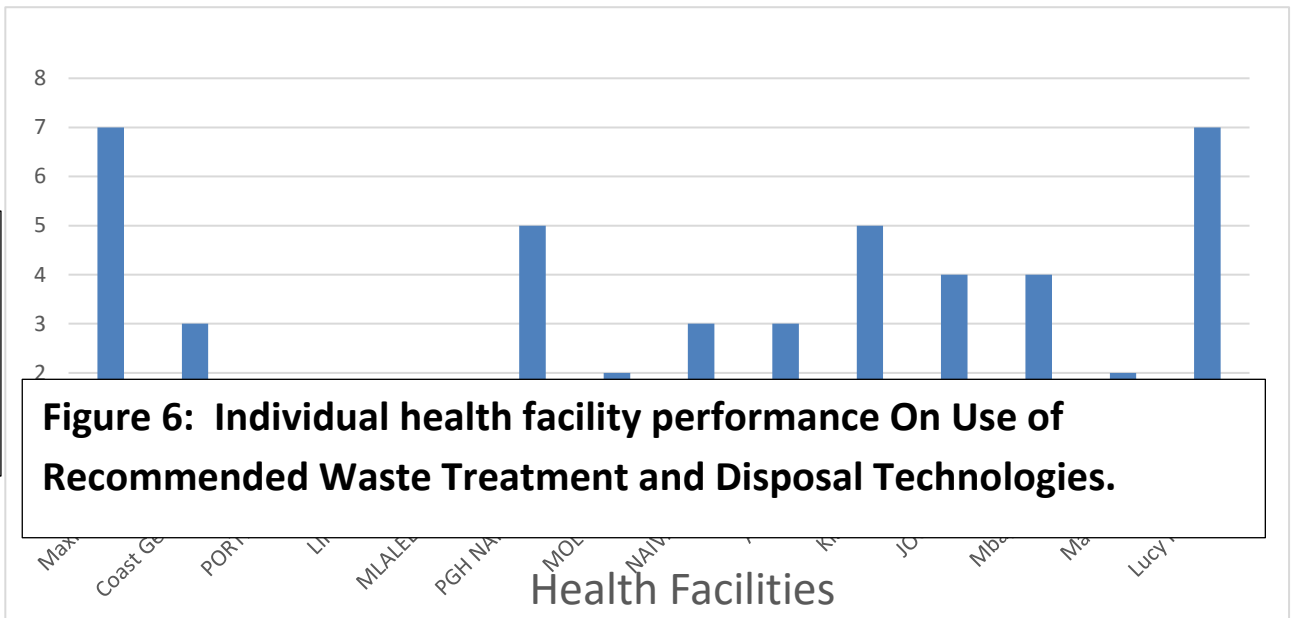


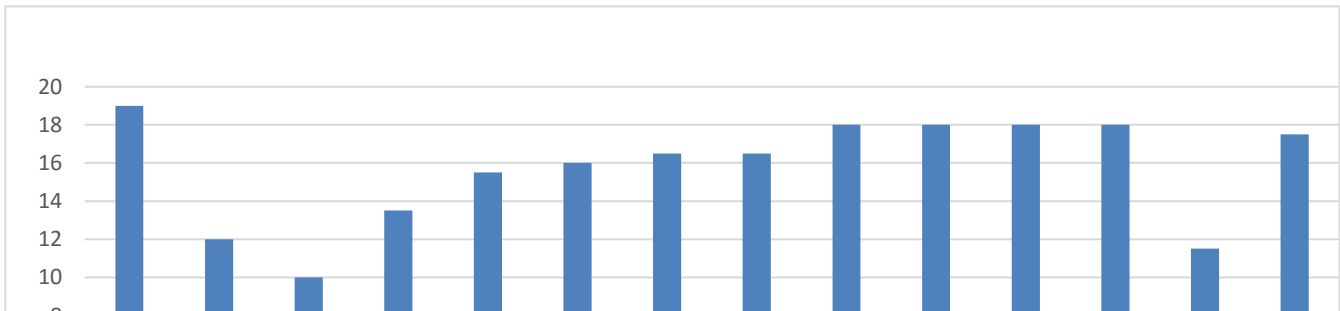
Figure 5: Individual health facility performance On Availability of Occupational Health and Safety Systems.

Area Assessed	1	2	3	4	5	6	7	8	9	10	11	12	13
Maximum cores													
Coast General Hospital													
PORTREITZ Hospital													
LIKONO													
MLALED CDT													
PGH NAKURU													
MOLO S/C Hosp													
NAIVASHA COUNTY HOSP													
Ahero													
Kisumu													
JOORTH													
Mbagathi													
Mathare													
Lucy Kibaki													



			1	2	3	4	5	6	7	8	9	10	11	12	13
Area Assessed	Maximum cores	Coast General Hospital	PORTREITZ Hospital	LIKONO	MLALED CDT	PGH NAKURU	MOLO S/C Hosp	NAIVASHA COUNTY HOSP	Ahero	Kisumu	JOORTH	Mbagathi	Mathare	Lucy Kibaki	

Figure 7: Individual health facility performance On Use of Proper Waste Collection and Handling Methods.

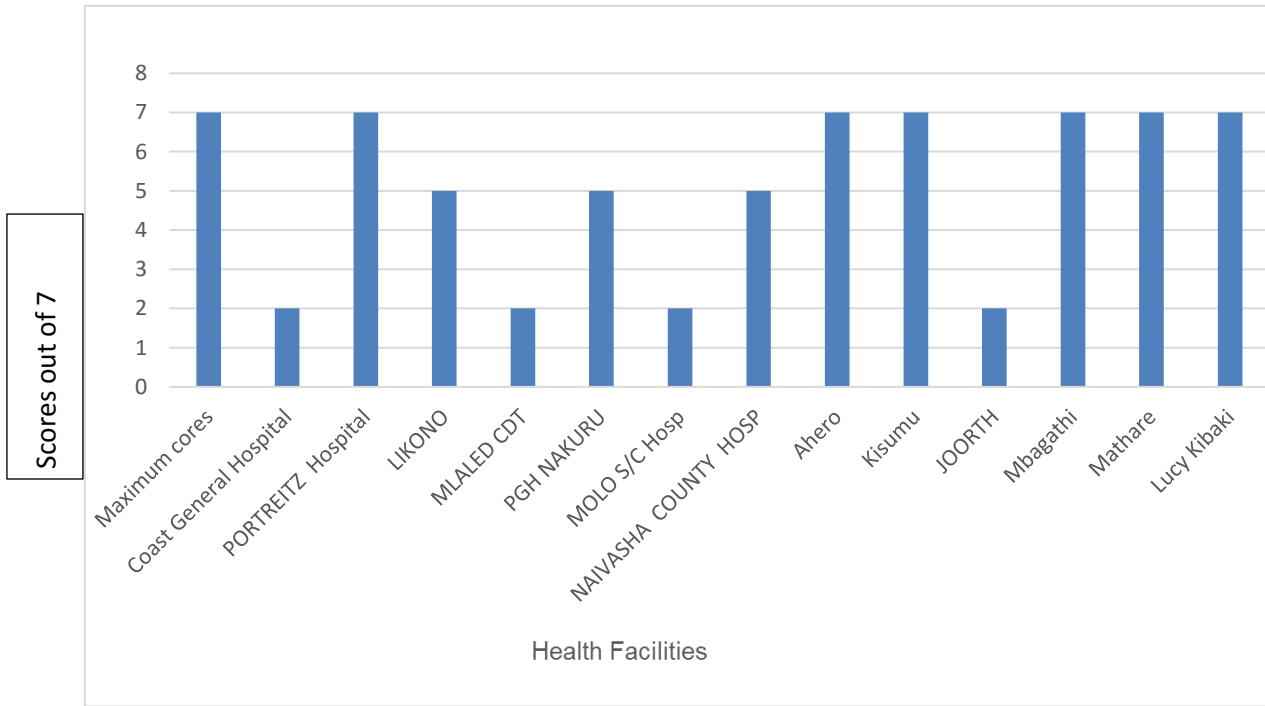


Scores out of 19

Area Assessed	1	2	3	4	5	6	7	8	9	10	11	12	13
Maximum cores													
Coast General Hospital													
PORTREITZ Hospital													
LIKONO													
MLALED CDT													
PGH NAKURU													
MOLO S/C Hosp													
NAIVASHA COUNTY HOSP													
Ahero													
Kisumu													
JOORTH													
Mbagathi													
Mathare													
Lucy Kibaki													

Figure 8: Individual health facility performance On Segregation of Health Care Waste

			1	2	3	4	5	6	7	8	9	10	11	12	13
Area Assessed	Maximum cores	Coast General Hospital	PORTREITZ Hospital	LIKONO	MLALED CDT	PGH NAKURU	MOLO S/C Hosp	NAIVASHA COUNTY HOSP	Ahero	Kisumu	JOORTH	Mbagathi	Mathare	Lucy Kibaki	



Organization of health care waste management services: Most (12/13) of the health facilities had a person in charge of HCWM, very few (6/13) had in place a permanent committee that deals with HCWM 8/13 had staff that were clear about their roles and responsibilities.

Policy and planning: The majority of the health facilities did not have copies of HCWM policies 10/13 and lacked written plans 8/13 manuals and procedures consistent with national laws, regulations and permits. Almost all facilities (8/13) lacked plans for recycling and waste minimization did not have policy on environmental protection (10/13) and were not mercury free.

Training: The majority of health facilities 7/13 did not have a training program in HCWM and were not orienting new staff in this subject. None of the facilities had provided their health workers with refresher training in the last one year.

Occupational health and safety: The majority (8/13) of facilities lacked occupational health and safety policies and guidelines, only 4/13 had vaccinated their health workers and waste handlers against hepatitis B and tetanus and 8 /13 were providing their waste handling staff with personal protective equipment.

Monitoring, evaluation and corrective action: Most of the health facilities (7/13) did not have plans for monitoring/inspection and taking corrective action and had not reviewed many of their policies in the last one year.

Financing: A good proportion of health facilities (7/13) had allocated budgets to HCWM activities; however, in majority of them, the allocated budget was not sufficient to meet their HCWM needs. None of the facilities had long-term financing plan to cover costs for sustainable HCWM.

Classification and segregation of health care waste: The health workers at all the 13 assessed facilities were familiar with the classification and waste segregation requirements and at 9/13 of these facilities, waste was being segregated at source according to different categories.

Waste segregation data: Very few 5 /13 facilities were weighing and recording infectious waste. All other types of waste were not being weighed.

Collection and handling: Most health facilities were using standard plastic pedal operated waste receptacles. All the assessed health facilities collected sharps in sharps containers or used needle destroyers and a good proportion collected/disposed of needles without recapping. All facilities had sharps containers or needle destroyers always available but few facilities used

sharps containers and needle destroyers approved according to existing standards and only 7/13 had sharps containers not more than $\frac{3}{4}$ full. All facilities placed sharps containers and needle destroyers as close as possible to enable safe immediate disposal. For all the health facilities, the health workers knew what to do in case of a needle stick injury.

All health facilities (13/13) had good quality waste bins that were being regularly disinfected and the accompanying waste bags were of good quality (9/13) and always available. At a good majority of the health facilities 11/13, infectious waste was being collected at least once a day and at 8/13 of the facilities, the workers knew what to do if sharps or infectious waste is accidentally spilled.

Color coding and labeling: All the health facilities were using a system of color coding for different types of waste but 8/13 had colors of waste containers not matching with the recommended color codes while others were using bin liners not matching the recommended color codes. For a good proportion of the facilities, the infectious waste bags were colored/labeled according to policies and guidelines.

Posters and signage: 7/13 facilities had posters or signs showing proper segregation of health care waste.

Transportation inside health establishment: Very few facilities were transporting waste away from patient areas, none transported waste in closed (covered) wheeled transport cart and only 6/13 were cleaning the transport cart at least once a day.

Storage: 5/13 facilities had storage areas that met the proper requirements, 9/13 kept the storage area clean and 9/13 removed wastes before maximum allowable storage time was exceeded.

Hazardous chemical, pharmaceutical and radioactive waste: All health facilities were segregating chemical and pharmaceutical and where applicable radio-active wastes from infectious and general noninfectious waste and a good proportion had a plan for its treatment and disposal.

Waste treatment and disposal: 8/13 of the health facilities treated infectious waste before final disposal while 8/13 treated laboratory cultures prior to disposal. Few of the facilities 3/13 had contingency plans for treating waste in case of waste treatment equipment failure or repair. All of the facilities were treating waste on the site. Only facility used off-site treatment.

Facilities treating waste on-site were further evaluated to determine whether the processes involved were done according to recommended standards. Findings revealed that; for most facilities 10/13, the treatment was located at an area that is accessible to workers and

inaccessible to the public as recommended; however, waste was transported safely at only 3/13 facilities. Very few facilities 3/13 had a program of regular and periodic inspection and periodic maintenance of the treatment technology and 3/13 had their treatment system clean, operating properly, and well maintained.

Treatment systems used at all the assessed facilities could destroy/mutilate sharps to prevent re-use. Four (4) facilities had incinerators and none of these met international standards. Only one facility with an incinerator kept PVC plastics out of the waste that is burned. None of the facilities was disposing of waste at a sanitary landfill.

Off-site treatment of health care waste:

4.3.2 Findings from key informant interviews

Availability, and use of guiding documents: Key informant interviews revealed that although the health managers were aware of some of the existing documents guiding management of health care waste in the country such as; policy guidelines on injection safety and health care waste management, infection prevention and control guidelines and guidelines on environmental safety, not all had copies of the documents and even of those that had the copies, not all had read the content. Those who had read the documents were of the view that the documents covered a lot but there is need to provide additional information in the following areas; procurement and use of non-burn technology and management of special types of waste including; e-waste, chemical waste, mercury and asbestos.

When asked to provide feedback on methods used for disseminating policies and guidelines, ease of use and other operational issues related to implementation of the policies and guidelines that are available; the respondents mentioned that dissemination is usually through training of health workers by members of the IPC committees, the documents were easy to use except for information gaps here and there but with limited access due to few copies. Most managers recommended that the documents should be uploaded at MoH website to improve access. The respondents were all of the view that uptake of guidelines was rather low and attributed this to weak enforcement of compliance through audits.

Respondents from the laboratory shared information that they had extracted information on safety from different guidelines (beyond IPC) and compiled them into one document that serves as reference on all issues related to laboratory safety. As incidents and accidents occur, the safety officer investigates risks that led to the incident/accident and corrective action is taken. This approach had helped a lot in eliminating risks in the laboratory. Corrective measures taken were then incorporated in the revised safety manual at the next revision.

Factors related to dealing with waste treatment technologies: Waste treatment technology found in use had been selected based on advice provided in the MoH HCWM guidelines at the

time of the procurement. The managers were concerned that newer available waste treatment technologies were very expensive and worse still some of the equipment installed such as incinerators and shredders never worked. There was a general outcry to the MoH to produce and disseminate information on selecting non-burn technology, developing specifications, and providing SOPs on how to use the equipment.

Specifications for the equipment are supposed to be generated by the equipment maintenance units but the teams on the ground lack capacities to take on this role. Incinerators in use did not have air pollution control devices therefore unable to meet smoke emission requirements. Reasonable effort was being made to ensure that waste treatment equipment was serviced but schedules were irregular with some equipment having been serviced only twice since 2015. Some incinerators were not functional at the time of the assessment.

Factors related to beliefs and benefits of the injection safety and healthcare waste management program: The key informants believe that injection safety and health care waste management programs are beneficial; for example, injection safety program reduced over-use of injections by promoting oral medications, re-use prevention syringes are in use (solo-shot), sharps containers were made available at service delivery points, health workers were trained in managing waste such as segregation and proper sharps disposal. There is a significant reduction in prevalence of needle-stick injuries. The facilities are provided with waste treatment technology such as incinerators, shredders and macerators and there is good tracking of consumption of needles and syringes.

Factors related to systems for managing HCW including roles and responsibilities: The health facilities could not describe any well-established systems for managing HCW but from their submissions, the Hospitals had in place IPC committees charged with the responsibility of addressing HCWM concerns. For the day –to- day operations, public health officers, where available, supported the staff and where these did not exist, an alternative focal person had been put in place. When asked about their roles and responsibilities, respondents provided the following information;

- the medical superintendents/facility in-chargers mentioned that they ensure that; the facility has enough commodities for managing health care waste, ensure patient safety, organize for staff training, ensure that waste treatment and disposal is provided for and that heads of departments are supervising and supporting staff to comply. Other responsibilities included ensuring the waste handling services are properly contracted out, handling staff are in place and where necessary salaried workers are recruited. The managers also ensure that post exposure management requirements are in place and that the system functional. In addition, the in-chargers allocate resources through votes to cater for waste management concerns

(applicable votes include construction/building materials, maintenance and servicing of plant, sanitation, and salaries/wages).

