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MINISTRY OF HEALTH

Health Care Waste Management Standard Operating Procedures

First Edition, 2016

Citation

Health Care Waste management SOPs.

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Foreword

The Health Care Waste Management (HCWM) Standard Operating Procedures (SOPs) covers all aspects of HCWM; development of HCWM policies and plans; management and oversight and the technical aspects related to waste management such as waste minimization,,waste segregation, collection,, storage, transportation, treatment, disposal and capacity-building and awareness creation. It also entails issues of occupational health and safety and management of special wastes.

To confront challenges in standardization of health are Waste Management procedures, these SOPs have been developed to provide viable standardized guidance and technical options for the management of health care waste (HCW) in Kenyan Health facilities.

This initiative of the Ministry of Health (MOH), together with its development partners—notably PATH, University of Maryland Kenya Program, the World Health Organization (WHO), the US Centres for Disease Control and Prevention (CDC), the World Bank, and the National Environment Management Authority (NEMA)—has renewed the focus on HCWM in Kenya. This is in a bid to domesticate the National guidelines for Safe management of Health Care Waste 2011 and Waste Management Regulations 2006 to ensure conformity to the new constitutional dispensation which provides for each person's entitlement to a clean and healthy environment as well as reasonable standard of sanitation.

The immediate benefit of putting into practice this SOPs is to reduce the risk of transmission of infections likely to be acquired from poor HCWM practices, such as HIV/AIDS, hepatitis B, and other health care-associated infections (HAIs) as well as improve the environment for sustainable development.

The Ministry, therefore, encourages the use of appropriate, safe, and cost-effective methods and techniques to segregate, contain, transport, treat, and dispose of HCW.

In this regard, therefore, I wish to call upon all the stakeholders to join hands with the Ministry of Health in ensuring consistent support for the successful dissemination and training on these SOPs to all our health facilities.

Finally, the Ministry is grateful to its strategic development partners and other stakeholders in the area of healthcare waste management for their technical and financial contributions towards the development of these Standard Operating Procedures (SOPs).

Dr. Nicholas Muraguri,
Director of Medical Services

Preface

This Health Care Waste Management SOPs were developed as a result of the need to strategically and professionally manage the healthcare waste arising from the healthcare industry as well as safeguarding healthcare workers from the risks and infections associated with such wastes. Management of wastes arising from health care installations is a requirement necessary for the country to attain environmental sustainability as envisioned in the Kenya's Environment Policy. The SOPs and guidance is therefore a derivative of the healthcare waste management Strategic Plan 2015 - 2020, Policy and Guidelines as well as the Infection Prevention and control Policy 2015.

The emergence and re-emergence of diseases such as HIV/AIDS, hepatitis B and hepatitis C with high per capita consumption of medical commodities and subsequent generation of hazardous waste has made the development of these SOPs inevitable. Further, large volumes of potentially hazardous waste can pollute the environment and consequently be injurious to health. These SOPs will go a long way in providing guidance and ways on how to plan, budget and implement appropriate health care waste management priorities in order to realize sound and professional management of healthcare waste.

These SOPs therefore will provide guidance necessary to all health institutions, Public, Private and Faith Based (FBO) health services programs to standardize Health care Waste Management in the Institutions both at the National and county levels. It is also envisioned that all partners and stakeholders plan, budget and finance to address the challenges associated with management of health care waste as well as support dissemination of these SOPs.

DIRECTOR OF MEDICAL SERVICES

Acknowledgments

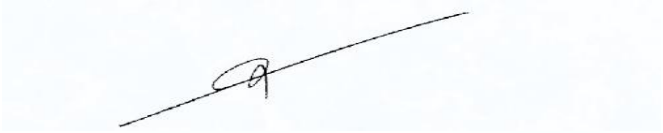
The development of the HCWM Standard Operating Procedures (SOPs) was a concerted effort that involved many individuals and partner institutions over the past one year. The SOPs development was a participatory process that involved a number of tailored task force meetings and retreats as well as consultative forums. The Ministry of Health, Division of Environmental Health acknowledges the contribution of those individuals and institutions who participated in the development of these Standard Operating Procedures, including:

- Centers for Disease Control and Prevention (CDC)
- National Environment Management Authority (NEMA)
- Kenya Medical Training College (KMTC)
- Kenya Medical Research Institute (KEMRI)
- Ministry of Health (MOH)
- Kenyatta National Hospital (KNH)
- PATH
- University of Maryland School of Medicine
- University of Nairobi (UON)
- World Health Organization (WHO)

Our strategic partners played an important role in providing the financial and technical resources necessary to complete these guidance and SOPs. Indeed, the Ministry of Health is very grateful to both individuals and organizations whose support and commitment made the SOPs a reality. In particular, we wish to thank Dr. Daniel Kimani and Mercy Njeru from the CDC Kenya Country Office, for the financial and technical support provided. In addition, we thank Mr. Fred Okuku, among other staffs from PATH, for providing financial, material, and technical support. Furthermore, special thanks goes to Mr. Solomon Nzioka from the WHO Country Office for being the co-convener of the HCWM technical working group (TWG) and providing valuable technical support.