- HCWM focal persons mentioned the following roles and responsibilities; making procurement plans, organizing for and training health workers, providing on-the-job technical supportive supervision to all staff, and presenting HCWM issues for discussion by the IPC committee.
- Laboratory safety officers had responsibilities ranging from extracting safety related guidelines from different source documents (including beyond IPC/HCWM) and compiling these into one document. Training and re-training laboratory staffs on safety guidelines, generating SOPs for achieving safety when performing procedures, conducting risk assessment, investigating incidents and accidents and taking corrective action, ensuring that all staffs are vaccinated and use PPE as appropriate and participating in managing exposures
- The nursing officer in-charge ensures that guidelines are disseminated to nursing staff, supports nurses to achieve best practices and monitors for levels of compliance among staffs.

Factors related to financing for healthcare waste management: The key informants mentioned that health care waste management was an expensive venture yet budgets provided were not adequate. Equipment used such as incinerators, autoclaves and macerators cost about 30,000,000 Kshs, 50,000, 000 Kshs and 500, 0000 Kshs respectively. Facilities that had tracked expenditure said that waste management/sanitation was consuming up to 10% of their budgets. Two major sources of financing for HCW were mentioned; MoH grant and cost sharing. Cost sharing funds were being used to cover 90% of costs for managing HCW with commodities and supplies taking a big chunk of the budget. Operational costs for incinerator maintenance were for example estimated to be 20,000 per quarter with fuel consuming almost 80% of this budget. The operators were being paid Kshs. 9,000 /= per month.

Resources available for managing health care waste at government facilities were further stretched by use of services by a private sector that is not willing to pay. Discussions with the superintendents that had explored this possibility revealed that the small scale private sector was only willing to Kshs. 500 for 1-5 kg (about Kshs. 1/= per Kg). At the time of the assessment, the situation was constrained by lack of clear processes for contracts and partnerships between government and the private sector making cost sharing mechanisms difficult to work out.

Training: Levels of training among staff varied from facility to facility with some facilities having their staff trained more regularly than others but training was generally organized as follows.

All the health facilities were providing their new staff induction courses in IPC with focus on HCWM. Intern doctors and clinical officers were given special consideration during training due to their vulnerability.

4.3.3 Findings from Focus Group Discussions

Focus group discussions with waste handlers revealed that at hospital level, waste handlers working for the contracted waste handling firms were being given full training courses in general health care waste management by the Hospital teams and additional training was offered for the specific assigned roles and responsibilities assigned. The contracted companies were also offering their staff training but the offered packages varied depending on years of experience in dealing in health care waste. This was confirmed with managers through key informant interviews.

Procurement regulations require that waste treatment and disposal equipment users are trained on how to operate equipment and in compliance with this requirements each site had installed new equipment in the last 3-5 years had at least one well trained equipment operator.

The rest of the staff were receiving refresher training mainly through IPC continuing medical education but for the majority of the facilities, the IPC CME sessions held over a period of one-two years prior to the assessment had not included health care waste management.

Lead persons in health care waste management had recently received comprehensive retraining in HCWM from the UPOPs project. The training was highly rated and gave the leads confidence organizing refresher training for all staff.

Educational materials: Other challenges mentioned included; poor waste segregation and lack of updated IEC materials.

Factors related to occupational health and safety: Most of the health workers at the assessed facilities were fully vaccinated against hepatitis B. Less than optimal vaccination was attributed to the high cost of the vaccine.

Most respondents mentioned that they although they did not have in place a proper system for assessing and reviewing risks associated with managing health care waste, there was an approach for reporting and managing needle stick injuries and through this mechanism, health workers could access post exposure management. According to registers for needles stick injuries, most risks were being posed by inappropriate use of safety boxes; where the boxes are overfilled and ended up causing needle stick injuries. Some managers had gone ahead to develop SOPs on management of exposures including reporting requirements. Access to post exposure prophylaxis was rated to be good.

The intern doctors and intern clinical officers were considered the most vulnerable groups to exposures especially needle stick and surgical blade injuries and were being offered by the facility-public health teams' induction training in infection and control in general with special

sessions in waste management. Higher vulnerability was attributed to less than optimal training in IPC offered in their pre-service training courses and heavy work schedules.

Focus group discussions with waste handlers revealed that there was variation in the prevalence of needle stick injuries among waste handlers with some facilities reporting only 2 injuries in period of 3 years while others were reporting up to 6 injuries. Similarly availability of PPE for waste handlers varied with handlers found on duty at highly performing facilities confirming that they are always provided with adequate personal protective equipment while others were being given only gumboots and gloves. There is a high turnover of waste handling staff making capacity building in this group expensive.

None of the participating waste handlers was fully vaccinated against hepatitis B, a few had received one or two doses mainly through donations.

Community concerns: The community still prefers injections and can argue if needs are not met. Sanitary pad disposal continues to be a problem; community members dispose of pads in sewer systems despite awareness raising. Muslims use water to clean themselves and dump used plastic bottles in toilets clogging the system.

Using needles and syringes: The key informants from the laboratory mentioned that when auto-disable needles and syringes are used to draw blood, they can lock themselves prematurely requiring the phlebotomists to use several devices for one blood draw. It was explained to the informant that ADs are not the most appropriate devices for drawing blood.

Preferred characteristics of the handbook include; using simple English, portable, backed by training sessions, complimented with relevant IEC materials, should have evidence photo, provide both hard and soft copies.

Recommendations on how to improve the program:

- Put more effort in disseminating policies and guidelines at lower levels.
- Continue training health workers in HCWM paying special attention to; chemical waste, e-waste, and non-burn technology
- Provide adequate funding for HCWM
- Provide IEC materials for the public.
- Enforce compliance through regular audits.
- Supply quality safety boxes
- Put in place transfer stations for recyclables

Use of Autoclave as HCW treatment technology in Kenya

- The use of autoclave as a technology for HCW treatment has not taken root in Kenya and is just picking up; with only a few units, totaling five, having been imported to the country so far, out of which only two are installed and operational in the various counties/ health facilities.
- The Kenyan Ministry of Health, through the support from the Program for Appropriate Technology in Health (PATH) secured and installed five (5) autoclave units for use in the various health facilities in the Country.
- From the field visits made by the Reviewer for purposes of this work, only Coast Provincial General Hospital, Mombasa, had a functional autoclave. The autoclave operates quite well with the main concern among the hospital management regarding its use being the fact that it cannot shred the sharps (especially small pieces of metal like needles) since it has big blades. The autoclave commodities/consumables such as paper rolls, testing strips/indicators, autoclave bags, bin liners etc. were available as they were still using those earlier supplied by PATH. The SOPs for the autoclave operation were also provided. The unit operator is well trained and provided with all the PPE that he requires for his work.
- The noted gaps in respect to use of autoclave in this facility included; lack of temporary holding bay for storage of HCW awaiting treatment; lack of holding bay for temporary storage of autoclaving by-products awaiting final disposal; and non-vaccination of the operator against Hepatitis B.

The use of microwave as a HCW treatment technology

During the field visits to the health facilities for purposes of this work, none of the health facilities visited was found to have a functional microwave in use for health care waste treatment. Only one of the health facilities visited, i.e. Rift Valley Provincial General Hospital, Nakuru, was found to be in the process of installing a microwave unit, having so far constructed a housing for the unit as is the requirement, in accordance with the building plan earlier provided by the National Ministry of Health. We were informed that the housing would be completed and ready by early October, 2017, after which the unit would be installed and ready for use.

A few issues of concern, however, came up during a discussion with the team spearheading the microwave installation work at the health facility, as described here-below;

- The apparent inability by the team to quantify the amount of HCW expected to be available for treatment as there had not been any prior feasibility study done to ascertain/estimate the amount of HCW that would be available for treatment from all the other link health facilities within the County expected to bring in the waste for treatment at the microwave.

- Lack of a substantive policy and/or legal framework to enforce the use of the microwave as a centralized HCW treatment site for the County and ensure that all the health facilities within the County, both public and private, that do not have recommended/acceptable treatment technology bring in their HCW to the microwave for treatment.
- Lack of payment modalities for the treatment services as this had not been drawn by the team responsible for the microwave operations.
- Lack of a holding bay for the health care waste awaiting treatment as there is a possibility of so much waste being brought in that has to be held up for some time before treatment, or even as a result of a machine break-down.
- High energy consumption rate – though yet to be experienced by the microwave management is an issue to take note of, basing on experiences from other regions where microwaves have been in use.
- Lack of public private partnership framework which would play an important role in facilitating proper operations of the microwave and general HCWM through greater involvement of the private sector to bring in higher level innovation, efficiency and creativity in the services. .
- Lack of a clearly defined transport system to enable link health facilities transport their HCW to the treatment site in a manner that conforms to the NEMA and other international standards.

It should be noted that the microwave units currently being procured and installed by the Government of Kenya through the Ministry of Health are supposed to operate under the direction of the respective County Health Leadership covering the health facilities within which they have been installed, and the County Governments are responsible, through an agreement with the National Government, for constructing the housing for the units.

A more detailed interview with the Focal Person for the microwave installation/operations at the Ministry of Health gave a further clarity on the status of microwave installation and operations as captured in the narrative here-below:

The use of microwave as a technology for HCW treatment has not taken root in Kenya and is just picking up; with only a few units having been imported to the country so far, out of which only two are under installation in the various counties/ health facilities. An interview with the Ministry of Health focal person for the installation of microwave units as HCW treatment technology in Kenya revealed that;

The Kenyan Ministry of Health, through the support from the Belgium Government, plans to install a total of 10 microwave units in the various health facilities in Kenya for use as health care waste treatment technology. The health facilities earmarked for the first phase of this project will include three (3) National Teaching and Referral Hospitals (i.e. Kenyatta National Teaching and Referral Hospital, Nairobi, Moi Teaching and Referral Hospital, Eldoret and Jaramogi Oginga

Odinga Teaching and Referral Hospital, Kisumu) and six (6) County Hospitals (i.e. Embu, Kakamega, Nakuru, Nyeri, Mombasa, Machakos and Kisii) County Hospitals.

To date, seven (7) microwave units have so far been shipped into the Country, with Moi Teaching and Referral Hospital, Kenyatta National Hospital, Jaramogi Oginga Odinga Teaching and Referral Hospital, Nyeri County Hospital, Nakuru County Hospital, Machakos County Hospital and Kisii County hospitals having benefitted, as they all have had the equipment delivered to them. The unit for Embu County hospital is in transit and expected to get to the Country by end of October, 2017. Those for Mombasa and Kakamega hospitals have been manufactured but still awaiting shipment to Kenya, and are expected to get to the country by November 2017.

In terms of installation, the Moi Teaching and Referral Hospital equipment is at a very advanced stage and should be ready by end of October, 2017 while the Nakuru hospital unit will be the next to be installed. The Machakos and Kisii hospitals units are at about 40% performance in terms of equipment installation process. Kakamega hospital has put up the foundation for the equipment housing while Nyeri, Kisumu and Kenyatta National Hospitals are still behind as they have only completed the relevant installation procurement process. Mombasa is lagging behind in terms of the process.

As a step towards ensuring that the microwave technology works successfully, the HCWM and Climate Change Unit at the Ministry of Health is currently working on the development of two main documents, namely the Public Private Partnership (PPP) and Monitoring and Evaluation (M&E) Frameworks. The development of the M&E Framework is being supported by the CDC through the University of Maryland while that of the PPP Framework is supported by the Ministry of Health.

The microwave HCWM technology is supposed to serve as a centralized waste treatment technology for the counties in which they have been installed.

SECTION 5: DISCUSSIONS

5.1 The extent of alignment of the Kenya National Guidelines for Safe Management of Health care Waste, 2011, to the WHO Blue Book on health care waste management, global recommendations and other global conventions on environmental protection

Guidelines help health workers to uniformly implement established regulations. The guidelines standardize practices and serve as the basis for evaluating quality. The WHO Blue Book recommends that HCWM guidelines fulfil the following; outline for health workers the legal framework that regulates their practices, specify roles and responsibilities of public health authorities, explain how hospital hygiene and occupational health and safety should be improved as well as provide the basis for setting up a system for monitoring, evaluation and taking corrective action. In addition, the guidelines should provide justification for health facility level HCWM practices in the areas of; waste minimization, segregation, handling, storage transportation, treatment and disposal for each category of health care waste. The guidelines should also provide limits of emission for atmospheric pollutants and measures for protection of water resources including standards for treating wastewater.

Legal framework: Guidelines are intended to help workers implement laws and regulations. Examination of the extent to which the section on legal framework within the Kenya HCWM guidelines elaborated on laws and regulations applicable to management of health care waste revealed that focus was put on four major laws; the Public Health Act, Chapter 242, Laws of Kenya; the Environmental Management and Coordination Act, 1999, with its three regulations (Legal Notice No. 101 on Environmental Impact Assessment; Legal Notice No 121 - covering waste management regulations and Legal Notice No 120 covering water regulations); the Occupational Safety and Health Act, 2007; and the Food, Drugs and Chemical Substances Act, Chapter 254, Laws of Kenya. The guidelines should have covered a couple of additional laws namely; the Biosafety Act of 2009 and Radiation Protection Act, Chapter 243, Laws of Kenya. It is also important to note that very little guidance is provided in respect to legal framework on chemical and e-waste management.

Clarification of roles and responsibilities: Clarifying roles and responsibilities helps staff to appreciate their job descriptions. The staff are further able to acquire knowledge and skills tailored to core competences required of them. Assigning roles and responsibilities improves staff confidence and minimizes duplication, thus improving efficiency in rendering services. The government of Kenya provides health services using a decentralized approach. The services are provided through a multi-layered structure operating at national, county, sub-county and health facility/institutional levels. It would therefore be expected that clear roles and responsibilities are provided for concerned officers operating at the different levels of service delivery. ***While the guidelines clearly clarify roles and responsibilities of health facility and institutional based***

officers, there is little guidance provided to national, county and sub-county level officers. This may be because the structures for the HCWM program are not well developed/defined across levels of care. Even where roles and responsibilities are well written like at health facility level, there is still a gap between what is written down and roles as described by the facility staff that were interviewed as key informants.

There is need for the MoH to improve on guidance provided in terms of structures for managing health care waste across levels of care (i.e. national, county and sub-county). As part of this process, effort should be made to clarify roles and responsibilities for respective officers reflected in the described structure.

Setting up a plan for safe monitoring of management of health care waste at the different health care levels: Monitoring is defined as an activity undertaken to provide specific information on the characteristics and functioning of environmental and social variables in space and time with the aim of comparing impacts to what is predicted such as ensuring that emission limits are not exceeded and providing warning of potential environmental/health damage. It is recommended at global level that countries put in place systems for monitoring HCWM at different levels.

The guidelines adequately cover processes for setting up monitoring plan but very little is provided on how exactly monitoring should be done. When asked about reasons for low levels of compliance to HCWM guidelines, one key informant revealed that there was unmet need for monitoring; “audits and monitoring are not done to enforce compliance”, a Public Health officer at one of the County Hospitals said. There is therefore a gap in information standardizing how exactly HCWM monitoring should be done.

Improving hospital hygiene, occupational health and safety: Guidance provided in the WHO Blue Book requires health facility management to be responsible for providing a safe, healthy workplace and safe systems of work. Chapter 11 of the Kenya National Guidelines for Safe Management of health care waste provides direction on how hospital hygiene and occupational health and safety should be improved and this involves; risk assessment, specifying best practices, making provisions for the continuous monitoring of practices, training of health workers, providing personal protective equipment, vaccination of health workers against immunizable diseases and putting in place pre and post exposure management programs. Putting in place an occupational health and safety committee is highly recommended. Detailed standalone guidelines for achieving occupational health and safety have been developed and disseminated. ***The guidelines are well aligned to global recommendations.***

Rationale for health care facility level safe HCWM practices: Recommended best practices in managing health care waste at health facility level include; minimization, segregation, handling,

storage transportation and treatment and disposal of each category of health-care waste: Global recommendations provided in the WHO blue book recommend that strategies are put in place to minimize generation of hazardous waste. This is to be achieved through the “reduce, reuse, recycle” strategy for waste minimization. It is required by WHO that health workers are given information on benefits of waste segregation and that a system for segregating waste is developed explaining containers and color codes that need to be used. Guidance should be provided on requirements for labeling, frequency of waste collection, best practices when storing the waste and appropriate methods used for final waste disposal. In addition, HCWM training requirements of staff should be stated.

The Kenya national guidelines for safe management of health care waste are, to a large extent, well aligned with recommended best environmental practices in several areas including; waste minimization, segregation, labeling and collection. Gaps in compliance to global recommendations were identified in the following areas of best practices; ***failure to state HCWM training requirements for health workers; recommending waste treatment technology that is not in line with BEPs and BATs (e.g. incineration is still recommended), and lack of guidance on how to store and dispose of certain types of HCW such as chemical and e-waste, asbestos and mercury.*** The Kenya HCWM guidelines were found to be well aligned with existing global recommendations in terms of recommended best practices in managing liquid waste.

Investing in HCWM: Health facilities are producing ever increasing quantities of health care waste. Managing the waste is an expensive venture especially when switching to newer waste treatment methods such use non-incineration technology (e.g. autoclaving, microwaving, shredding etc.). It is recommended at global level that national guidelines should provide information on strategies for securing resources for establishing sound health care waste management systems. WHO core principles for sustainable management of HCW recommend that all concerned with delivery of health care contribute to safe management of resulting waste as a duty of care. ***The Kenya National Guidelines for Safe Management of Health Care Waste lack specific guidance on financial investment and mechanisms for providing for costs for carrying out HCWM operations.***

5.2 The extent of alignment of the Kenya Injection Safety and Safe Disposal of Medical Waste National Communication Strategy to the National Health Communication Guidelines, 2013

Guidance on communication strategy development provided in the Kenya National Health Communication Guidelines, 2013, was first bench-marked against a globally standardized field guide to designing a health communication strategy developed by John Hopkins Bloomberg School of Public health/Center for Communication Programs in 2003 to determine the extent of alignment with global standards. Information provided in the Kenya communication guidelines

of 2013 on communication strategy development was found to be well aligned to the global recommendations. The Kenya injection safety and safe disposal of medical waste national communication strategy was then reviewed for alignment with guidance provided in the Kenya National Health Communication Guidelines, 2013.

The Kenya National Health Communication Guidelines, 2013, require that those engaged in development of a health communication strategy follow three major steps; planning and designing of health communication interventions; implementation of communication interventions; and monitoring and evaluation. When broken down into smaller components, planning and designing a health communication strategy processes entail consulting stakeholders, investigating predisposing factors, bringing out underlying causes and effects of the problem, reviewing epidemiological data, identifying problem audience and groups influencing them, their values, beliefs, attitudes, and what motivates them. Other components include understanding the partners, allies and gatekeepers and identifying change necessary to solve the problem and identifying barriers and obstacles. Communication materials are then developed and pre-tested for clarity, acceptability and suitability to the target audience.

The Kenya Injection Safety and Safe Disposal of Medical Waste National Communication Strategy was reviewed for conformity to the above recommended processes.

The document brings out three major communication issues; high demand for unnecessary injections among communities, most especially among the youth as measured against patient preferences for treatment when sick; high risks of exposures to hazardous waste especially among waste handlers; and risk of transmission of HIV by the health sector through unsafe injection use.

The key health issues raised in the communication strategy are ***very narrow in scope leaving out broader aspects in the area of health care waste management such as; lack of funding for HCWM activities, poor waste segregation, pollution of air, water and land, and exposure to chemicals and heavy metals. There is therefore a need to broaden communication issues captured with the aim of giving broader health care waste management and environmental concerns more visibility. Factors pre-disposing to the health issues raised were not stated.***

Analysis of the **underlying causes** revealed that the high demand for injections was being driven by the following; community and individual beliefs that injections are stronger than alternative options; belief that peers have effective influence on what is preferred by individuals; belief that medicine prescriber knows better; lack of understanding of guidelines by medicine prescribers; desire to meet needs and wants of clients (client/patient centeredness) and complacency among policy makers and law enforcement officers/regulators. The underlying factors have, however, not been subjected to a ***rigorous scientific analysis*** to determine to what extent each factor

contributes to the problem. ***There is therefore a strong need to conduct good studies that provide evidence for prioritization.***

Global and local epidemiological data were used to highlight the situation.

Analysis of people affected by unsafe injection practices brings out three main groups of segmented target audiences; primary targets (community members including patients/consumers), secondary targets (including health practitioners, respected family members and community leaders but also community based health workers, peers,) and tertiary targets (policy makers). On the other hand, segmented target audiences for safe disposal of health care waste include the following; health workers and waste handlers at facility level as primary targets, public health officers and community health workers as secondary target audience and policy makers, program managers as tertiary audiences. Although the target audiences are broad enough, lack of comprehensiveness in issues pertinent to health and the environment leaves a gap in ability to adequately protect all concerned parties.

Partners, allies, and gatekeepers were broadly identified as secondary and tertiary audiences but no specifics were provided on their roles and how they relate to behavior change. It was a ***plan of the drafting stakeholder group to conduct additional studies to gain clarity regarding partner roles in implementing the strategy – this was, however, not done.***

Changes necessary to solve the problem were identified through consultative meetings that involved carrying out brain storming sessions. The identification process put into consideration findings of the SWOT analysis. Identified barriers to adoption of change included; lack of knowledge among communities on dangers associated with unsafe and unnecessary use of injections; lack of knowledge on efficacy of alternative formulations; lack of understanding of clinical guidelines among prescribers; desire to please and retain clients by prescribers; essential medicines lists that favor providing injectables and stock-outs of oral formulations. Communication interventions were developed to overcome these barriers.

Objectives of the communication strategy were stated as follows; reducing the number of unnecessary injections; reducing the number of unsafe injections administered; promoting alternative methods of treatment and facilitating safe disposal of medical waste.

Global standards recommend that objectives are developed per target audience so that communication is better directed. ***The four objectives above are not explicitly directed to a specified target audience.*** The objectives do not state the measure of expected change and the timeframe within which the change will be realized. Some of the objectives such as facilitating safe disposal of medical waste ***are not SMART and could be difficult to measure.***

Five strategic approaches were selected to be used in executing the communication strategy; capacity strengthening in injection safety and safe disposal of medical waste; development of targeted evidence based and contextualized information tools and materials; media alertness to raise awareness and promote accurate analytical coverage; outreach to influencers at community and health care delivery systems to include injection safety and medical waste in their agenda, and policy advocacy among decision makers to allocate resources and build institutional commitment. ***These strategies were not wholly and exhaustively executed.***

Information that was provided on underlying causes of the problem/ issue was scanty therefore lack of clarity on justification for the selected strategies. It is not clear which strategies will be used to achieve what objectives. Further evaluation of the document actually reveals that most assessment findings which would inform development of the strategy ***were to be conducted as part of implementation of the strategy itself.***

Identification of necessary change to solve the problem: The following changes tailored against gaps in best practices were identified as priority areas for social change; communities not demanding for injections; communities demanding for safe injections when injectables are deemed necessary with special attention to use of a new needle and syringe from a sealed pack; communities seeking health care from qualified/licensed health workers; communities accepting use of alternative treatment options such as oral medicines; health workers not prescribing injections if not recommended by treatment protocol; a need for health workers to segregate waste that they generate according to category of risk and by color coding; a need for health workers to provide only safe injections and use new needles and syringes for each injection and drug reconstitution; managers removing unnecessary injections from treatment protocols; managers training health workers in safe and appropriate use of injections including sharps waste disposal; managers supplying adequate quantities of injection devices and related materials. Although these priorities will go a long way in solving injection safety concerns, the priorities do not adequately address sharps waste concerns for example, ***waste handlers are left out and resource mobilization is not captured (see annex 1 for more details).***

Messages and communication channels: Messages generated were addressing mainly improving safety of injections and reducing unnecessary injections but not adequate to improve sharps waste disposal. Most messages lacked preferred characteristics of messages such as; key facts that if addressed will lead to desired behavior, a promise that motivates one to take action, support promise explaining why the message should be believed, competition for the message, lasting impression, desired user profile and consistency in message communicated.

Communication channels were selected based on experience of individuals that participated in the stakeholder engagement meetings.

Implementation: A draft implementation plan was developed but it is not clear whether the plan was implemented. The ***Reviewer was not provided with performance progress reports*** to determine levels of adherence to the original implementation plan.

Monitoring and evaluation: Critical indicators for monitoring were not selected.

5.3 The extent of alignment of the current Kenya HCWM Standard Operating Procedures to the best available technologies (BAT) and best environmental practices (BEP) and international practices

The following measures are recommended as BEP, BAT and best international practices; putting in place and implementing a system for managing health care waste together with the basic elements within the system; providing information and education to the public and to users about environmental consequences of choice of particular activities, their use and ultimate disposal; emphasizing the need to develop an application of codes of good environmental practices which covers all aspects of an activity/procedures that have impact on the environment; calling for the application of labels informing users of environmental related risks related to a product, its use and ultimate disposal; creating awareness regarding a need to save resources including energy; requiring managers to avoid hazardous substances/products and generation of hazardous waste; use of best available technologies and promoting best environmental practices; stressing recycling, recovery and re-use; ensuring the application of economic instruments to activities, products or groups of products and catering for the establishment of a system of licensing, involving a range of restrictions.

Review of the Kenya HCWM SOPs reveals that there is good effort on the requirement to set up a HCWM system. The system has integrated best practices in managing HCW (minimization, segregation, handling, collection, storage, transportation, treatment and disposal). Health facility managers are required to put in place HCWM committees to provide oversight. Roles and responsibilities are specified. Since Kenya provides health services using decentralized structures, the existing guidance on setting up HCWM system ***does not adequately cover national, county and sub-county levels.***

The SOPs provide guidance on code of conduct, explain risk of non-compliance and make it a responsibility of staff to ensure compliance. The SOPs recognize protection of the environment as essential for a healthy community and identify health workers as a community that needs to be provided with information on risks associated with HCW including the precautions that they need to take to mitigate identified risks. ***There is however very little information provided on how the public should be informed.*** The use of labels/symbols to identify HCW that poses risk is addressed in the SOPs with guidance being provided on how to minimize generation of hazardous waste through reduce, recycle and re-use.

The extent to which the SOPs integrate BEP/BAT/International practices that aim at reducing use of products that contain hazardous chemicals and avoid generation of hazardous waste was assessed against the recommendations of the Basel, Stockholm, Minamata and SAICM conventions/strategy. In regard to the recommendations of the Basel convention, there is significant integration reflected in the HCWM SOPs as follows; health facility managers are required to establish HCWM committees with oversight roles. The SOPs were themselves developed based on national guidelines and the guidelines were developed in conformity with global recommendations. SOPs on transportation of waste require the transporters to be licensed and to adhere to adopted standards.

Review of the SOPs reveals that, to a good extent, the recommendations of the Stockholm convention are integrated; steps for waste segregation using color coding, collection, transportation, treatment and disposal are covered. There is emphasis on the need to train staff and SOPs are provided on how to use different types of incinerators. More still need to be done as the SOPs still recommend use of small scale incinerators that cannot achieve recommended temperature and smoke emission requirements; guidance should be provided on use of centralized waste treatment facilities.

In relation to the recommendations of the Minamata convention, two areas are captured in the SOPs; the requirement for health facilities to strive to be mercury free and an SOP on how to store amalgam.

Recommendations of the SAICM strategy captured in the HCWM SOPs include; implementation of occupational health and safety standards, putting in place national policies and plans, providing information on risks associated with chemical waste to health workers and waste handlers, requiring health facilities to keep lists of stored chemicals, SOPs on how to clean up chemical spillages, and specific SOPs on how to use specific hazardous chemicals.

There is however still a lot that needs to be done to achieve best practices in managing chemical waste; provide information on how to protect human from chemical exposures from conception, through childhood, adolescence and adult life; generating a list of prioritized chemicals for assessment; identifying contaminated sites and taking mitigation measures; generating plans for phasing out toxic substances, and developing and publishing a national pollutant release and transfer registers. Systems that need to be put in place/strengthened include the following; harmonized risk assessment, monitoring impacts of chemicals on health and the environment, generation and dissemination of data on hazards of chemicals in use. In addition, there is need to design a program for strengthening capacity to deal with poisoning and other chemical toxicities. ***There is a strong need to put in place a communication strategy for raising awareness and protection of waste handlers dealing in chemical waste. Inspection systems should integrate chemical waste.***

5.4 Current health care waste management practices at the health facilities supported by the UPOPs project.

There was wide variation in health care waste management practices among visited health facilities with those having better management and resources performing better than others. When rated using the I-RAT, facility scores ranged from as low as 31/150 to 121/150. The average score was 72/150.

Areas of practice where facilities had high levels of adherence to recommended best practices included the following; having in place a HCWM focal person, health workers being familiar with waste classification and segregation requirements, collecting needles without recapping and disposing of the used sharps in a sharps container. In addition, almost all facilities had not had stock-outs of sharps containers and the containers were being placed close enough to enable easy sharps disposal. Other areas where performance was good was in levels of knowledge among health workers on what to do in case of needle stick injuries, facilities having in place quality color coded waste bags, carrying out disinfection of waste bins regularly, removing waste at least once a day and using a system of color coding for the different types of health care waste. The health facilities were also doing a good job segregating out hazardous chemicals, pharmaceuticals and radioactive waste from other types of health care waste. Laboratory waste was being autoclaved before being taken out of the laboratory at all the visited facilities and other types of waste were being treated at locations accessible to the waste handling staff but not accessible to the public.

Moderate adherence to recommended practices was registered in several areas assessed such as; making sure that health workers were familiar with waste classification and segregation requirements, collecting needles without recapping and disposing of the used sharps into a sharps container, having adequate quantities of containers all the time and placing them close enough to ensure easy and safe disposal. Other areas where adherence was moderate included having in place the following; adequate and quality waste bags, and using a color coding system for the different types of health care waste.

A reasonable proportion of health facilities was disinfecting waste bins regularly and removing waste from generation points at least once a day. 13/13 of the facilities were segregating out hazardous chemicals from other types of health care waste. All the facilities (13/13) were treating laboratory waste by autoclaving it while still inside the laboratory before taking it for disposal.

Poor adherence to recommended best practices in HCWM was noted in the following areas; having in place a permanent committee dealing with HCWM; having in place plans for recycling waste, training health workers, phasing out mercury; having policies on occupational health and safety/vaccination of health workers, commitment to protect the environment; written policies, plans and manuals for procedures consistent with regulations. The facilities lacked internal systems for monitoring, evaluation and taking corrective action. Budgets provided for managing health care waste were found to be insufficient and none of the facilities had a long-term financing plan to cover costs for sustainable HCWM. A good number of health facilities was filling

sharps containers beyond recommended $\frac{3}{4}$, thus posing risks of needle stick injuries among health workers and were transporting waste in open wheeled carts. The carts were not being cleaned on a daily basis. Most storage areas did not meet recommended requirements and waste treatment technology in use did not qualify as approved non-incineration technology. Where incinerators existed, none met recommended standards and one had been out of function for over 3 months. PVC was not being kept out of waste to be incinerated while the treated of waste water did not meet international standards.

Summary: Health facilities showed good progress towards meeting the recommended best practices in management of HCW in several areas such as; putting in place a person responsible for managing the waste, planning for sharps waste management and making HCWM commodities regularly available, putting in place a system for managing exposures and educating staff on what to do in case of injury, putting in place a color coding system for segregating waste and selecting sites where waste should be treated.

Reasonable progress was registered in making sure that health workers are familiar with waste classification and segregation, putting in place a color coded system for managing HCW, not recapping needles, removing waste from generation points at least once a day, and segregating out hazardous chemicals.

However, the areas where facilities were not doing well included; putting in place a HCWM committee, making policies and guidelines readily available, committing to protecting the environment and putting in place internal systems for monitoring, evaluation and taking corrective action. Facilities also need more support in the area of continuous HCWM quality improvement, generating budgets for HCWM, switching to non-incineration technology and improving of efficiency of existing waste water treatment systems.

SECTION 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

A lot has been done in Kenya to provide guidance on how best health care waste should be managed. Policies and guidelines that conform to international best practices have been developed and disseminated. Where there are gaps, SOPs have been developed providing more detailed guidance regarding what needs to be done. The SOPs to a good extent integrate BEP/BAT but with a lot of room for improvement especially in the area of chemical waste. Through stakeholder support, efforts are ongoing to introduce BAT for use at health facilities in the country. Assessment of current HCWM practices in selected health facilities shows that there is some progress made in translating guidance provided into action with some facilities compiling information into summarized manuals for quick reference. There is a national injection safety and safe disposal of medical waste national communication strategy developed to a large extent in line with global standard but lacking comprehensiveness in addressing broader HCWM concerns.

Findings of the health facility assessment show that there is wide variation in quality of HCWM among facilities with facilities that are better managed and those with more resources demonstrating higher quality. Analysis of collected data revealed that quality of performance is segmented with all facilities performing either very well or very poorly against selected set indicators, and showing a mixed picture on other Performance indicators.

Lack of a proper HCWN system a cross levels of health care, non-availability of written guidelines at health facilities, low intensities of dissemination of the guidelines, poor reading culture, expensive BATs (initial and maintenance costs) , lack of clarity on roles and responsibilities, fragmented training programs and lack of IEC materials all contribute to the problem.

6.2 Recommendations

6.2.1 Recommendations for the HCWM Guidelines:

- Critical guiding principles especially around resource mobilization (such as WHO core principles for managing health care waste) should be adopted and operationalized by the MoH to increase resources available to support implementation of HCM activities.
- There is need for the MoH to generate medium and long term strategies for improving HCWM practices. As part of this process, the national HCWM strategic plan should be developed/updated.
- The MoH should conduct research on cultural aspects of HCWM with focus on how infection prevention and control practices can impact outcomes of disease outbreaks.