The Ministry greatly values the contributions of each member of the task force and its secretariat for the tireless efforts that ensured a professionally sound Guidance and Standard Operating Procedures. Special appreciation therefore goes to: Gamaliel Omondi, Rose Mokaya, Arthur Gohole, Samuel Okuche, Michael Mwania, Jackson Muriithi (MOH); Jemima Katama, Bernard Runyenje (KNH); Nasaye John, Mugare Grace, Janet Shauri (PATH) , Dr.Christina Mwachari and Alan Logendo (University of Maryland, School of Medicine- Kenya Program)

The secretariat members made up of Mr. Lolem Lokolile (MOH); Sophie Matu (KEMRI), Gladys Ngeno (PATH); Adriane Berman (PATH-Seattle) and Charles Obiero (KMTC) provided the necessary lead technical support through the entire development process of the document and deserve special acknowledgment. Thank you all.



Kepha Ombacho, PhD, MBS.
DIRECTOR OF PUBLIC HEALTH

Table of Contents

Citation i
Foreword ii
Preface iii
Acknowledgments iv
Acronyms viii
CHAPTER 1: Introduction 1
CHAPTER 2: Guidelines for development of HCWM Policy and facility HCWM Plan. 3
2.1 Facility Health Care Waste Management Policy 3
2.2 Standard guidelines for developing Facility Health Care Waste Management Plan 5
CHAPTER 3: Management and Oversight for HCWM 8
3.1 Facility Waste Management Oversight Committee – Guidance 8
3.2 Health Care Waste Management Audit Procedures 11
CHAPTER 4: On-site Handling of Health Care Waste 13
4.1 Waste Minimization, Recycle and Reuse 13
4.2 Waste Identification and Segregation 15
4.3 Handling and Collection of Healthcare Waste 18
4.4 Waste Storage and Transportation 20
CHAPTER 5: Management of Special Waste 22
5.1 Management of Amalgam Waste 22
5.2 Management of Cytotoxic Wastes 24
5.3 Management of Radioactive Wastes 28
5.4 Management of Diapers and Sanitary Towels Wastes 31
5.5 Management of Special Sharps Wastes 34
5.6 Management of Chemical waste 36
CHAPTER 6: Waste Treatment and Disposal 39
6.1 Diesel Fired Incinerator Operation SOP 39
6.2 Medical Waste Autoclave Operation and Testing- SOP 43
6.3 Medical waste shredders 47
6.4 Microwave Treatment of Medical Waste 51
6.5 Healthcare Waste Land disposal 54
6.6 *Healthcare waste water Disposal* 57
CHAPTER 7: Occupational Health and Safety in HCWM 60
7.1 Handling of Infectious Waste Spills SOP 60
7.2 Post Exposure Prophylaxis (PEP) SOP 63
7.3 Immunization for Hepatitis B and Tetanus 65
7.4 Personal Protective Equipment for Healthcare Waste Handlers –Sop 67
APPENDICES 70

Appendix 1: HCWM Facility Plan Template 70
A. Staffing Plan 70
A– 1 Roles and Responsibilities 70
A-2 Staff List 70
B. Quantifying Healthcare Waste 71
C. HCWM handling practices 71
C-1 Guidelines for Bin Placement 71
D. Treatment and Disposal Procedures 72
E. Schedule for Treatment and Disposal of Waste 72
F. List the proposed improvements the hospital needs to work on HCWM/ Occupational PEP Systems in order of priority. 72
G. HCWM supplies and Operational Costs 73
H. Training and capacity building on HCWM through CME's 73
I. Monitoring Schedule 73
J. Budget Allocation 73
K. Outline the key steps to be taken to operationalize the Facility HCWM Plan 74
L. Organization structure and reporting authority for HCWM in the facility 74
M. Annual Work plan 75
Appendix 2: Procedure for conducting facility HCWM audits 76
Appendix 3: Facility Audit Checklist 78
Appendix 4: Service Delivery Point Waste Container Audit Form 81
Appendix 5: Diesel-fueled Incinerator 82
A. Incinerator Burn Log 82
B. Maintenance Schedule for Diesel Fired Incinerator 83
Appendix 6: Autoclave Operation Log 84
Appendix 7: Autoclave testing and validation log 85
A. General Information 86
A-1 Description of process cycles tested 86
B. In-house conditions 86
B-1 Water Quality Test 86
B-1.1 Structural and Technical Prerequisites at the Operator's Premises 86
C. Installation of the autoclave 87
C-1 Delivery check 87
C-1.1 Correct delivery 87
C-1.2 Information provided from the manufacturer to the operator (Documents) 87
C-2 Operation qualification / Performance checklists 88
C-2.1 Visual Inspection 88
C-2.2 Temperature testing in the empty chamber – Program check 88
D. Waste to be treated – reference load 89

D-1 Reference load: 89
D-1.1 Specification of programs to be tested 90
D-1.2 Hollow-Load-Test (PCD) 90
E. Summary of results / deviation 91
Appendix 8; Step-By-Step Operation of the Waste Microwave 92
Appendix 9: Parts of a standard Waste Microwave 93
REFERENCES 94
LIST OF CONTRIBUTORS 96