One area for special consideration is the way communities conduct ceremonial burials and how these can impact outcomes of Viral Hemorrhagic Fever (VHF) outbreaks.

- The MoH should streamline the HCWM system across all levels of care (national, county, sub-county) including assigning roles and responsibilities to designated officers working in the area of HCWM. Linkages with relevant sectors should be factored in.
- The MoH should specify minimum training requirements for staff engaged in managing health care waste. Training packages should be standardized for different cadres of staff.
- Identified missing content in the areas of e-waste, chemical waste, pharmaceutical waste and management of asbestos that has been drafted should be reviewed and approved for incorporation.
- The MoH should streamline the system for monitoring HCWM activities and including a sub-system for conducting joint risk assessment.
- Content has been drafted on gaps identified in the rationale for selected best HCWM practices. The content should be reviewed for possible incorporation in the HCWM guidelines.

6.2.2 Recommendations for the HCWM Standard Operating Procedures

- Additional SOPs should be developed addressing gaps in guidance provided by the MoH to;
- Health workers operating at national, county and sub-county levels. This will help in further clarifying staff roles and responsibilities.
- Health facility managers on procedures for selecting technologies for use at the health facility (beyond incinerators and autoclaves).
- Eliminate SOPs that favor use of polluting technologies such as small scale incinerators.
- Provide proper guidance on processes for possible public private partnerships especially in setting up centralized waste treatment facilities and recovering resources such as chemicals and minerals. Systems should be developed for tracking activities and their outcomes.
- The MoH should establish and publish national pollutant release and transfer registers.

6.2.3 Recommendations for the Injection Safety and Safe disposal of Medical Waste National Communication Strategy

- The communication strategy should be composed of two sections; a section for injection safety concerns and a section for health care waste management including sharps waste.
- The section on injection safety should be revised to incorporate new emerging global recommendations such as the WHO 2015, injection safety strategy.
- Information gathered on health care waste management during the review process brings out many communication issues that need to be addressed. These issues should serve as the basis for developing the section on HCWM communication strategy. The strategy should prioritize creating public awareness on risks associated with health care waste and its management.
- The situation analysis should be updated to improve on information provided on the communication situation in the country. This is for purposes of bringing out what works and what doesn't work. Preferred channels and local languages should be mentioned and targeted for use when implementing the communication strategy.
- Adequate resources should be mobilized to support launching and implementation of the revised communication strategy. Stakeholder engagement meetings should be held to increase buy-in.

6.2.4 Recommendations on the observed Health facility practices

- Allocate sufficient budgets for meeting costs for HCWM including providing budgetary codes/vote-heads against which HCWM activities can be charged.
- Ensure full supply of HCWM commodities.
- Train and re-train health workers and standardize training packages for different cadres of staff depending on assigned roles and responsibilities.
- Provide regular/consistent technical supportive supervision to ensure consistent implementation of activities and sustainable achievements.
- Provide appropriate technology for treating and disposing of health care waste.
- Strengthen linkages among HCWM stakeholder groups, health facilities (public/private), and with higher level technical and management structures.

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American Dental Association (2012): Guidelines to Amalgam Waste Management.

APPENDICES:

Appendix I: I-RAT

Individualized Rapid Assessment Tool • Healthcare Waste Management				
Put yes/no responses in the yellow spaces in column C; use "y" for yes and "n" for no. Put text or numerical responses in the yellow spaces in column F. Numerical answers should be in the units specified and should not include any text. The final score is shown at the bottom.				
	C			F
<i>Name of the person collecting the data</i>				
<i>Date of assessment</i>				
PART I. INITIAL INTERVIEW				
BASIC DATA				
Name of the healthcare facility:				
Address				
Telephone/Fax:				
Description of healthcare facility:				
Number of beds:				
Average occupancy rate (in percent):				
Average number of outpatients per day:				
Names of persons interviewed:				
Lengths of service of persons interviewed in healthcare facility:				
#	"y" or "n"	WeightValue	Score	Text or Numerical Input
ORGANIZATION				
1	Is there a person in charge of healthcare waste management?	5	0	
	If yes, write the name of the person in charge:			
2	Is there a permanent committee that deals with healthcare waste management and meets on a regular basis?	1.5	0	
3	Are the roles and responsibilities regarding healthcare waste management made clear to the staff?	1.5	0	
POLICY AND PLANNING				
4a	Does the healthcare facility have written policies dealing with healthcare waste management?	2	0	
4b	Does the healthcare facility have written plans, manuals, or written procedures dealing with healthcare waste management?	2		
5	Are the policies, plans, manuals, and/or written procedures consistent with national laws, regulations, and any permits?	3.5	0	

6	Does the healthcare facility have a plan for recycling or waste minimization?		1.5	0
7	Does the healthcare facility policy explicitly mention a commitment to protect the environment?		0.5	0
8	Is the healthcare facility mercury-free? OR Does the healthcare facility have a policy or plan to phase out mercury?		1.5	0
TRAINING				
9	Does the facility have a training program on healthcare waste management for managers, health professionals, waste workers, and auxiliary staff?		5	0
10	Does the training program include relevant national laws and regulations?		1	0
11	Does the training program include the following: segregation, collection and handling of sharps waste, use of proper containers and bags for infectious waste, color coding, 3/4th fill rule, use of personal protection equipment by waste workers, transport, storage, and treatment?		2	0
12	Are the staff trained, including new staff when they begin their employment?		3	0
13	Is there refresher training at least once a year?		1	0
OCCUPATIONAL HEALTH AND SAFETY				
14	Do the policies and plans related to healthcare waste management include occupational health and safety (including policies for needle-stick injuries or exposure to blood splatter)? OR Does the facility have separate occupational health and safety policies that include needle-sticks and exposure to blood?		3	0
15	Are the workers who collect, transport and treat waste provided with the proper personal protection equipment (gloves, shoes or boots, and aprons)?		2	0
16	Are the health workers and workers handling waste given hepatitis and tetanus vaccinations?		2	0
MONITORING, EVALUATION AND CORRECTIVE ACTION				
17	Is there a system of internal monitoring or inspection to determine compliance with healthcare waste management requirements?		1	0
18	Is there a system of taking corrective action when practices or technologies related to healthcare waste management do not meet the requirements?		1	0
19	Are policies and/or plans reviewed or updated at least once a year?		0.5	0
FINANCING				
20	Does the facility have an annual allocation in its budget for healthcare waste management?		4	0

21	Is the current budget sufficient for healthcare waste management? Budget for healthcare waste management (in the local currency):	2	0	
22	Does the facility have a long-term financing plan or mechanism to cover the costs for sustainable healthcare waste management?	0.5	0	
PART II: POST-INSPECTION TOUR INTERVIEW				
CLASSIFICATION AND SEGREGATION				
23	List the types of waste produced in the facility: Are the wastes properly segregated at the source according to different categories?	5	0	
24	Are the health workers familiar with the classification and segregation requirements?	2	0	
WASTE GENERATION DATA				
25	Have the amounts of total waste and infectious waste produced per day been measured? If yes, put the figures below; if no, provide the best estimate below. Total waste (infectious and non-infectious) generated on average (in kilograms per day): Total waste minus recycled or reused waste (in kilograms per day): Infectious waste generated on average (in kilograms per day): percentage of infectious waste relative to total waste: kilograms infectious waste per bed per day: kilograms unrecycled waste per bed per day:	1	0	
		0.5	0	
		0.5	0.5	
COLLECTION AND HANDLING				
26	Describe the types of containers used for each separated category: Are used syringe needles collected WITHOUT recapping?	2	0	
27	Is sharps waste collected in sharps containers or destroyed using needle destroyers?	5	0	
28	Are the sharps containers puncture-resistant and leak-proof? OR Are the needle destroyers approved under existing regulations or standards?	2	0	
29	Are the sharps containers filled only 3/4th full? OR Are the needle-destroyers well maintained?	2.5	0	
30	Are the sharps containers or needle-destroyers always available?	1	0	
31	Are the sharps containers or needle-destroyers properly placed such that they are easily accessible to personnel and located as close as possible to the immediate area where the sharps are used?	1.5	0	

32	Do the health workers know what to do in the event of a needle-stick injury? OR Are the health workers familiar with the policy on needle-stick injuries?		1	0
33	Are the plastic bags used for non-sharps infectious waste of good quality? OR Do you use specialized containers that are disinfected, cleaned and reused and do not require a plastic bags?		1	0
34	Are plastic bags always available? OR are the specialized containers described in #33 always available?		1	0
35	Are the bag holders or hard containers holding the plastic bags of good quality? OR Do you use specialized containers that are disinfected, cleaned and reused and do not require a plastic bags?		0.5	0
36	Are the infectious wastes removed at least once a day?		1	0
37	Do the waste workers know what to do if sharps or infectious waste is accidentally spilled? OR Are the waste workers familiar with the spill clean-up plans?		0.5	0
COLOR CODING AND LABELING				
38	Does the healthcare facility use a system of color coding for different types of wastes?		3	0
39	Are the colors of the waste containers consistent with the color coding?		2	0
40	Are the infectious waste bags colored or labelled in accordance with the policies or regulations?		1	0
POSTERS OR SIGNAGE				
41	Are there posters or signs showing proper segregation of healthcare waste?		0.5	0
TRANSPORTATION INSIDE HEALTH ESTABLISHMENT				
42	Is the waste transported away from patient areas and other clean areas?		0.5	0
43	Is the waste transported in a closed (covered), wheeled transport cart?		1	0
44	Is the transport cart cleaned at least once a day?		0.5	0
STORAGE				
45	Does the storage area meet the proper requirements?		1	0
46	Is the storage area kept clean?		0.5	0
47	Are the wastes removed before the maximum allowable storage time is exceeded?		1	0
HAZARDOUS CHEMICAL, PHARMACEUTICAL AND RADIOACTIVE WASTE				

48	Are hazardous chemical, pharmaceutical, and radioactive wastes segregated from infectious and general non-risk wastes? (Put Y in column C if the facilities does not generate these categories of waste.)		4	0
49	Does the healthcare facility have a plan for the treatment and disposal of hazardous chemical, pharmaceutical, and radioactive wastes? (Put Y in column C if the facilities does not generate these categories of waste.)		1	0
TREATMENT AND DISPOSAL				
50	Does the healthcare facility treat its infectious waste (either on-site or at an off-site treatment facility) before final disposal? If infectious waste is not treated before disposal, put N in column C of QUESTION #53b and skip to QUESTION #69.		25	0
51	Are laboratory cultures and stocks of infectious agents treated within the healthcare facility before being taken away from the facility?		2	0
52	Is there a contingency plan for the treatment of infectious waste in the event that the treatment technology is shut down for repair?		1	0
53a	<i>>> Does the healthcare facility treat its waste on-site? If yes, put Y in column C, make sure column C of QUESTION #53b is left blank, and go to QUESTIONS #54-61. If the healthcare facility treats its waste off-site, put N in column C, make sure column C of QUESTION #53b is left blank, and go to QUESTIONS #63-68. However, if the healthcare facility treats its waste BOTH on-site and off-site, put Y in column C and Y in column C of QUESTION #53b.</i>			
53b	<i>>> Does the healthcare facility treat its waste both on-site and using an off-site treatment center? If yes, put Y in column C and answer QUESTIONS #54-68. If the healthcare facility does not treat its waste before disposal, put N in column C of QUESTION #50 and go to QUESTION #69.</i>			
<u>For facilities with on-site treatment:</u>				
Describe the method of treatment used:				
54	Is the waste transported safely to the treatment area?		0.5	0
55	Is the treatment area located in a place that is easily accessible to the waste worker but not accessible to the general public?		0.5	0
56	Does the healthcare facility have a program of regular inspection and periodic maintenance of the treatment technology?		3	0
57	Is the treatment system clean, operating properly, and well maintained?		3	0

58	Does the treatment system destroy or mutilate sharps waste in order to prevent reuse?		1	0	
59	Does the healthcare facility use an approved non-incineration treatment technology such as an autoclave-shredder, integrated steam treatment system, or microwave unit? If yes, put Y in column C and skip to QUESTION # 60.		6	0	
60	If the facility uses an incinerator: Does the incinerator meet international standards?		3	0	
61	If the facility uses an incinerator: Are PVC plastics kept out of the waste that is burned?		0.5	0	
62	Is the waste that is treated in an alternative technology disposed of in a sanitary landfill? OR Is the incinerator ash buried in a hazardous waste landfill? <i>>> If the answer to QUESTION #53a is yes, go to QUESTION #69. If the answer to QUESTION #53b is yes, answer QUESTIONS #63-68.</i>		1	0	
<u>For facilities that use centralized off-site treatment:</u>					
Name of the company that transports the infectious waste:					
Name and location of the off-site treatment center:					
63	Does the transport vehicle meet the regulations or international standards?		2	0	
64	Does the healthcare facility keep copies of manifests or shipment records?		2	0	
65	Has a representative of the healthcare facility inspected the off-site treatment center?		2	0	
Describe the method of treatment used at the off-site treatment center:					
66	Does the off-site treatment center use an approved non-incineration treatment technology such as an autoclave-shredder, integrated steam treatment system, or microwave unit? If yes, put Y in column C and skip to QUESTION #68.		7	0	
67	If the answer to QUESTION #66 is no, does the off-site treatment center use an incinerator that meets international standards?		4.5	0	
68	Does the healthcare facility know where the treated waste or incinerator ash is dumped? If yes, described the final disposal of the treated waste or ash:		2	0	
WASTEWATER					
69	Does the healthcare facility treat its wastewater (liquid waste) before being released? OR Is the healthcare facility connected to a sanitary sewer that is linked to a wastewater treatment plant?		3	0	
70	Does the treated wastewater from the healthcare facility meet national or international standards?		1	0	



TOTAL SCORE =

0

Appendix II: Plan of work for the Review of National Guidelines for Safe Management of Health Care waste, Injection Safety and Safe Management of Medical Waste National Communication Strategy and the HCWM Standard Operating Procedures

The plan of work is attached separately herein.

Appendix II: Key Informant Interview Guide for Health Managers and Policy Makers (At County, Sub-County and Health Facility Levels)

For official use only

Date of interview: ____/____/____

Venue: _____

Designation of Respondent: _____

Duration in service: _____

Interviewer _____

Time started: _____ Time ended: _____

Injection safety

A safe injection is one given when there is no other suitable alternative. Safety is assured when the right drug is given to the right patient in the right dose, using the right needle and syringe, at the right site, by the right route. It should be given by a skilled healthcare worker and the waste resulting from its use should not cause harm to the provider, the recipient or the community.

Waste management

Waste generated at health facilities poses several risks to health workers, the environment and communities. Some of these affect our health (infections, corrosion, injuries) while others affect the environment (air, water and land pollution).

Medical Superintendent and Public Health Officer/HCWM Officer will respond to all questions in all sections of the interview guide

Section A: General Questions

1. Are you aware of any HCWM policy documents, guidelines or strategy documents currently available/in use in Kenya? If yes, name them.
2. Do you have any of the documents you have named here/above in the health facility where you work currently or in health facilities within your area of operation (for officers covering wider areas/multiple health facilities)?

3. If yes to Q2, which ones do you have? Name them

4. Have you ever gone through any of the documents? Yes..... No.

5. If yes, do you believe they are comprehensive enough in content?

Yes..... No.....

6. If no, what are the gaps? Please state the gaps.....

7. From your own use of or reference to the documents or from feedback received from regular users of these documents, what are the notable gaps that require improvements?

.....

(Please suggest any desired improvement you think of in this regard)

8. Let us begin by you sharing your experience with regard to safe injection practices and appropriate HCWM.

Probe

- What good things have you observed with safe injection for the time you have been here?
- What challenges have you observed with unsafe injection for the time you have been here?

9. As someone with experience in health care waste management (HCWM), what are your views about HCWM? Probe

- a. Please describe the structure of the health care waste management system?
- b. Do you think the system is efficient in meeting intended objectives? And if not what are the major challenges?
- c. How are you addressing the challenges?
- d. Do you receive any external support in solving problems?
- e. Is there any form of documentation of waste management activities that happen at the health facility?
- f. Are all your health workers trained in injection safety and health care waste management
- g. When was the last training?
- h. What materials are available for health workers to use when updating their knowledge and skills in health care waste management?
- i. How do you rate capacities of the health workers when generating and managing waste? (segregation, handling, storage, transportation, treatment and disposal)

Section B: Roles and Responsibilities

Health managers have a duty of care to ensure that waste generated from their facilities is managed in a manner that does not pose harm to people managing the waste down the stream; from generation to final disposal.

10. What are your roles as far as injection safety and appropriate HCWM is concerned? (Probe for the different activities related to safe injections and appropriate HCWM).

Section C: Availability and use of Injection safety Policy and HCWM guidelines

11 a. What guiding documents do you use to direct health workers on waste management related issues?