Acronyms

AIDS	Acquired Immune-Deficiency Syndrome
ARV	Antiretroviral
BCC	Behaviour Change Communication
BSL	BioSafety Level
CDC	US Centres for Disease Control and Prevention
CME	Continuous Medical Examination
CTC	Cancer Treatment Centre
FBO	Faith-Based Organization
HAO	Hospital Administration Officer
HAI	Health care-associated infection
HAV	Hepatitis A virus
HBC	Home-Based Care
HBV	Hepatitis B virus
HCW	Health Care Waste
HCWM	Health Care Waste Management
HEPA	High Efficiency Particulate Air
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information Systems
HOD	Head of Department
IEC	Information, Education, and Communication
IPC	Infection Prevention and Control
KEBS	Kenya Bureau of Standards
KEMRI	Kenya Medical Research Institute
KMTC	Kenya Medical Training College
KNH	Kenyatta National Hospital
M&E	Monitoring and Evaluation
MEA	Multilateral Environmental Agreement
MOH	Ministry of Health
MSDS	Material Safety Data Sheet
NEMA	National Environment Management Authority
NGO	Non- Governmental Organization

PATH	Program for Appropriate Technology in Health
PCD	Polychlorinated Biphenyls
PEP	Post Exposure Prophylaxis
PEPFAR	President's Emergency Plan for AIDs Relief
PHC	Primary Health Care
PPE	Personal Protective Equipment
SCBIs	Self-Contained Biological Indicators
SDP	Service Delivery Point
SOP	Standard Operating Procedure
TWG	Technical Working Group
USAID	United States Agency for International Development
WC	Water Closet
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

With increasing population, technology and burden of disease, provision of healthcare services is accompanied with massive challenges in management of health care waste in line with safety and environmental concerns. In Kenya, health services are being offered by over 4,000 facilities, which are either public or private for profit or not for profit, or faith-based organizations. Large volumes of potentially hazardous waste can pollute the environment and consequently be injurious to health. Unsafe handling of waste is associated with disease burden. In Kenya, the actual burden of HAIs has not been accurately quantified, but it is projected to account for about 10% to 25% of hospital admissions in government health facilities and 2.5% of HIV infections in health care workers, 32% of hepatitis B cases and 40% of hepatitis C cases (WHO 2010).

Kenya's constitutional dispensation provides for each person's entitlement to a clean and healthy environment and a reasonable standard of sanitation. In order to make this practical for the benefit of citizens, the health sector has been developing legal and regulatory framework to provide guidance to health care providers or managers on minimum operation requirements.

The MOH Kenya has made progress towards addressing the problem of HCWM. Key milestones include the National Policy on IPC 2015, National Guidelines on IPC 2015, National Guidelines for Safe Management of Health Care Waste 2011, Injection Safety and Waste Management policy 2007, the Kenya Environmental Sanitation and Hygiene policy,2016-2030 among other relevant policy documents. Other important health care waste management documents include the Strategic Plan (2015 -2020), the Health Care Waste Management Plan (2016 -2021), the Training Guide and On - Job - Training Manual. Also, currently under review is the Communication Strategy.

This health care waste management Standards Operating Procedures is an important document, which binds together a number of SOPs meant to tackle various critical procedures within the health care waste management system right from production to disposal of wastes.

What is an SOP?

An SOP is defined as a method for accomplishing policy. It is a procedural document which 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. Furthermore, the step-by-step written procedure 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. It is an essential component of healthcare delivery systems which strive to keep ISO standards.

These SOPs will address key aspects related to waste management such as waste handling, storage, transportation, treatment, and disposal.

Why SOPs?

The purpose of the SOPs is to follow up on the framework provided by existing policy and guidelines related to HCWM and/or IPC in order to provide direction and steps that promote safety and environmental concerns. This will work to reduce the risk of transmission of infections likely to be acquired from poor HCWM, such as HIV/AIDS, hepatitis B, and other health care-associated infections (HAIs)

How it will be used?

Since the promulgation of the new Kenyan constitution (2010) that led to the devolved system of governance, the MOH has shifted toward decentralization of health services as part of the broad policy framework. The national MOH structures are thus charged with the responsibility of providing enabling policy environment. This document is thus aimed at being customized for use at the national referral services, county health systems, and other service delivery points whether they be for profit or not for profit entities.

Stakeholders in the health sector are many and they range from other government ministries, private-sector institutions including non-governmental organizations, professional associations, and development partners. The SOPs should be rolled out to encourage the use of appropriate, safe, and cost-effective methods and techniques to segregate, contain, transport, treat, and dispose of HCW and thereby safeguarding healthcare workers from the risks and infections associated with such wastes.

CHAPTER 2: GUIDELINES FOR DEVELOPMENT OF HCWM POLICY AND FACILITY HCWM PLAN

MINISTRY OF HEALTH	GUIDELINES FOR DEVELOPMENT OF HCWM POLICY AND FACILITY HCWM PLAN 2.1 Facility Health Care Waste Management Policy	SOP/MOH/HCWM-2/001 VERSION 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

This section details guidance on developing a health facility policy.