- b. Are guidelines comprehensive enough to meet needs of health workers?
- c. Are the guidelines always easy to apply and if not what areas are difficult to apply?
- d. Do you know any gaps in providing guidance? Please explain.
- e. How are these guidelines and policies disseminated to the health facilities? (Probe for accessibility of guidelines to the users)
- f. Since you are a manager, how do you ensure compliance with the guidelines?
- g. Do your workers have any unmet training/information needs?
- h. If staff were to be provided with additional information on procedures for managing health care waste, in what format would you like to have the information packaged?
- i. We are in the process of developing a waste management handbook for health workers to serve as quick reference during day-to-day service delivery. What themes do you believe should be included in the handbook?
- j. What special features should the hand book have?
- k. Who should be the most appropriate target for the hand book? Can it be cross cutting or tailored by section to individual groups of health workers?

Section D: What are the different sources of financing for health care waste management?

12 a. Do you have an annual plan for managing health care waste?

- b. Do you have costed procurement plans for waste management commodities?
- c. What is the total expenditure for health care waste management?
- d. What is the Government expenditure on health care waste management [segregation, handling, transportation, treatment and disposal]?
- e. Total expenditure on waste treatment technology?
- f. Government expenditure on personal protective equipment?
- g. Quantify their financial needs, which may lead to better planning and budgeting for the program.
- h. Identify financing gaps and improve their financial management capacity.

- i. Is there tracking of financial flows for waste management expenditures (national and subnational).
- j. Advocate for predictable, sustainable and sufficient financing.

Section E: Waste treatment technologies in use

13a. What type of waste treatment technologies do you use at the health facility?

- b. How is the technology selected?
- c. Do you have specifications for the technology in use?
- d. Are equipment operators trained in operating the equipment?
- e. What are the initial costs for the equipment?
- f. What are the operational costs?
- g. What are the maintenance costs?
- h. What challenges do you have using the equipment?
- i. Do you get any external support operating/maintaining the equipment?
- j. Is the equipment serviced regularly?
- k. What methods do you use for final waste disposal?

Section F: Prevalence of Incidents and Accidents and their management

14a. How common are incidents and accidents at the health facility?

- c. What are the risk factors for the incidents and accidents?
- d. Is there a system for reporting such incidents and accidents?
- e. Do health workers have access to post exposure management?
- f. Do you routinely review risks associated with health care waste management?

Section G: Community concerns

15. From your observation as health manager, what community beliefs or practices have you noted that impact on proper implementation of safe injection practices and appropriate HCWM? (Probe: demanding for unnecessary injections, how they handle used needles and syringes, what's the underlying cause?)

16. What have you done to address these community beliefs or practices?

Section H: Recommendations for improving the HCWM systems

17. As we come to the end of the interview, what would you recommend to be done in order to improve safe injection practices and waste disposal in the health facilities?

- a. At national level.
- b. Sub-County level.
- c. Providers.

- d. Consumers.
- e. Anything else?

18a. Please share with me all your other thoughts and ideas on how best to improve on the current HCWM policy documents and guidelines.

18b. Do you find any gaps in them? If yes, please specify.....

End of Interview; thank you for your time

Interview with Nursing Officer In-Charge, Laboratory Technologist In-Charge

1. Are you aware of any HCWM policy documents, guidelines or strategy documents currently available/in use in Kenya? If Yes, name them.

2. Do you have any of the documents you have named here/above in the health facility where you work currently or in health facilities within your area of operation (for officers covering wider areas/multiple health facilities)?

3. If yes to 2, which ones do you have? Name them

4. Have you ever gone through any of the documents? Yes..... No.

5. If yes, do you believe they are comprehensive enough in content?

Yes..... No.....

6. If no, what are the gaps? Please state the gaps.....

7. From your own use of or reference to the documents or from feedback received from regular users of these documents, what are the notable gaps that require improvements?

.....

(Please suggest any desired improvement you think of in this regard)

8. Let us begin by you sharing your experience with regard to safe injection practices and appropriate HCWM.

Probe

- What good things have you observed with safe injection for the time you have been here?
- What challenges have you observed with unsafe injection for the time you have been here?

Section F: Prevalence of Incidents and Accidents and their management

14a. How common are incidents and accidents at the health facility?

- b. What are the risk factors for the incidents and accidents?
- g. Is there a system for reporting such incidents and accidents?
- h. Do health workers have access to post exposure management?
- i. Do you routinely review risks associated with health care waste management?

Section G: Community concerns

15. From your observation as health manager, what community beliefs or practices have you noted that impact on proper implementation of safe injection practices and appropriate HCWM? (Probe: demanding for unnecessary injections, how they handle used needles and syringes, what's the underlying cause?)

16. What have you done to address these community beliefs or practices?

Section H: Recommendations for improving the HCWM systems

17. As we come to the end of the interview, what would you recommend to be done in order to improve safe injection practices and waste disposal in the health facilities?

- f. At national level.
- g. Sub-County level.
- h. Providers.
- i. Consumers.
- j. Anything else?

18a. Please share with me all your other thoughts and ideas on how best to improve on the current HCWM policy documents and guidelines.

18b. Do you find any gaps in them?

Appendix III: Focus Group Discussion Guide

Assessment of injection safety and health care waste management practices in health facilities.

For Official Use Only

Date of interview: ____/____/____

Name of Health Facility: _____

Venue: _____

Number of participants: _____

Time started: _____ Time ended: _____

Background information

	Age	Sex	Occupation/Job title/Cadre	Duration in health service
R1				
R2				
R3				
R4				
R5				
R6				
R7				
R8				

Team Introduction

Thank you for agreeing to participate in the study on assessment of injection safety and health care waste management practices in health facilities in Kenya. We are now set to begin our discussion. Let us introduce ourselves so we get to know who is participating in this discussion. I am _____ and I am with you today to lead the discussion. My colleague _____ will be taking notes during the discussion. As I mentioned, the entire session will be audio-recorded. To protect everyone's privacy, we will use numbers only in referring to individuals. Your response will not be linked to you personally, so feel free to say whatever is on your mind. Let's begin from this side [moderator points to the right side]. Please tell us your name, where you come from and your expectations from this discussion. We will go

round like this [moderator demonstrates in a clockwise fashion] until each of us has introduced him/herself.

Ground Rules

Before we begin, let's remind ourselves of the following rules that each of us should respect if we have to have a meaningful discussion:

1. We would like to encourage each person here to freely contribute to the discussion, but most importantly, to stick to the subject being discussed. We will be glad if we let only one person speak at a time. We would like to remind you to respect each other's privacy; please don't tell other people who are not here what any person has said here.

2. In our discussion today, please keep in mind that we are interested in your opinion and perspectives. We would like to know what you think, what you think other people think, and what you know other people have experienced. The purpose of this discussion is not to talk about your own personal experiences. However, if you feel you have had your own personal experience that is relevant to the discussion and that you are comfortable talking about it, you are welcome to share this information. In summary, if we get on a topic, and you or someone you know has had an experience related to the topic, it would be most appreciated if you could share that story – but you don't have to.

3. There is no need to raise hands. Please speak right up from your seat but also respect others when they are talking. This discussion will last about two hours. Is there anyone who can't stay for the duration of the discussion? Are there any questions before we begin?

We would like to audio-record this discussion. The recording is only to help us make sure we "hear" everything that is said and to make good notes. Only people who are working on this project will ever hear any of the recordings or read the notes we take. After the study and all planned data analyses have been completed, these tapes will be destroyed. Does anyone have any objections to being tape-recorded?

Thank you for your attention, we are now set to begin the discussion

Introduction of discussion

Injection safety

A safe injection is one given when there is no other suitable alternative. Safety is assured when the right drug is given to the right patient in the right dose, using the right needle and syringe, at the right site, by the right route. It should be given by a skilled healthcare worker and the waste resulting from its use should not cause harm to the provider, the recipient or the community.

Section A: General Questions

1. Let us begin by you sharing with us your experience with recommended best practices for achieving a safe injection

- a. Do you believe it is easy to achieve a safe injection?
- b. What good things have you observed with safe injection for the time you have been here?
- c. What challenges have you observed with unsafe injection for the time you have been here?
- d. Do you usually have all the information you need to achieve a safe injection?
- e. What is the usual source of information regarding use of injections including disposal of used sharps?
- f. Is there any specific information that you would like to have but do not have access to?
- g. If information is to be in written form how would you like to have it organized?

Waste management

Waste generated at health facilities poses several risks to health workers, the environment and communities. Some of these affect our health (infections, corrosion, injuries) while others affect the environment (air, water and land pollution).

2. As someone with experience in health care waste management (HCWM), what are your observations about HCWM? Probe

- a. Describe the system in place for managing health care waste.
- b. What challenges are associated with poor HCWM?
- c. How can these challenges be overcome?
- d. What waste treatment methods do you use at this facility? And what are the associated risks?
- e. How do you select technology for use at the facility and what procedures do you follow to select the technology?
- f. If no longer usable, how is the equipment disposed of?

- g. What type of support does the health facility need to improve the management of health care waste?
- h. Do you have access to information that can guide you when managing health care waste?
- i. What is the common source of information for this type of topic?
- j. If information is to be in written form, what format would you prefer?
- k. How else can information be made available to health workers at your health facility?

Section B: Working Environment

3. As health workers involved in giving injections and HCWM, how do you ensure that the working environment is safe? In particular comment on

- a. Availability of loose disposable needles and syringes, loose disposable phlebotomy equipment; loose disposable intravenous infusion equipment. (Why? What are the reasons for the observed practices?)
- b. Risks of re-using injection equipment.
- c. Risks during disposal of waste in appropriate containers/final disposal method.
- d. Availability of appropriate containers; running water and soap for cleansing hands; alcohol-based hand rub for cleansing hands.

Section C. Policies and guidelines

4. Tell us about the availability of policy and health care waste management guidelines in this facility. Probe (availability, use and compliance).

- a. Are guidelines available at the health facility and if yes which ones?
- b. Share challenges faced in implementation of the guidelines?
- c. Are guidelines actually used and if not, why?
- d. When are the guidelines most relevant?
- e. What aspects of the guidelines work out well?
- f. What aspects need to be revisited?
- g. What don't you like about the guidelines?

Section D: Stock of disposable equipment (Probe for procurement, storage, availability).

5. From your experience, comment on the availability of injection devices, personal protective equipment, commodities for managing health care waste and equipment for treating and disposal of health care waste. Probe

- a. Stock at hand
- b. Procedures for placing an order.
- c. Processes for determining what to order.
- d. Support when developing specifications.

Section E: Training on injection safety and health care waste management

6. Tell us about the training in injection safety you have ever received.

Probe for

- a. Pre- and In-service training received (mentorship, supervision etc).
- b. When was the last training conducted and by who?
- c. The duration of training?
- d. The content of training i.e. what you learnt?
- e. Was the training adequate for you to do what you do?
- f. Which cadres or which people were trained?

7. Section F: Immunization, Needle stick injuries

- a. Comment on hepatitis B immunization coverage among providers? Probe
- b. Proportions immunized; have they received all the required 3 doses? Give reasons why some health workers have been immunized while others have not.
- c. Comment on hepatitis B immunization coverage for waste handlers. Probe for proportions immunized; have they received the required 3 doses? (Reasons why some have been immunized while others haven't, if any.)

8. How common are needle stick injuries among workers (health workers and support staff) at this facility in the last six months? Probe for the procedures that commonly lead to needle stick injuries.

9. What are the procedures for handling needle stick injuries at the facility? Probe for availability of post exposure prophylaxis and counselling services.

10. Section G: What are the different sources of financing for health care waste management?

- a. Total expenditure on health care waste management?
- b. Government expenditure on health care waste management [segregation, handling, transportation, treatment and disposal]?
- c. Total expenditure on waste treatment technology?
- d. Government expenditure on personal protective equipment?

- e. Quantify their financial needs, which may lead to better planning and budgeting for the program;
- f. Identify financing gaps and improve their financial management capacity;
- g. Is there tracking of financial flows for (national and subnational)?
- h. Advocate for predictable, sustainable and sufficient financing of immunization services; and

Section H: Recommendations

11. We are now approaching the end of our discussion. Is there anything else anyone would like to add about injection safety and health care waste management practices in health facilities that we have not talked about?

12. Propose actions to ensure proper injection safety and health care waste management practices at this facility?

Thank you for your responses

Appendix IV: Findings from Key Informant Interviews on Status of HCWM by health facility

	Area assessed	1. Coast Provincial General Hospital
1	Awareness about HCWM policies and guidelines	Aware about infection prevention and control and national HCWM guidelines
2	Benefits of injection safety and HCWM program	<ul style="list-style-type: none"> • New technology introduced (re-use prevention injection devices) • Reduction in needle stick injuries • Wide spread use of safety boxes • Reduction in use of unnecessary injections
3	Persisting challenges facing the program	<ul style="list-style-type: none"> • Lack of CME • Delayed collection of safety boxes • Need for frequent updates • Incinerator broken down • Poor segregation of sharps
4	Description of Structure of HCWM system	There is no specific HCWM structure
5	Effectiveness of HCWM system in meeting program objectives	The respondent mentioned that the facility is managing somehow but there is need for a full time coordinator
6	How challenges are being addressed	Facility management Informed the public health department
7	External support received	None
8	Documentation of HCWM activities carried out	None
9	Training of health workers and frequency of training	<ul style="list-style-type: none"> • Laboratory staff were trained in injection safety, bio-safety and bio-security • Other staff last trained two years ago
10	Educational materials available to health workers	The facility has only a chart on waste segregation
11	Capacities of health workers in segregating health care waste	Health workers are trained but do not practice as expected due to attitude issues
12	Roles and responsibilities of managers	<ul style="list-style-type: none"> • Training staff • Monitoring HCWM processes • Assigning other staff roles and responsibilities • Training students in HCWM

	Area assessed	1. Coast Provincial General Hospital
13	Roles and responsibilities of Nursing officer in-charge	<ul style="list-style-type: none"> • Ensure that staff adhere to recommended practices • Make arrangements for Procurement of supplies • Oversee system for management of exposures • Orientation of new staff in IPC
14	Roles and responsibilities of HCWM focal person	
15	Guidelines used to enforce	
16	Comprehensiveness of guidelines to meet needs of health workers	Had not read the guidelines so was not sure
17	Ease of application of guidelines	Had not read the guidelines so was not sure
18	Ensuring compliance with HCWM guidelines	
19	Gaps in the guidelines	Had not read the guidelines so was not sure
20	Methods used to disseminate the guidelines	CME
21	Preferred format of new educational materials	
22	Preferred physical features of a HCWM hand book	
23	Themes that must be included in the hand book	
24	Targeting of audience	
25	Availability of annual HCWM plans	HCWM is budgeted for under cleaning services
26	Sources of financing for the HCWM	Use FIF for everything
27	Availability of costed procurement plans for HCWM commodities	There is a costed procurement plan under cleaning
28	Total annual expenditure on HCWM	Not known
29	Government expenditure of PPE	Not known
30	Gaps in financing	Never been worked out
31	Availability of expenditure tracking	
32	Advocacy for funding	Not done
33	Type of technology used when treating HCW	Incinerator and autoclave

	Area assessed	1. Coast Provincial General Hospital
34	Process for selecting the technology	N/A
35	Availability of specifications for the technology selected	None
36	Availability of trained waste treatment equipment operators	N/A
37	Initial costs for the equipment	Autoclave 30,000,000
38	Annual operational costs	Not sure
39	Annual maintenance costs	1.2 M
40	Challenges in using the equipment	The incinerator does not have a pollution control device
41	External support in equipment maintenance	None
42	Regular servicing of equipment	Serviced twice (2015 and 2016)
43	Prevalence of incidents and accidents	Not common
44	Risk factors for incidents and accidents	<ul style="list-style-type: none"> • Students coming for attachment • Poor waste segregation and overfilling of safety boxes
45	Availability of a system for reporting incidents and accidents	Yes, there is a system for reporting incidents and accidents (recorded in PEP registers).
46	Access to PEP	All staff can access PEP.
47	Routine reviews of risks associated with HCWM	Not done
48	Community concerns	The facility management is spending significant resources to unblock toilets malfunctioning due to plastic bottles dumped in toilets by Muslim clients/patients
49	What the facility is doing about community concerns	Health education
50	Recommendations on how the HCWM program can be improved	<ul style="list-style-type: none"> • Provide CME to staff • Provide the health facility with new waste treatment technology • Provide HCWM commodities • Provide technical supportive supervision, monitoring and evaluation

	Area assessed	1. Coast Provincial General Hospital
		<ul style="list-style-type: none"> Guidance should be provided on how to handle and dispose of chemicals, silver, mercury and lead waste.

	Area assessed	2. Likoni Sub-County Hospital
1	Awareness about HCWM policies and guidelines	Not fully aware of the HCWM policies and guidelines used in Kenya.
2	Benefits of injection safety and HCWM program	
3	Persisting challenges facing the program	
4	Description of Structure of HCWM system	Waste is segregated in color codes, sharps put in safety boxes and the waste is collected and transported by hired waste handlers.
5	Effectiveness of HCWM system in meeting program objectives	System is not efficient; there is no space for temporary storage of waste, funds are not adequate, huge loads of expired pharmaceuticals and asbestos are clogging the system, and the Incinerator is defective.
6	How challenges are being addressed	Forwarded the issues to the country health officer
7	External support received	Through external partner support, a bio-safety cabinet was received from the AIDS health Foundation. In addition, AMREF is supporting biosafety and biosecurity components of the labs.
8	Documentation of HCWM activities carried out	
9	Training of health workers and frequency of training	
10	Educational materials available to health workers	
11	Capacities of health workers in segregating health care waste	Capacities of health workers in segregating was rated to be satisfactory
12	Roles and responsibilities of managers	

	Area assessed	2. Likoni Sub-County Hospital
13	Roles and responsibilities of Nursing officer in-charge	<ul style="list-style-type: none"> • Ensuring availability and proper use of safety boxes • Provision of all required HCWM materials, • Overseeing training of health workers, • Creating awareness on what to do in case of needles tick injuries
14	Roles and responsibilities of HCWM focal person	
15	Guidelines used to enforce	
16	Comprehensiveness of guidelines to meet needs of health workers	
17	Ease of application of guidelines	
18	Ensuring compliance with HCWM guidelines	<p>Compliance with guidelines is enforced through;</p> <ul style="list-style-type: none"> • Giving health workers knowledge in required areas • Conducting CME • On-the-job-support • Through monitoring and supervision
19	Gaps in the guidelines	The guidelines should provide more information regarding how waste handlers should manage health care waste.
20	Methods used to disseminate the guidelines	
21	Preferred format of new educational materials	The facility staff interviewed mentioned that they prefer that new educational materials are provided to them in form of; with manuals to read, SOPs, teaching aids, flipcharts, demonstration videos
22	Preferred physical features of a HCWM hand book	<ul style="list-style-type: none"> • Pictures of color coded waste bins and liners, • Picture of waste handlers in PPE • Pictures of shredders and autoclaves • Showing proper storage of waste
23	Themes that must be included in the hand book	<ul style="list-style-type: none"> • Principles of HCWM • Policies and reasons for managing health care waste • Declaring that HCWM is in your own hands • Risks associated with HCWM

	Area assessed	2. Likoni Sub-County Hospital
		<ul style="list-style-type: none"> Mention training requirements
24	Targeting of audience	
25	Availability of annual HCWM plans	None
26	Sources of financing for the HCWM	FIF and maternity fund
27	Availability of costed procurement plans for HCWM commodities	No procurement plan for HCWM
28	Total annual expenditure on HCWM	
29	Government expenditure of PPE	
30	Gaps in financing	
31	Availability of expenditure tracking	
32	Advocacy for funding	
33	Type of technology used when treating HCW	
34	Process for selecting the technology	
35	Availability of specifications for the technology selected	
36	Availability of trained waste treatment equipment operators	
37	Initial costs for the equipment	
38	Annual operational costs	
39	Annual maintenance costs	
40	Challenges in using the equipment	
41	External support in equipment maintenance	
42	Regular servicing of equipment	
43	Prevalence of incidents and accidents	<ul style="list-style-type: none"> On average, the facility registers one needle stick injury is registered in two months. Exposure to umbilical cord fluid spillage is common in labor suite

	Area assessed	2. Likoni Sub-County Hospital
44	Risk factors for incidents and accidents	<ul style="list-style-type: none"> • Most needle stick injuries happen as a result of Improper disposal of used sharps • Failure to use PPE
45	Availability of a system for reporting incidents and accidents	There is a general system for reporting incidents and accidents happening all over the Hospital. A register is available for record keeping and an independent system exists for managing and reporting on laboratory incidents and accidents
46	Access to PEP	Staff have good access to post exposure management
47	Routine reviews of risks associated with HCWM	Not done
48	Community concerns	
49	What the facility is doing about community concerns	
50	Recommendations on how the HCWM program can be improved	<ul style="list-style-type: none"> • MoH should disseminate HCWM policies and guidelines including dissemination to health training institutions • The Hospital should form an IPC committee that should address HCWM concerns • The MoH should establish proper systems for managing health care waste • The MoH should provide supportive supervision in IPC • The health facility management should conduct CME on HCWM to update staff • The health facility management should train waste handlers in HCWM

	Area assessed	4. Mlaleo CDF Health Centre
1	Awareness about HCWM policies and guidelines	Not aware. The facility did not have copies of policies and guidelines.
2	Benefits of injection safety and HCWM program	<ul style="list-style-type: none"> • Many health workers were trained • Reduction in injection use

	Area assessed	4. Mlaleo CDF Health Centre
		<ul style="list-style-type: none"> Improved knowledge on sharps waste disposal and waste segregation
3	Persisting challenges facing the program	<ul style="list-style-type: none"> Patient beliefs that injections are stronger in causing healing Do not have an incinerator Filled safety boxes accumulate Lack of transport to shopping centers
4	Description of Structure of HCWM system	Use of color coded waste bins and safety boxes, store room for sharps waste, a public health officer in-charge of HCWM,
5	Effectiveness of HCWM system in meeting program objectives	The existing HCWM system was rated to be ineffective
6	How challenges are being addressed	<ul style="list-style-type: none"> Take safety boxes to other facility for incineration but their incinerator also broke down Contacted CDF chairman about the need to repair the incinerator
7	External support received	The facility borrows a pickup from county to transport sharps waste to Tudor DC Hospital.
8	Documentation of HCWM activities carried out	
9	Training of health workers and frequency of training	Most health workers were trained one year back
10	Educational materials available to health workers	The facility does not have educational materials on HCWM
11	Capacities of health workers in segregating health care waste	The capacity of health workers in waste segregation was rated to be poor
12	Roles and responsibilities of managers	<ul style="list-style-type: none"> To ensure that the health facility has structures in place To Put in place HCWM facilities Ensure staff are knowledgeable about HCWM

	Area assessed	4. Mlaleo CDF Health Centre
	Roles and responsibilities of Nursing officer in-charge	
	Roles and responsibilities of HCWM focal person	
	Guidelines used to enforce	<ul style="list-style-type: none"> The facility does not use any specific guidelines to enforce health care waste management practices. Use knowledge acquired from injection safety training
13	Comprehensiveness of guidelines to meet needs of health workers	N/A
14	Ease of application of guidelines	N/A
	Ensuring compliance with HCWM guidelines	Uses personal knowledge
15	Gaps in the guidelines	N/A
16	Methods used to disseminate the guidelines	
17	Preferred format of new educational materials	The facility prefers that a team of experts comes in to train the health workers then provide IEC materials to use during CME
18	Preferred physical features of a HCWM hand book	Not specified
19	Themes that must be included in the hand book	<ul style="list-style-type: none"> Definition of HCW Segregation of HCW Guidance on waste disposal
20	Targeting of audience	The hand book should target all cadres of health workers
	Availability of annual HCWM plans	There is no standalone HCWM annual work. Some aspects of HCWM are however integrated in annual work-plans
21	Sources of financing for the HCWM	<ul style="list-style-type: none"> Funds from county FIF (User fee) DANIDA FFMS fund
22	Availability of costed procurement plans for HCWM commodities	No costed procurement plans but when money is received can be used to buy HCWM items
23	Total annual expenditure on HCWM	Don't know

	Area assessed	4. Mlaleo CDF Health Centre
24	Government expenditure of PPE	Government gives lump sum money. The facility does own budgeting
25	Gaps in financing	Not determined
26	Availability of expenditure tracking	Not done
27	Advocacy for funding	Not done
28	Type of technology used when treating HCW	Use open burning of all other waste except sharps waste that is taken for incineration
29	Process for selecting the technology	N/A
30	Availability of specifications for the technology selected	N/A
31	Availability of trained waste treatment equipment operators	N/A
32	Initial costs for the equipment	N/A
33	Annual operational costs	N/A
34	Annual maintenance costs	N/A
35	Challenges in using the equipment	N/A
36	External support in equipment maintenance	N/A
37	Regular servicing of equipment	N/A
38	Prevalence of incidents and accidents	Incidents and accidents are not common
39	Risk factors for incidents and accidents	<ul style="list-style-type: none"> • Negligence • Uncooperative clients • Lack of PPE • Inadequate staff training
40	Availability of a system for reporting incidents and accidents	There is a PEP SOP that is used to guide health workers.
41	Access to PEP	Yes
42	Routine reviews of risks associated with HCWM	Don't review
43	Community concerns	Communities prefer injections

	Area assessed	4. Mlaleo CDF Health Centre
44	What the facility is doing about community concerns	
45	Recommendations on how the HCWM program can be improved	<ul style="list-style-type: none"> • Pass policy/law that provides for budgets for HCWM • Training of health workers • Provide information on “How” waste should be managed at the health facility.

	Area assessed	5. Rift Valley Provincial Hospital, Nakuru
1	Awareness about HCWM policies and guidelines	<ul style="list-style-type: none"> • The health facility manager and public health officer were aware of the national guidelines for managing health care waste. • Facility has Kenya HCWM guidelines but the manager had never read them in detail. • The manager felt that the guidelines were not comprehensive due to new changes that had been effected within the health system. • Other guiding documents mentioned by HCWM focal person and lab safety officer include; injection safety and HCWM policy, IPC guidelines, EHS policy and laboratory safety manual.
2	Benefits of injection safety and HCWM program	<ul style="list-style-type: none"> • Eliminated re-use of injection devices and eliminated cost of sterilizing needles and syringes • Safety boxes became available • There is better handling of sharps so less needle stick injuries • HCWM Guidelines are in place and are being followed • PPE is being provided to health workers • There is a good and timely exposure management system

	Area assessed	5. Rift Valley Provincial Hospital, Nakuru
3	Persisting challenges facing the program	<ul style="list-style-type: none"> • New technology was introduced for blood drawing (vacutainer system) but doctors have not been trained on how to use the technology. • Not all health workers are vaccinated against hepatitis B as the vaccine is expensive • There is no mechanism that can be used by government health facilities to charge outsiders for waste treatment costs
4	Description of Structure of HCWM system	<ul style="list-style-type: none"> • Waste is segregated using color codes, how to dispose of waste. • There is a public health officer working as the HCWM focal person, contractors that manage waste on behalf of the Hospital and an incinerator operator that destroys the waste.
5	Effectiveness of HCWM system in meeting program objectives	System is not effective as the incinerator keeps breaking down and there is lack of proper coordination of HCWM activities. .
6	How challenges are being addressed	<p>Proposed that a HCWM coordination committee is put in place.</p> <p>Recommended Intensification of training of staff especially through CME and streamlining procurement to make sure that bin liners and safety boxes are made available. Trolleys were bought for transporting waste and the facility contracted a private company to manage the waste.</p>
7	External support received	In the past, PATH assisted training health workers and some waste transporting trolleys were donated by an external partner.
8	Documentation of HCWM activities carried out	Hazardous waste generated is weighed and records kept at the incineration point
9	Training of health workers and frequency of training	<p>Not all health workers present at the facility were trained as new staffs keep coming in.</p> <p>Training used to be conducted annually but because of health worker strikes, regularity was affected. No training had been done in period of one year.</p>

	Area assessed	5. Rift Valley Provincial Hospital, Nakuru
10	Educational materials available to health workers	Preferred educational materials that were mentioned include; power point presentations, guidelines of waste segregation (in form of a chart), Ebola waste management chart, biohazard laboratory charts, PATH checklist etc.
11	Capacities of health workers in segregating health care waste	The capacities of health workers in segregating health care waste were rated to be high (above 75%).
12	Roles and responsibilities of managers	Roles of the manager include; enforcement of standards, resource mobilization and allocation, logistical support, ensuring timely procurement of HCWM commodities, approval and allocation of waste, treatment costs including fuel costs and planning for health worker trainings.
13	Roles and responsibilities of Nursing officer in-charge	
14	Roles and responsibilities of HCWM focal person	<ul style="list-style-type: none"> • Ensure safety of the workers • Proper segregation of waste up to safe disposal • Ensure those injured/exposed get PEP.
15	Guidelines used to enforce practice	The following guidelines were being used by the facility to enforce practices; Injection safety and HCWM policy, IPC guidelines, HCWM guidelines, EHS guidelines and additional information provided during training workshops
16	Comprehensiveness of guidelines to meet needs of health workers	Gaps in guidelines mentioned include; lack of guidance on management and disposal of asbestos, mercury and e-waste.
17	Ease of application of guidelines	The guidelines were rated to be easy to apply
18	Ensuring compliance with HCWM guidelines	<ul style="list-style-type: none"> • Provide supportive supervision • Conduct CME • On-the-job training.
19	Gaps in the guidelines	Lack of specifications for color coded bin liners in line with new KNEMA, lack of information on how to dispose of asbestos, mercury dental amalgam and instruments (scrap metal).
20	Methods used to disseminate the guidelines	CME

	Area assessed	5. Rift Valley Provincial Hospital, Nakuru
21	Preferred format of new educational materials	Upload materials at the MoH website, conduct induction training and avail copies during the training.
22	Preferred physical features of a HCWM hand book	It should be in flip form like desk calendars but small enough to be put in pocket.
23	Themes that must be included in the hand book	Legislation related to HCWM; key steps in HCWM; hand washing and personal hygiene; roles and responsibilities of different cadres of staff; treatment and disposal technologies; management of liquid waste; guidance of disposal of placenta
24	Targeting of audience	Cross-cutting but in simple English that can be understood by all cadres of staff.
25	Availability of annual HCWM plans	The facility does not have a standalone HCWM plan but aspects of waste are captured in the annual work-plan. The plan has e-waste component.
26	Sources of financing for the HCWM	90% of HCWM funds come from FIF. Government funds come in as grant but can only cover limited items.
27	Availability of costed procurement plans for HCWM commodities	There is no standalone costed procurement plan but HCWM commodities are catered for under general supplies so can buy as need arises
28	Total annual expenditure on HCWM	Expenditure on HCWM was estimated to be about 10% of Hospital revenue. Hospital revenue per quarter is about 7.5M
29	Government expenditure of PPE	Government funds come in a grant (equalized fund). The funds are used to pay salaries for incinerator operator but can also be used to buy fuel, trolleys and diapers.
30	Gaps in financing	Not calculated
31	Availability of expenditure tracking	The facility continuously tracks actual expenditure.
32	Advocacy for funding	
33	Type of technology used when treating HCW	Incinerator Placenta macerator

	Area assessed	5. Rift Valley Provincial Hospital, Nakuru
34	Process for selecting the technology	Technology that was installed is what was at the time being recommended in national guidelines. The facility procured what was available in the country.
35	Availability of specifications for the technology selected	Specifications for incinerators are available at NEMA but the equipment does not meet requirements
36	Availability of trained waste treatment equipment operators	There is a trained incinerator operator and the female waste handlers working in labor suite were trained on how to use macerators
37	Initial costs for the equipment	Housing Kshs. 35000000.00 Cost of machine not known
38	Annual operational costs	Not availed
39	Annual maintenance costs	Not availed
40	Challenges in using the equipment	Frequent breakdowns
41	External support in equipment maintenance	None
42	Regular servicing of equipment	The servicing was done irregularly.
43	Prevalence of incidents and accidents	Not common
44	Risk factors for incidents and accidents	Accidents occur as a result of poor attitude and carelessness among injection providers as they rest used sharps on surfaces and forget them there.
45	Availability of a system for reporting incidents and accidents	There is a PEP register at the Hospital Comprehensive Care Centre (CCC.)
46	Access to PEP	All staff can access PEP any time.
47	Routine reviews of risks associated with HCWM	
48	Community concerns	<ul style="list-style-type: none"> The community likes scavenging for bottles from healthcare waste temporarily stored at the health facility. Some unknown people steal flushing cisterns and manhole covers from Hospital premises
49	What the facility is doing about community concerns	Deployment of security at waste storage areas.

	Area assessed	5. Rift Valley Provincial Hospital, Nakuru
50	Recommendations on how the HCWM program can be improved	<ul style="list-style-type: none"> • MoH should create awareness among public on risks associated with health care waste • Law enforcement officers should enforce compliance from cradle to grave • Government should provide for tax exemption on HCWM commodities • Ministry of education should Introduce Professional courses in HCWM • Completion of annual refresher training in HCWM should a requirement for renewal of health worker registration • Controlled licensing of health facilities as part of renewal of practicing license • The Hospital should form a HCWM coordination committee. • MoH should provide IEC materials.