Purpose

To outline the steps and contents of developing a health care waste management policy

Responsibilities

a) **Hospital Management**
- Provide guidance for developing the policy

b) **Hospital Director** –
- Approve the policy

c) **Hospital Staff**
- Implementation of the hospital policy

Procedure

The table below outlines the content of developing a facility HCWM policy;

OUTLINE	CONTENT
a) General Policy Statement	Outline the hospital commitment in managing the health care waste in accordance with hospital procedures, subject to national guidelines laws or regulations; • Kenya Constitution • Kenya Health Sector Strategic Plan III • National Guidelines for Safe Management of Healthcare Waste 2011 • Waste Management Guidelines 2003 (*NEMA*)
b) Policy Purpose:	Describe the purpose of the policy in protecting people and the environment from hazardous exposure from healthcare waste.
c) Risk for Noncompliance of Policy:	Describe the risks of ineffective management of waste to the hospital and the community.

d) Applicability of Policy:	Outline the applicability e.g. This Policy is intended for use and compliance by all Hospital employees, students on attachment and interns.
e) General Responsibility Policy Statements:	**Outline responsibilities in policy implementation of;** • Hospital Management • Staff Responsibilities • Individual Responsibilities: - Hospital Director - Infection Prevention and Health Care Waste management committee. - Heads of departments - Hospital Matron - Ward Supervisors. - Waste management officer - Hospital Staff - Waste Handlers - Morgue attendants - Incinerator Operators
f) Health Worker Safety Policy Statements:	List all the hospital actions to address health workers Safety i.e. Occupational Vaccinations, provision of PPE, Workplace provisions.
g) Monitoring and Compliance with Policies	**Accountability:** • Designate all supervisors and departments under their control to have an up-to-date copy of this Policy and Guidelines **Policy Effectiveness:** • Determine the frequency of audit to be conducted to promote and improve compliance with the policy. **Review:** • Indicate how frequent the hospital management will review the policy.

h) Authority to Establish Policy	• Indicate the facility's authority to establish the policy; "*The Hospital Management has the authority to establish this policy under…..*" • Indicate the references used; "This Policy was established in keeping with the following laws and regulations: *[Medical waste and injection safety policy 2007, Infection prevention and control policy 2015, Environmental sanitation and Hygiene Policy 2016-2030, HCWM guidelines]*. • Indicate the Date of Issuance of the policy

i) Approval	The policy must be signed by the Facility Director.

Scope

This guideline defines all aspects of managing waste, from minimization, proper segregation and containment, safe handling, storage and transport, to treatment and disposal.

Purpose

To outline the requirements for developing the health care facility's waste management plan.

Responsibilities

Every member of the facility is responsible for the waste they generate; however, certain personnel will have specific waste management tasks and responsibilities assigned to them.

a) **Facility manager**

- Ensure compliance with legal and other requirements, overall responsibility and accountability for waste generated and management on site, as well as for transportation from the facility for treatment and/or disposal off-site. The manager is also responsible for ensuring that sufficient resources are allocated for proper waste management

b) **Facility management and supervisors**

- Ensure appropriate standards are set and maintained.

c) **Waste generators**

- Ensure that waste is properly segregated at the source and suitably contained to reduce risk of exposure to others.

d) **Waste handlers**

- Ensure that waste in the intermediate storage areas is contained and labeled.

e) **Waste management officers**

- Responsible for ensuring that waste is managed according to legal and other requirements, checking that standards are maintained, that everyone is aware of these requirements, that relevant personnel are appropriately trained to safely deal with waste in their areas and that all necessary data are recorded and communicated to the waste management committee, and other related agencies

f) **IPC/Waste management committee.**

- This committee should meet monthly to discuss the key performance indicators (e.g.volume of waste generated, hazardous versus general waste ratio, incidents, audit findings, etc.) and plan awareness programs and other initiatives to improve compliance with legal and other requirements.

g) **Contractors**

- Ensure their staff are adequately trained to comply with waste management requirements

Procedures

A. Developing the plan

i. Secure approval from senior management to develop the plan
ii. Convene a committee to steer the development of the plan; it should be lean and inclusive
iii. Agree on major policy points.
iv. Identify quick wins - Identify some actions that will make a big impact quickly. For example: returning expired items, to the suppliers purchasing items that are reusable, where possible and ensuring waste segregation is practiced.
v. Consult with stakeholders - Seek guidance from the county authorities and relevant stakeholders.
vi. Undertake a baseline assessment of current waste management practices.
vii. Disseminate the findings of the baseline to stakeholders, consult and design waste management options for each waste stream.
viii. Create a detailed implementation plan including time frames, resources (financial, people, time, and equipment), and details of deliverables.
ix. Finalize budget and seek approval from the county government.

x. Communicate -. Regularly communicate how the project is progressing and showcase good practices.
xi. Monitor progress once the plan is rolled out
xii. Set targets to track trends, so you can try to improve yearly.

B. Contents of the plan

The facility's waste management plan should include the following items:

i. Glossary
ii. Duties and responsibilities for each category of personnel generating and/or involved in managing health care waste.
iii. Assessment of current state of waste management activities
iv. Implementation plan - a detailed plan and timetable outlining the stages of the implementation.
v. Resources (people, equipment,supplies and budget) required to implement the plan.
vi. HCWM Training requirements.
vii. Documentation - Waste management documentation (procedures, training and awareness, signages, contractors, authorizations, etc.)
viii. Information, Education and Communication materials.
ix. Incident management and reporting
x. Targets and strategies for reaching them, communicating progress and plans for continuous improvement. Some targets might include:
xi. Reducing the number of incidents and injuries related to health care risk waste management
xii. Reducing the environmental impact of waste treatment technologies
xiii. Reducing the amount and toxicity of waste yearly
xiv. Improving recycling/reuse rates

C. Reporting and Recordkeeping

HCWM approved plan (see appendix 1 for a template of a facility HCWM plan)

CHAPTER 3: MANAGEMENT AND OVERSIGHT FOR HCWM

MINISTRY OF HEALTH	MANAGEMENT AND OVERSIGHT FOR HCWM 3.1 Facility Waste Management Oversight Committee – Guidance	SOP/MOH/HCWM-3/001 VERSION 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

This document describes the steps required to establish and maintain the Waste Management Oversight Committee at the health care facility.

Purpose

To provide guidance to the health facilities when forming a HCWM oversight committee

Membership of the IPC/Waste management Committee

The membership of the committee should be multidisciplinary, involving all departments in the hospital

Responsibilities

The Waste Management oversight committee is responsible for establishing standards of acceptable waste management that seek to minimize harm to people and the environment. The responsibilities of specific members of the committee are as follows:-

a) Chairperson is responsible for Convening and chairing meetings, ensuring the associated administration is carried out efficiently and effectively

b) Secretary is responsible for Maintaining the records of the committee

c) Waste management coordinator is responsible for:

- Providing expertise on medical waste management to committee members and other staff as needed
- Researching and reporting on ways to improve waste management
- Organizing and reporting on inspection and audits
- Assisting the chairperson and secretary in convening and conducting meetings

d) Committee members are responsible for the timely reporting on waste management,, nonconformance and problems in their areas of work and undertaking improvements to the system.

e) Senior management

- Must ensure they provide the strategic support to the work by:

- Ensuring that appropriate plans are developed to deal with any deteriorating trends
- Providing sufficient resources (people, time, funds, equipment, supplies etc.)

f) Facility in-charge

- This person is ultimately responsible and accountable for waste management and ensuring compliance with legal requirements

Hazards and Safety Concerns

- When conducting visits to the site, committee members should refer to the appropriate SOPs and procedures for information on hazards and safety concerns.

Procedures

Materials and Equipment

✓ HCWM facility audit tool.

i. Develop and execute a committee charter.

ii. Provide oversight of HCWM to ensure that waste is managed safely, by:

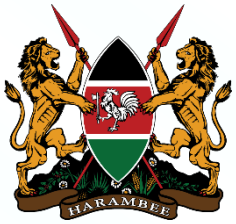
- Reviewing monthly reports from the different sectors of the facility/waste management and agreeing on appropriate actions needed to solve problems.
- Conducting periodic audits
- Ensuring that waste management documents are adequate and current.

iii. Provide periodic feedback

iv. Implement improvement by developing and executing a facility HCWM strategy and implementation plan.

v. Reporting and Recordkeeping

- Minutes of Meetings held.
- Routine and audit reports on waste generated, treated and disposed of, as per the SOPs and guidance documents.
- Records of contracts with contractors dealing with the facility's waste, e.g., waste treatment facilities, waste transportation agencies, recycling contractors, municipal authorities.
- Financial reports including the investment, training and operating costs for the waste management system and income from sales of recyclables
- The waste management committee should hold copies of all policies and procedures relevant to the facility including approved designs of posters and signages to be used.

 MINISTRY OF HEALTH	MANAGEMENT AND OVERSIGHT FOR HCWM 3.2 Health Care Waste Management Audit Procedures	SOP/MOH/HCWM-3/002 VERSION 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

Outlines the key areas to be audited in the health facility and identifies current gaps in relation to best practices.

Purpose

To guide health facilities on how to appropriately audit facility waste management systems

Responsibilities

a) Waste management oversight committee and coordinator –

- Establish systems to monitor compliance with the agreed-upon medical waste procedures and to conduct regular and routine audits of the waste management system.

Hazards and Safety Concerns

- Avail appropriate PPEs for use when conducting audits
- Secure authorization from respective departmental heads prior to accessing restricted areas
- Ensure environmental safety; adequate lighting, proper ventilation and ease of access
- Adhere to signages on handling of equipment and movement within buildings
- Follow recommended SOPs and guidelines for consistency of practice

Procedures

Materials and Equipment

The auditor may need to refer to:

- Facility health care waste management policy
- Facility safety procedures
- National or regional medical waste treatment guidelines
- Previous audit/inspection reports
- Accident or incident reports
- Collection records where final disposal is off-site
- Service agreement, if collection and/or treatment is outsourced
- Service agreement, if housekeeping is outsourced
- Service agreement, if waste handling is outsourced
- Staff training logs
- Standard operating procedures for housekeeping and waste handling
- Standard operating procedures for waste holding and storage
- Standard operating procedures for waste treatment and disposal

- PPE – gloves, overalls/lab coat, sealed shoes/boots, eye protection, surgical face mask/ particulate respirators (to prevent inhalation of particles/aerosols and barrier protection against droplets respectively)
- Tongs and other waste handling tools
- Color coded Bins, liners, buckets, bags, safety boxes and other waste containers

NOTE: The procedure for conducting facility HCWM audits is summarized in appendix 2, 3 and 4.