	Area assessed	6. Molo Sub-county Hospital
1	Awareness about HCWM policies and guidelines	The manager had some awareness but lacked comprehensive information therefore not able to discuss the topic. The facility did not have any copy of the recommended HCWM guiding documents.
2	Benefits of injection safety and HCWM program	<ul style="list-style-type: none"> • Health Workers are no longer re-capping used sharps • Needles and syringes are being disposed of in safety boxes • There is full supply of HCWM commodities
3	Persisting challenges facing the program	Syringes with re-use prevention features when used for drawing blood cause a lot of wastage as they lock before the procedure is completed
4	Description of Structure of HCWM system	There is no written system but waste is collected from generation points and taken for burning using a

	Area assessed	6. Molo Sub-county Hospital
		wheel barrow. Open burning is then done. Safety boxes are incinerated
5	Effectiveness of HCWM system in meeting program objectives	The system is not effective
6	How challenges are being addressed	Challenges include incomplete burning and waste handlers not being well trained. The challenges are overcome by providing supervision.
7	External support received	None
8	Documentation of HCWM activities carried out	None
9	Training of health workers and frequency of training	70% of staff were trained. There is no schedule for training.
10	Educational materials available to health workers	None
11	Capacities of health workers in segregating health care waste	Health workers' capacities in segregating waste was rated to be good.
12	Roles and responsibilities of managers	
13	Roles and responsibilities of Nursing officer in-charge	<ul style="list-style-type: none"> • Ensure that there are adequate stocks of needles and syringes.
14	Roles and responsibilities of HCWM focal person	<ul style="list-style-type: none"> • Ensure availability of safety boxes • Training on handling of safety boxes
15	Guidelines used to enforce standards	<ul style="list-style-type: none"> • Injection safety and HCWM guidelines and segregation charts
16	Comprehensiveness of guidelines to meet needs of health workers	Not sure
17	Ease of application of guidelines	Not sure
18	Ensuring compliance with HCWM guidelines	Compliance with guidelines is ensured by providing regular supervision
19	Gaps in the guidelines	The number of copies of guidelines provided to the facility are too few
20	Methods used to disseminate the guidelines	Not clear

	Area assessed	6. Molo Sub-county Hospital
21	Preferred format of new educational materials	Materials should be provided in both soft and hard copies
22	Preferred physical features of a HCWM hand book	
23	Themes that must be included in the hand book	<ul style="list-style-type: none"> • Waste segregation, storage, treatment, and disposal • Risks associated with HCWM
24	Targeting of audience	xxxxxxxx
25	Availability of annual HCWM plans	None
26	Sources of financing for the HCWM	xxxxxxxx
27	Availability of costed procurement plans for HCWM commodities	No procurement plans
28	Total annual expenditure on HCWM	Don't know
29	Government expenditure of PPE	Don't know
30	Gaps in financing	Not sure
31	Availability of expenditure tracking	Not tracked
32	Advocacy for funding	Not done
33	Type of technology used when treating HCW	<ul style="list-style-type: none"> • Burning chamber for safety boxes • Medical waste pit for other types of waste
34	Process for selecting the technology	Not sure how the technology was selected. The manager found the treatment technologies in place.
35	Availability of specifications for the technology selected	Don't know
36	Availability of trained waste treatment equipment operators	None
37	Initial costs for the equipment	Not sure
38	Operational costs	Not sure. Just burn the waste.
39	Maintenance costs	Not known

	Area assessed	6. Molo Sub-county Hospital
40	Challenges in using the equipment	The methods used for treating waste cause high levels of air pollution.
41	External support in equipment maintenance	None
42	Regular servicing of equipment	no
43	Prevalence of incidents and accidents	Incidents and accidents are rare (one case in three months).
44	Risk factors for incidents and accidents	The safety boxes provided to the facility are of poor quality as they give way pouring used needles and syringes. Lack of proper training among health workers and lack of adequate space for providing injections within the injection room also contribute to the accidents.
45	Availability of a system for reporting incidents and accidents	There is system for reporting incidents and accidents
46	Access to PEP	All staff have good access to PEP.
47	Routine reviews of risks associated with HCWM	Not done
48	Community concerns	Not aware of any issues of concern among community members
49	What the facility is doing about community concerns	N/A
50	Recommendations on how the HCWM program can be improved	<ul style="list-style-type: none"> • Train all health workers • MoH should provide proper waste treatment technology • MoH should provide enough copies of guidelines including SOPs • The facility should dedicate specific budgets to HCWM • The bureau of standards should improve on quality of safety boxes on the market.

	Area assessed	7. Naivasha County Hospital
1	Awareness about HCWM policies and guidelines	The manager mentioned that he was aware but could not remember exact names of the documents

	Area assessed	7. Naivasha County Hospital
		The facility did not have copies of the national policy or guidelines on HCWM
2	Benefits of injection safety and HCWM program	<ul style="list-style-type: none"> • Loose sharps are less common and needle stick injuries rare • There is better awareness among staff • HCWM commodities are available for use
3	Persisting challenges facing the program	<ul style="list-style-type: none"> • Waste bins are filled beyond ¾ full • At times safety boxes are not available on the market so improvise with JIK bottles • Incinerator breaks down • Poor waste segregation practices • Stock-outs of PPE
4	Description of Structure of HCWM system	Waste is segregated according to color codes, the waste is collected by waste handlers. Infectious waste is burnt in furnace while food items are composited in a pit
5	Effectiveness of HCWM system in meeting program objectives	The system is not effective. The private sector uses Hospital waste treatment facilities but they are not willing to pay reasonable charges
6	How challenges are being addressed	Dialogue on-going
7	External support received	Other than the private sector that pays a small fee, there is no other external support
8	Documentation of HCWM activities carried out	Weights of generated waste are recorded in Kg. In addition, fuel consumption is recorded and tracked
9	Training of health workers and frequency of training	New staff are being trained but old staffs have not been trained for some time. The waste handlers not properly trained.
10	Educational materials available to health workers	Except for the lab that has SOPs, the rest of the service delivery areas do not have educational materials on HCWM.
11	Capacities of health workers in segregating health care waste	The capacities of health workers to segregate waste were rated to about 60%
12	Roles and responsibilities of managers	

	Area assessed	7. Naivasha County Hospital
13	Roles and responsibilities of Nursing officer in-charge	<ul style="list-style-type: none"> • Identify commodity needs and ensure commodity security • Planning and budgeting for HCWM • Supervision and mentoring • Conducting CME • Taking corrective measures
14	Roles and responsibilities of HCWM focal person	<ul style="list-style-type: none"> • Coordinate HCWM activities • Supervise staff • Assess risks and take corrective action • Participate in meeting to share updates • Participates as part of planning and management team
15	Guidelines used to enforce	Usually put up notices written at the health facility but these are removed from the board
16	Comprehensiveness of guidelines to meet needs of health workers	Not sure
17	Ease of application of guidelines	Cannot be sure
18	Ensuring compliance with HCWM guidelines	Through supervision and mentorship
19	Gaps in the guidelines	
20	Methods used to disseminate the guidelines	CME
21	Preferred format of new educational materials	Combine visual and audio
22	Preferred physical features of a HCWM hand book	
23	Themes that must be included in the hand book	<p>Waste segregation</p> <p>How to handle body parts</p>
24	Targeting of audience	Should be general
25	Availability of annual HCWM plans	Integrated in facility annual workplans under votes for cleaning, plant maintenance and fuel.
26	Sources of financing for the HCWM	Funds used at the facility come from two sources, county grant and FIF but waste management is mainly catered for from FIF

	Area assessed	7. Naivasha County Hospital
27	Availability of costed procurement plans for HCWM commodities	Procurement needs are addressed as need arises but there is no detailed procurement plan
28	Total annual expenditure on HCWM	Not calculated
29	Government expenditure of PPE	Not sure
30	Gaps in financing	There is a big gap in providing financing for HCWM activities but this gap has not yet been costed.
31	Availability of expenditure tracking	Can be done but not available at the time of the visit.
32	Advocacy for funding	
33	Type of technology used when treating HCW	Placenta pit, compost pit, burning furnace an old incinerator, sewer system for liquid waste
34	Process for selecting the technology	Was selected based on what was being recommended in the national HCWM guidelines
35	Availability of specifications for the technology selected	Not sure
36	Availability of trained waste treatment equipment operators	Trained staff are available
37	Initial costs for the equipment	Not known
38	Operational costs	Kshs. 21,600 annually for fuel. Note that the salaries of waste management staffs is not included in this cost
39	Maintenance costs	Kshs. 20,000 per servicing
40	Challenges in using the equipment	The incinerator does not have a pollution control system
41	External support in equipment maintenance	All contracted engineers are paid for by the Hospital
42	Regular servicing of equipment	Erratic
43	Prevalence of incidents and accidents	1 injury in a period of 2-3 months
44	Risk factors for incidents and accidents	<ul style="list-style-type: none"> • High numbers of casualties being brought in at the same time put stress on health workers and in the process injuries occur especially among interns • I & D also poses risks

	Area assessed	7. Naivasha County Hospital
		<ul style="list-style-type: none"> • Strikes also contribute as the few that continue to work are subjected to work overload. Overload contributes to injuries
45	Availability of a system for reporting incidents and accidents	There is system for reporting incidents and accidents
46	Access to PEP	All staff have good access to PEP. The Hospital used to have a register but the book is not filled in anymore.
47	Routine reviews of risks associated with HCWM	Not sure
48	Community concerns	Not known
49	What the facility is doing about community concerns	N/A
50	Recommendations on how the HCWM program can be improved	<ul style="list-style-type: none"> • MoH should conduct technical supportive supervision • The government should make sure that required HCWM commodities are available on the market (safety boxes, in liners) • MoH should advocate to industries to make sure the items are locally produced • The facility should continue training health workers • Lobby for more budgetary allocation • Reduce high turn-over of staff.

	Area assessed	8. Jaramogi Oginga Odinga Teaching and Referral Hospital
1	Awareness about HCWM policies and guidelines	Public health officer was aware of policies and guidelines, named five applicable guidelines and mentioned that the documents were comprehensive enough.
2	Benefits of injection safety and HCWM program	<ul style="list-style-type: none"> • Waste segregation done by using color coded containers.

	Area assessed	8. Jaramogi Oginga Odinga Teaching and Referral Hospital
		<ul style="list-style-type: none"> • The facility receives waste bin liners that are compatible • There is an incinerator being used for treating waste • Have a contracted firm that collects waste • Staffs have been trained on bio-safety almost 2/3 because of high staff turnout. • Waste handlers and cleaners have been trained on lab safety and handling of wastes. • Adopted a closed system for drawing blood. This system is safe since it eliminated the risk of spillage of blood. • There is increased use of PPE among the health workers
3	Persisting challenges facing the program	<ul style="list-style-type: none"> • High prevalence of needle stick injuries among students and injection providers due to overcrowding, and administering injections on agitated patients • Lack of guidelines on management of chemical waste
4	Description of Structure of HCWM system	No clear structure
5	Effectiveness of HCWM system in meeting program objectives	Trying to cope with the situation but with periodic lapses especially in segregating waste
6	How challenges are being addressed	
7	External support received	The representative of the supplier of the waste treatment equipment is providing technical support in training the operator, equipment maintenance and record keeping.
8	Documentation of HCWM activities carried out	
9	Training of health workers and frequency of training	Not all the health workers at the facility are trained due high staff turnover. For example, about 60% of laboratory staff are trained in CWM.
10	Educational materials available to health workers	None

	Area assessed	8. Jaramogi Oginga Odinga Teaching and Referral Hospital
11	Capacities of health workers in segregating health care waste	Poor waste segregation
12	Roles and responsibilities of managers	
13	Roles and responsibilities of Nursing officer in-charge	
14	Roles and responsibilities of HCWM focal person	
15	Roles and responsibilities of laboratory safety officer	Works closely with public health officer to ensure compliance with recommended standards among staff
16	Guidelines used to enforce	The facility uses the national injection safety and health care waste management policy and the IPC policy to guide HCWM practices.
17	Comprehensiveness of guidelines to meet needs of health workers	To a large extent comprehensive but lacks proper guidance on management of laboratory and chemical waste
18	Ease of application of guidelines	
19	Ensuring compliance with HCWM guidelines	Try all means
20	Gaps in the guidelines	Lacks proper guidance on management of laboratory and chemical waste
21	Methods used to disseminate the guidelines	CME
22	Preferred format of new educational materials	<ul style="list-style-type: none"> • Provide the materials in form of small posters • Incorporate the information in laboratory manual since it is well read by laboratory staff
23	Preferred physical features of a HCWM hand book	
24	Themes that must be included in the hand book	<ul style="list-style-type: none"> • IPC as a topic • Waste segregation chart tailored to the laboratory setting • Management of chemical waste
25	Targeting of audience	

	Area assessed	8. Jaramogi Oginga Odinga Teaching and Referral Hospital
26	Availability of annual HCWM plans	HCWM is mainly dealt with in quarterly planning but some aspects are catered for in annual work-plan
27	Sources of financing for the HCWM	
28	Availability of costed procurement plans for HCWM commodities	Yes. Integrated in main facility procurement plan
29	Total annual expenditure on HCWM	Exact figure not known but in millions
30	Government expenditure of PPE	Not known
31	Gaps in financing	Not sure but allocated budget is very small compared to needs
32	Availability of expenditure tracking	Not tracked
33	Advocacy for funding	Not done so far
34	Type of technology used when treating HCW	Incinerator, macerator, placenta pit
35	Process for selecting the technology	Selected according to types of waste generated at the health facility
36	Availability of specifications for the technology selected	Don't know
37	Availability of trained waste treatment equipment operators	Trained staff are available
38	Initial costs for the equipment	Not sure but in millions
39	Operational costs	Not sure
40	Maintenance costs	Maintenance done by supplier so do not know the actual costs
41	Challenges in using the equipment	Poor waste segregation affecting efficiency of the equipment.
42	External support in equipment maintenance	Equipment maintained by the supplier
43	Regular servicing of equipment	Done regularly by supplier

	Area assessed	8. Jaramogi Oginga Odinga Teaching and Referral Hospital
44	Prevalence of incidents and accidents	Incidents and accidents are rare but tend to occur among students
45	Risk factors for incidents and accidents	Lack of skills among students
46	Availability of a system for reporting incidents and accidents	There is a good system for reporting incidents and accidents
47	Access to PEP	PEP can be accessed 24 hours day
48	Routine reviews of risks associated with HCWM	Annual risk assessment is conducted and mitigation measures strengthened
49	Community concerns	Not known
50	What the facility is doing about community concerns	N/A
51	Recommendations on how the HCWM program can be improved	<ul style="list-style-type: none"> • The health facility should procure non-burn technology • Staff should be trained in application and use of new technology

	Area assessed	9. Kisumu County Hospital
1	Awareness about HCWM policies and guidelines	Public health officer was aware of existing HCWM policies and guidelines. The facility uses the national injection safety and health care waste management policy and Republic of Kenya guidelines for managing medical waste
2	Benefits of injection safety and HCWM program	<p>There is wide use of safety boxes</p> <p>There an active Infection Committee. All departments are participating</p> <p>The facility has a functional incinerator</p>
3	Persisting challenges facing the program	The hospital acts as a training institution. Students turn up for practicum with very low levels of

	Area assessed	9. Kisumu County Hospital
		<p>knowledge and skills in HCWM requiring the Hospital to provide a lot of OJT and CME's</p> <p>There is periodic shortage of safety boxes and during such times the boxes are over filled beyond the recommended $\frac{3}{4}$ posing risks of needle stick injuries.</p>
4	Description of Structure of HCWM system	There is a HCWM committee overseeing HCWM. Generated waste is segregated by health workers and is collected by a private waste handling firm, taken to the incinerator. Waste is then taken for incinerated.
5	Effectiveness of HCWM system in meeting program objectives	<p>The system is to a good extent efficient but there is need to improve handling of expiries of medicines as these have accumulated over time.</p> <p>Delays in procuring HCWM commodities also need to be sorted out.</p>
6	How challenges are being addressed	It was suggested that the procurement committee should be represented on the HCWM committee as way of improving efficiency in procuring HCWM commodities
7	External support received	At the time of the visit, the facility has not had any external support for some time.
8	Documentation of HCWM activities carried out	Sharps waste is weighed daily before being incinerated. Records are kept.
9	Training of health workers and frequency of training	<ul style="list-style-type: none"> • Training in injection safety had been done many years back. • Training in HCWM was done about two years prior to the assessment but only few staffs benefited. • Communicated a strong need to have their staffs trained.

	Area assessed	9. Kisumu County Hospital
10	Educational materials available to health workers	Do not have training materials
11	Capacities of health workers in segregating health care waste	Capacity in segregating waste is not good as sharps are still being found mixed with other types of waste.
12	Roles and responsibilities of managers	
13	Roles and responsibilities of Nursing officer in-charge	Supervision of practices and ensuring availability of commodities for managing health care waste.
14	Roles and responsibilities of HCWM focal person	<ul style="list-style-type: none"> • Coordination of HCWM activities • Supervision of staff • Participation in meetings to share updates.
15	Roles and responsibilities of laboratory safety officer	<ul style="list-style-type: none"> • Training laboratory staff • Assessing risks and taking corrective action • Overseeing health care waste management
16	Guidelines used to enforce	There are specific guidelines being used.
17	Comprehensiveness of guidelines to meet needs of health workers	N/A
18	Ease of application of guidelines	N/A
19	Ensuring compliance with HCWM guidelines	N/A
20	Gaps in the guidelines	N/A
21	Methods used to disseminate the guidelines	CME
22	Preferred format of new educational materials	
23	Preferred physical features of a HCWM hand book	
24	Themes that must be included in the hand book	Management of chemical waste
25	Targeting of audience	
26	Availability of annual HCWM plans	Quarterly plans are used to address HCWM concerns
27	Sources of financing for the HCWM	There is no special budget for waste. HCWM commodities are catered for under health supplies.