CHAPTER 4: ON-SITE HANDLING OF HEALTH CARE WASTE

MINISTRY OF HEALTH	ONSITE HANDLING OF HEALTHCARE WASTE 4.1 Waste Minimization, Recycle and Reuse	SOP/MOH/HCWM-4/001 VERSION 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

The SOP covers the activities undertaken to prevent unnecessary waste generation, reduce amount of waste generated, reuse and recycling of noninfectious waste.

Purpose

To provide all healthcare facilities with information about how to reduce the amount of waste produced and how to recycle/reuse if possible.

Responsibilities

a) Waste management oversight committee

- Develop a facility waste minimization strategy

b) Senior management

- Approve the waste minimization strategies, plan and provide resources.

c) Procurement department

- Procure goods of high quality and in quantities needed.

d) All health care workers

- Practice segregation

Hazards and Safety Concerns

- **Expired Items** – These may pose hazards to the health workers in the facility, and need to be stored and labelled
- **Un-segregated Waste** – Poses hazards to the waste handlers i.e needle stick injuries.

Procedures

Materials and Equipment

- Stock sheets
- Segregation charts
- Appropriate PPE

i. Procure quality products that address the hospital needs and practice best practices in commodities management.

ii. Recycling; place collection bins in appropriate collection area, or take recyclables to a processing centre or sell to recyclers.

iii. Reuse vials as specimen bottles where applicable i.e. lab specimen bottles after sterilization

iv. Ensure waste is segregated at the source of generation according to the national guidelines

v. Promote rational use of injectable medicines and advocate for oral medication.

vi. Ensure all waste leaving the facility is recorded; Use a waste Tracking Form to ensure accountability

Note: Prevent unofficial sale of waste to avoid potential reuse of dangerous items.

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MINISTRY OF HEALTH	ONSITE HANDLING OF HEALTHCARE WASTE 4.2 Waste Identification and Segregation	SOP/MOH/HCWM-4/002 VERSION 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

This SOP covers waste segregation of all waste generated in healthcare facilities.

Purpose

To provide a standard procedure for healthcare workers to appropriately segregate waste at point of generation.

Responsibilities

a) **All health care workers**

- Segregate waste at point of generation.

b) **Facility in charge**

- Ensure availability of HCWM Commodities- Color coded bins, bin liners and PPEs

c) Waste Management Officer;

- To ensure that segregation is done at point of generation and remedial action taken accordingly.
- Quantification of the commodities and ensuring continuous supply of commodities
- Ensure appropriate bin placement

Hazards and Safety Concerns

- Spillages of waste
- Needle-prick injuries

Procedures

Materials and Equipment

- Color coded bins/liners
- Waste segregation charts
- Appropriate PPE

➢ Segregate all waste at the point of generation in accordance the the segregation schedules;

Category	Examples of Wastes	Color of Bin and Liner	Marking
General or non-infectious	Paper, packaging materials, plastic bottles, food, cartons	Black	No recommended marking
Infectious	Gloves, dressings, blood, body fluids, used specimen containers	Yellow –pedal action	
Highly infectious or anatomical/ pathological	Laboratory specimens and containers with biological agents, anatomical waste, pathological waste	Red- pedal act	
Chemical	Formaldehyde, batteries, photographic chemicals, solvents, organic chemicals, inorganic chemicals	Brown	Marking will vary with classification of the chemical
Radioactive	Any solid, liquid, or pathological waste contaminated with radioactive isotopes of any kind	Yellow	 Radioactive symbol
Genotoxic/ Cytotoxic	All drug administrative equipment (e.g. needles, syringes, drip sets), gowns and bodily fluid/ waste from patients undergoing cytotoxic drug therapy	Purple	
Sharps Box (Safety Box)	Needles, Syringes, broken vials	White/yellow safety boxes (WHO Approved)	

References

1. *National Guidelines for Safe Management of Healthcare Waste 2011*
2. *WHO Bluebook*

MINISTRY OF HEALTH	ONSITE HANDLING OF HEALTHCARE WASTE 4.3 Handling and Collection of Healthcare Waste	SOP/MOH/HCWM-4/003 VERSION 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

SOP outlines the best practices to be followed when handling and collecting waste within the health facility.

Purpose

To provide guidance on proper handling and effective collection of waste within the health facility

Responsibilities

a) Waste Management Officer
   - Ensures safe handling and collection of health care waste
   - Ensures the waste handlers collect the waste as outlined in the schedule
   - Develop a waste collection plan

b) Waste handler
   - Tie the bin liners and collect the waste from the generation point
   - Replace the liners

c) Health care worker
   - Ensure waste is well segregated
   - Ensure safety boxes that are ¾ full are closed, stored appropriately and ready for collection.

Hazards and Safety Concerns

- **Spillages –** while collecting the waste, care must be taken to avoid spillage of the waste, However if they occur; cordon the area, collect the spilled waste, disinfect with 5% chlorine solution and clean the area.

Procedures

Materials and Equipment

- Waste trolleys
- Colour coded bins and bin liners
- PPE

- Follow the waste collection schedule
- Remove the liners from the bins
- Tie/knot the liners
- Label the liners with their point of generation (hospital and ward or department) and contents
- Replace the liners immediately with new ones of the same type
- Take the waste to the temporary storage area within the ward/department i.e. sluice room.
- Collect the waste from sluice room and place in the trolley for transportation

NOTE: **Waste must be collected daily form point of generation, however in areas with high waste generation it may be collected twice a day or as it is required as advised by the department in-charge.**

References

1. *National Guidelines for Safe Management of Health care Waste 2011*
2. *PATH guiding principles for managing medical waste. Seattle (WA): PATH; 2005. 1 p http://www.path.org/publications/files/TS_gps_mng_med_wst.pdf*

MINISTRY OF HEALTH	ONSITE HANDLING OF HEALTHCARE WASTE 4.4 Waste Storage and Transportation	SOP/MOH/HCWM-4/004 VERSION 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

The SOP covers the procedures to be followed when storing and transporting waste within a health facility.

Purpose

Provide guidance and standardize waste storage and transportation of waste within the health facility.

Responsibilities

a) Health facility Management

- Provide an adequate temporary storage area in the facility that is secure, easily cleaned and leak-proof together with a waste transfer trolley

b) Waste handler

- Transport to the onsite temporary storage area/ sluice room
- Collect waste from the generation points/sluice rooms and transport to the treatment site/storage area.

c) Waste management officer

- Oversee waste storage and transportation of waste within the facility.

Hazards and Safety Concerns

- Needle Prick injuries
- Spillages

Materials and Equipment

- Temporary storage area
- Waste transfer trolley
- PPE

Procedures

3.4 Waste Storage

1. Restrict access to storage areas
2. Wear PPE when handling waste
3. Maintain segregation at the designated storage area
4. Place the Safety boxes in a dry floor to avoid soaking
5. Maintain cleanliness in the storage area

Note: Waste should not be stored for more than 2 days before treatment.

3.5 On-site transportation

1. Wear appropriate PPE
2. Wheel the trolley to the temporary storage area/ generation sites
3. Knot bin liners and place them in the trolley
4. Collect the safety boxes, ensure the safety boxes are not more than ¾ full and closed
5. Safety boxes must not be stored for more than one week in a service delivery point and must be disposed off.
6. Wheel the trolley through designated route to avoid contact with the patients and other clean areas

3.6 Offsite transportation

1. Develop a schedule of waste collection by the contracted firm
2. Always wear PPE when handling waste
3. Weigh the amount of waste to be collected by the waste transporter and record in the tracking form
4. Keep copy of the tracking form for accountability.

Documentation

1. Fill the waste receipt log with waste treatment staff.
2. Summarize the daily waste quantities in a weekly waste quantification tool

CHAPTER 5: MANAGEMENT OF SPECIAL WASTE

MINISTRY OF HEALTH	MANAGEMENT OF SPECIAL WASTE 5.1 Management of Amalgam Waste	SOP/MOH /HCWM-5/001 VERSION : 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

The SOP covers the procedures to be followed when storing and transporting of amalgam waste.

Purpose

To effectively handle and dispose of amalgam waste safely

Terms & Definitions

Amalgam—amalgam is an alloy of mercury with various metals used for dental fillings. It commonly consists of mercury (50%), silver (~22-32%), tin (~14%), copper (~8%), and other trace metals.

Contact amalgam– amalgam that has been in contact with the patient e.g. extracted teeth with amalgam, amalgam captured during procedures in side traps, filters or screens.

Non-contact amalgam: (scrap): excess mix left over at the end of a dental procedure

Responsibilities

a) The in-charge of Dental unit
   - Has the overall responsibility to ensure that the requirements for appropriate handling, segregation and disposal of amalgam waste are available
   - Develop appropriate procedures for clean-up/spills of amalgam

b) Dentists and Nurses
   - Segregate amalgam waste during amalgam placement or removal procedures to designated container.

c) Support staff
   - Transport waste containers to a designated area that is secure and lockable.

d) Licensed Recycler
   - Collects amalgam waste from designated storage area for recovery.

Hazards and Safety Concerns

- All staff involved in the handling of amalgam waste must have training in spill management and decontamination
- If it's a large spill also wear enclosed footwear and a mercury vapour respirator.
- Always consult with the Hospital biosafety Officer when handling any spillages or follow institutional spillage policy.

Procedures

Materials and Equipment

- Airtight plastic container labelled- Amalgam for recycling
- Segregation chart (special dental segregation chart) (Tag resp.)