	Area assessed	9. Kisumu County Hospital
		Waste handling staffs are catered for under contracts for cleaning.
28	Availability of costed procurement plans for HCWM commodities	Integrated in facility procurement plans and procurement of HCWM commodities/consumables is done on quarterly basis
29	Total annual expenditure on HCWM	Not sure
30	Government expenditure of PPE	Not sure
31	Gaps in financing	Not sure of amount but funds provided are too little compared to what needs to be done.
32	Availability of expenditure tracking	Expenditure tracking is done at sub-county level
33	Advocacy for funding	
34	Type of technology used when treating HCW	Incinerator, burning chamber and placenta pit
35	Process for selecting the technology	This technology was at the time thought to be the best option
36	Availability of specifications for the technology selected	Don't know
37	Availability of trained waste treatment equipment operators	Trained staff are available
38	Initial costs for the equipment	The incinerator was installed by KEMRI. All costs were made paid for directly by KEMRI.
39	Operational costs	Only costs for fuel (exact figure was not provided)
40	Maintenance costs	No serious maintenance was done since equipment was installed
41	Challenges in using the equipment	The size is too small for volume of work.
42	External support in equipment maintenance	None
43	Regular servicing of equipment	Only what is done by the operator
44	Prevalence of incidents and accidents	Incidents and accidents occur but are not very common.

	Area assessed	9. Kisumu County Hospital
45	Risk factors for incidents and accidents	Being a student is a risk factor
46	Availability of a system for reporting incidents and accidents	There is a system for reporting incidents and accidents including a register for record keeping.
47	Access to PEP	There is good access to PEP
48	Routine reviews of risks associated with HCWM	Risk assessment and audit are occasionally carried out. The process involves identification of the risks, discussing how the risks can be minimized and communicating mitigation measures to staff to prevent future occurrence
49	Community concerns	Mainly unnecessary demand for injections
50	What the facility is doing about community concerns	Patients are provide with counselling on risks associated with unnecessary use of injections. Information is provided on benefits of orals.
51	Recommendations on how the HCWM program can be improved	<ul style="list-style-type: none"> • MoH should provide posters tailored to laboratory situations • The health facility procurement committee should procure waste commodities on time • Continue training staff in HCWM • Procure a new incinerator for the laboratory

Appendix V: Facility Individualized Rapid Assessment Results

Individualized Rapid Assessment Tool											
Organization of HCWM	1	2	3	4	5	6	7	8	9	10	11
	Coast General	PORTREITZ Hospital	LIKONO	MLALED CDT	PGH NAKURU	MOLO S/C Hosp	NAIVASHA COUNTY	AHERO	KISUMU	JOORTH	
Person in charge of HCWM	5	5	5	0	5	5	5	5	5	5	5
Permanent Committee for HCWM	0	0	0	0	0	1.5	1.5	0	1.5	1.5	1.5
Roles and responsibilities made clear to staff	0	0	0	1.5	1.5	0	1.5	1.5	1.5	1.5	1.5
Subtotal	5	5	5	1.5	6.5	6.5	8	0	8	8	
Policy and Planning											
Facility has written policy dealing with HCWM	0	0	0	0	2	0	0	0	2	0	
Written plans, manuals, procedures for HCWM	0	0	0	0	2	0	0	0	2	2	
Policies, plans, manuals, written procedures consistent with national laws, regulations and permits	0	N/A	0	0	3.5	0	0	0	3.5	0	
Facility has plans for recycling or waste minimization	0	0	0	0	1.5	0	0	0	1.5	1.5	
Facility has policy explicitly mentioning a commitment to protect the environment	0	0	0	0	0.5	0	0	0	0.5	0	
The health facility is mercury free or has plans to phase out mercury	0	0	0	0	1.5	0	1.5	0	1.5	0	
Training											
Facility has training program on HCWM	0	0	0	0	5	0	3	0	5	5	
Training program includes relevant national laws and regulations	0	N/A	0	0	0	0	1	0	1	1	
Training program includes; segregation, collection, handling of sharps waste, use of proper containers, bags of infectious waste, color coding, 3/4 fill rule, use of personal PPE by waste handlers, transport and storage	0	N/A	0	0	2	0	2	0	2	2	

Staff trained including new staff when they begin their employment	0	0	0	0	3	0	2	0	3	3	
There is training at least once a year	0	0	0	0	2	0	0	0	1	1	
Sub-total	0	0	0	0	12	0	8	0	12	12	
Occupational health and safety											
Policies and plans related to health care waste management include occupational health and safety/ or separate occupational health and safety policies with management of exposures	0	0	0	0	3	0	3	3	3	0	
Health workers who collect waste are provided with PPE	2	0	0	0	2	2	0	0	2	2	
Health workers who handle waste are given hepatitis B and tetanus vaccine	1	0	0	0	0	0	0	0	0	2	
Subtotal	3	0	0	0	5	2	3	3	5	4	
Monitoring and evaluation and corrective action taken											
There is a system for internal monitoring/inspection to determine compliance with HCWM requirements	0	0	0	0	1	0	1	1	1	0	
There is a system for taking corrective action when standards are not met	0	0	0	0	1	0	0	1	1	1	
Polices and plan are reviewed at least once a year	0	0	0	0	0	0	0	0	0.5	0	
Sub-total	0	0	0	0	2	0	1	2	2.5	1	
Financing											
Facility has an annual allocation of its budget for HCWM	4	4	0	0	4	0	4	4	4	4	
Current budget is sufficient for HCWM	0	0	N/A	0	0	0	0	0	0	0	
Facility has long-term financing plan to cover costs for sustainable HCWM	0	0	0	0	0	0	0	0	0	0	
Sub-total	4	4	0	0	4	0	4	4	4	4	
POST INSPECTION TOUR INTERVIEW											

SEGREGATION OF WASTE											
Is waste segregated at source according to category	0	5	3	0	3	0	3	5	5	0	
Are health workers familiar with classification and segregation requirements	2	2	2	2	2	2	2	2	2	2	
Sub-total	2	7	5	2	5	2	5	7	7	2	
WASTE GENERATION DATA											
Have total amounts of infectious waste produced been measured	1	0	0	0	1	0	1	0	0	1	
COLLECTION AND HANDLING											
Are used needles collected without re-capping	0	?	2	2	2	2	2	2	2	2	
Sharps waste collected in sharps containers or destroyed using needle destroyers	5	5	5	5	5	5	5	5	5	5	
Sharps containers puncture resistant and leak proof or if needle destroyers approved according to existing regulations	0	0	0	2	2	0	1	2	2	2	
Sharps containers filled up to 3/4 full or needle destroyers well maintained	0	?	0	0	0	2.5	2	2.5	2.5	2.5	
Sharps containers or needle destroyers always available	1	1	1	1	1	1	0	1	1	1	
Sharps containers and/or needle destroyers located close enough for immediate disposal	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Do health workers know what to do in case of needle stick injury?/ are the workers familiar with the needle stick injury policy	1	1	1	1	1	1	1	1	1	1	
Are waste bags used for non-sharps waste of good quality?	1	0	1	1	1	1	1	0	0	0	
Are the waste bags always available? And/or are waste containers always available?	1	0	0	1	1	1	1	1	1	1	
Are the bag holders or waste bins used of good quality (disinfected and cleaned)?	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	

Infectious waste removed at least once a day	1	1	1	0	1	1	1	1	1	1	
Do workers know what to do if sharps or infectious waste is accidentally spilled? Are waste workers familiar with the spill clean-up plans?		0	0.5	0.5	0	0	0.5	0.5	0.5	0.5	
Sub-total	12	10	13.5	15.5	16	16.5	16.5	18	18	18	
COLOR CODING AND LABELLING											
Does the healthcare facility use a system of color coding for different types of wastes.	3	3	3	3	3	3	3	3	3	3	
Are the colors of waste containers consistent with the color coding?	0	2	0	2	2	2	0	0	0	2	
Are the infectious waste bags colored or labelled in accordance with the policies or regulations?	0	1	1	0	0	1	0	0	0	0	
Sub-total	3	6	4	5	5	6	3	3	3	5	
Posters or SIGNAGE											
Are there posters or signs showing proper segregation of health care waste	0	0.5	0.5	0	0.5	0.5	0	0	0	0.5	
TRANSPORATION INSIDE HEALTH ESTABLISHMENT											
Is the waste transported away from patient areas and other clean areas?	0	0	0	0	0.5	0.5	0.5	0.5	0.5	0.5	
Is the waste transported in a closed (covered), wheeled transport cart?	0	0	0	0	1	0	0	0	0	0	
Is the transport cart cleaned at least once a day	0	0	0	0	0.5	0	0.5	0.5	0.5	0	
Sub-total	0	0	0	0	2	0.5	1	1	1	0.5	
STORAGE											
Does the storage area meet the proper requirement?	0	N/A	0	0	1	0	0	1	1	1	
is the storage area kept clean	0.5	N/A	0	0.5	0.5	0.5	0	0.5	0.5	0.5	

Are the waste removed before the maximum allowable storage time exceeded?	1	N/A	0	0	1	1	1	1	1	1	
Sub-total	1.5		0	0.5	2.5	1.5	1	2.5	2.5	2.5	
HAZARDOUS CHEMICAL, PHARMACEUTICAL AND RADIO-ACTIVE WASTE											
Are hazardous chemicals, pharmaceutical and radio-active wastes segregated from infectious and general non risk waste?	4	4	4	4	4	4	4	0	0	4	
Does the health facility have a plan for the treatment and disposal of hazardous chemical, pharmaceutical and radio-active wastes?	1	0	1	1	0	0	0	0	0	1	
Sub-total	5	4	5	5	4	4	4	0	0	5	
TREATMENT AND DISPOSAL											
Does the health facility treat its infectious waste before final disposal?	25	0	25	0	25	0	25	25	25	0	
Are the laboratory cultures and stocks of infectious agents within the health facility treated before being taken away from the facility?	2	2	2	0	2	2	2	0	0	0	
is there a contingency plan for treatment of infectious waste in the event that treatment technology is shut down for repair?	1	0	1	0	0	0	0	0	0	0	
Does the health facility treat its waste on-site?		?	Y	N	Y	N	Y	Y	Y	Y	
Is the waste transported safely to the treatment area?	0	0	0.5	0	0.5	0	0	0.5	0.5		
Is the treatment area located in a place that is easily accessible to the waste worker but not accessible to the general public?	0.5	0.5	0.5	0	0.5	0.5	0.5	0.5	0.5	0.5	
Does the health facility have a program of regular and periodic inspection and periodic maintenance of the treatment technology?	0	0	0	0	0	0	0	3	3	3	

Is the treatment system clean, operating properly and well maintained?	3	0	0	0	3	0	0	3	3	3	
Does the treatment system destroy or mutilate sharps waste in order to prevent re-use?	1	1	1	1	1	0	1	0	0	0	
Does the healthcare facility use an approved non-incineration treatment technology such as an autoclave-shredder, integrated steam treatment system, microwave unit?	3	0	0	0	0	0	3	0	0	0	
If the facility uses an incinerator, does the incinerator meet international standards?	3	0	0	N/A	3	N/A	0	0	0	3	
If the facility uses an incinerator: Are PVC plastics kept out of the waste that is burned?	0	N/A	0	N/A	0	N/A	0	0	0	0.5	
Is the waste that is treated in an alternative technology disposed of at sanitary landfill? Or is the incinerator ash buried in a hazardous waste land fill?	0	N/A	0	N/A	0	N/A	1	1	1		
For facilities that use centralized off-site treatment, name the company that transports infectious waste	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
For facilities that use centralized off-site treatment, name the site of the off-site treatment center	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Does the transporting vehicle meet the regulations or international standards?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Does the health facility keep copies of manifests or shipment records?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Has the representative of the health facility inspected the off-site treatment center?	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
If yes, describe the treatment methods used at the off-site treatment center.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Does the off-site treatment center use an approved non-incineration treatment technology such as autoclave-	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

shredder, integrated steam treatment system, or microwave unit?												
If No to 66, does the off-site waste treatment center use an incinerator that meets international standards?	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Does the health care waste treatment facility know where the treated waste or ash is disposed of?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A			
If yes, describe the final disposal method for the treated waste or ash.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0				
Sub-total	38.5	3.5	30	1	35	2.5	32.5	33	33	10		
WASTE WATER												
Does the healthcare facility treat its waste water (liquid) before being released? OR is the healthcare facility connected to a sanitary sewer that is linked to waste a wastewater treatment plant?	3	0	0	0	3	0	3	0	0	0		
Does the treated waste Water from the health facility meet national or international standards?	0	N/A	N/A	0	1	N/A	1	0	0	0		
Sub-total	3	0	0	0	4	0	4	0	0	0		
	Coast Prov General	PORTREITZ Hospital	Likoni	Mlaleo CDF HC	PGH NAKURU	MOLO S/C Hospital	NAIVASHA COUNTY	Ahero SCH	Kisumu CH	JOORTH		
Grand Total	74	40	63	30.5	115.5	42	93.5	80	107	77		

Appendix VI: List of stakeholders engaged

1. Ministry of Environment and Natural Resources (MENR)
2. Ministry of Health (MoH)
3. National Environment Management Authority (NEMA)
4. Water Resource Management Authority (WARMA)
5. University of Nairobi (UoN)
6. Greenbelt Movement (GBM)

Appendix VII: List of Documents Reviewed

1. RoK (2011). National Guidelines for Safe management of Health Care waste.
2. RoK (2010). Injection Safety and Safe Disposal of Medical Waste Management National Communication Strategy.
3. RoK (2015). Health Care Waste Management Standard Operating Procedures; 1st Ed.
4. WHO (2013). Safe Management of Wastes from health-care Activities, Second Ed.
5. **NACC (2009)**: National HIV and AIDS Monitoring, Evaluation and Research Framework (2009/10- 2012/13). Ministry of Special Programs; Nairobi, Kenya.
6. **Coulson and Magner (2004)**: Code of Practice for Health Care Waste Management; Gauteng Department of Health, South Africa.
7. **RoK (2015)**: The National Social Marketing and Communication Strategy for Food Fortification. Ministry of Health, Nairobi.
8. **WHO (2013)**: Safe Management of Wastes from Health Care activities. 2nd Edition.
9. **RoK (2007)**: National Policy on Injection Safety and Medical Waste Management, 1st Edition; Ministry of Health; Nairobi, Kenya.
10. **RoK (2014)**: National Health Communication Guidelines (2013-2017). Ministry of Health; Nairobi, Kenya.
11. **RoK (2007)**: National Standards and Guidelines on Injection Safety and Medical Waste Management; 1st Edition. Ministry of Health; Nairobi, Kenya.
12. **RoK (2007)**: National Environmental Sanitation and Hygiene Policy. Ministry of Health; Nairobi, Kenya.
13. **RoK (2014)**: Project Document – Sound Chemicals Management Mainstreaming and UPOPs Reduction in Kenya. Ministry of Environment and Natural Resources; Nairobi, Kenya.
14. **John Hopkins University (2003)**: The Field Guide for developing a Health Communication Strategy. London, United Kingdom.
15. **RoK (2009)**: Kenya Strategic Communication Plan for Hand Washing with Soap. Ministry of Health; Nairobi, Kenya.
16. **RoK (2009)**: Report on Kenya Country Situational Analysis and Needs Assessment for the Preparation of National Plans of Joint Action for Implementation of the Libreville Declaration on Health and Environment in Africa. Ministry of Health; Nairobi, Kenya.
17. **RoK (2010)**: National Infection Prevention and Control Guidelines for Health Care Services in Kenya. Ministry of Public Health and Sanitation and Ministry of Medical Services; Nairobi, Kenya.
18. **American Dental Association (2012)**: Guidelines to Amalgam Waste Management.
- 19.

Appendix VIII: List of health facilities studied/ visited

1. Coast Provincial General Hospital
2. Port Reitz Sub-County Hospital
3. Likoni Sub-County Hospital
4. Mlaleo Health Centre
5. Mbagathi Sub-County Hospital

6. Mathare National Teaching and Referral Hospital
7. Mama Lucy Kibaki Sub-County Hospital
8. Rift Valley Provincial Hospital
9. Naivasha Sub-County Hospital
10. Molo Sub-County Hospital
11. Jaramogi Oginga Odinga Teaching and Referral Hospital
12. Kisumu County Hospital
13. Ahero Sub-County Hospital