- Stock amalgam capsules in a variety of sizes to minimize the amount of amalgam waste generated.
- Use high velocity evacuation, if appropriate with air/water spray, when carving, finishing, polishing or removing amalgam restorations.
- Use personal protective equipment such as gloves, masks, and protective eyewear when handling it since amalgam waste may be mixed with body fluids, such as saliva, or other potentially infectious material.
- Store amalgam waste in airtight covered plastic container labelled "Amalgam for Recycling". Keep different types (e.g., contact and non-contact) of amalgam wastes in separate containers.
- Transport containers to designated area that is secure and lockable
- Arrange for the registered recycler to collect the amalgam waste on a regular basis

References

1. *Occupational Safety and Health Guidelines for health sector in Kenya.2014*
2. *Office of Air Quality Planning and Standards, Office of Research and Development. Mercury Study Report to Congress. Volume II: An inventory of anthropogenic mercury emissions in the United States. Washington, D.C.: Environmental*
3. *Protection Agency. Publication No. EPA-452/R-97-004. December 1997, p. ES-6. International Organization for Standardization. ISO No. 11143—2008, Dentistry—Amalgam Separators. Geneva: ISO.*
4. *World Health Organization. Guidelines for safe disposal of unwanted pharmaceuticals in and after emergencies. Geneva: World Health Organization; 1999. 31 pp. http://www.who.int/water_sanitation_health/medicalwaste/unwantpharm.pdf*

Scope

This procedure describes the process of handling and disposal of cytotoxic drug waste

Purpose

To guide health care workers on safe handling, treatment and disposal of cytotoxic waste

Terms & Definitions

Cytotoxic reconstitution team – a team of healthcare workers involved in the processing of cytotoxic drugs from their original formulation into a product that is ready to administer

Cytotoxic spill kit - a specially assembled receptacle containing all the necessary equipment and material required to handle a cytotoxic drug spillage

Responsibilities

a) The in-charge of oncology unit/Ward

- Has the overall responsibility to ensure that the requirements for handling cytotoxic drugs and waste are available for complete and safe execution of the process.

b) The Head of departments Pharmacy CTC, Nursing and Public Health

- Has the responsibility to familiarize, implement, and provide oversight and review of this SOP.

c) The cytotoxic reconstitution team

- Shall ensure safe handling, administration and proper disposal of the cytotoxic waste.

d) The waste handlers

- Have the responsibility of appropriate handling, collection and disposal of the cytotoxic waste.

Hazards and Safety Concerns

All staff involved in the handling of cytotoxic waste must have training in spill management and first Aid measures

First Aid Measures

- If the eyes are contaminated, immediately irrigate with water or saline eyewash for at least 15-20 minutes. Seek medical advice immediately. NOTE: If gloves are worn, these should be removed before irrigating the eyes as they may be contaminated.
- Remove contaminated clothing, and place in cytotoxic waste disposal bag if to be discarded. For clothing not to be discarded, wash separately in hot wash, and repeat wash.
- If the drug has come into contact with the skin, shower with copious amounts of water for 10-20 minutes, then with soap and rinse off with running water. The shower must be cleaned thoroughly immediately after use.

Large Spills

i. Contain the chemotherapy involved in the spill by covering with an impermeable plastic packed pad.
ii. Cordon off the area. If possible, close off the area by closing windows and doors.
iii. Turn off any fans which may spread the spill/aerosols.
iv. Obtain the Cytotoxic drug spillage kit.
v. Move patients away from the area of the spill.
vi. Open the Cytotoxic spill kit.
vii. Identify Spill. Any spill should be identified with a warning sign so that other people in the area will not be contaminated.
viii. Ensure the spill is covered with an impermeable packed pad, before placing on any protective clothing.
ix. Put on protective clothing in the following order
    - Shoe covers (water-repellent).
    - Disposable water-repellent long-sleeved gown.
    - Mask
    - Non-sterile gloves (nitrile gloves).

Liquid Spills

i. Cover the area immediately with thick absorbent pads, paper towels or paper mats.

Powder Spills

i. If there is a powder spill, cover with a wet wad of paper towels and manage as liquid spill. Cover gently to avoid spread of powder.

Linen Spills

i. Contaminated linen is to be double bagged in a specially marked linen bag labelled "Cytotoxic" and kept separate from all other linen.

ii. Wash the soiled items twice using hot water and detergent and rinse well. It can now be washed with other linen

Hazards and Safety Concerns

Personnel can be exposed to cytotoxic drugs during preparation, administration, handling patient waste, transport and waste disposal. The exposure can be through:

- Skin contact
- Skin absorption
- Inhalation of aerosols and dry particles
- Ingestion
- Needle skin injuries
- Spillages

Procedures

Materials and Equipment

- PPE's i.e Overalls ,Lint free disposable gowns,Head covering ,Closed footwear ,Nitrile powder free gloves ,Safety glasses and Masks
- Cytotoxic spill kit
- Pedal-operated cytotoxic waste bin.
- Purple liner bags
- Appropriate waste trolley
- Plastic purpose made sharp containers.

A. Handling of patient waste

Patient body fluids, secretions and excretions such as urine, faeces, vomitus and the contents of colostomy and urostomy bags may be disposed off in the normal sewerage system.

B. Segregation and Storage

1. All cytotoxic waste shall be segregated at the point of generation in purple colour coded liner bags.
2. The chemotherapy reconstitution team shall ensure that waste is not more than ¾ full, sealed, labelled and securely stored in a temporary storage area.

3. All sharps shall also be segregated at the point of generation in appropriate sharp containers.

C. Treatment and Disposal

- Onsite Treatment And Disposal

a) The cytotoxic waste shall be incinerated at 11000C

b) The bottom ash shall be disposed of in ash pit

- Offsite Treatment and Disposal

a) The facility shall use NEMA licensed waste transportation, treatment and disposal facilities for the cytotoxic waste.

References

1. *National Guidelines for Safe Management of Health care Waste 2011*
2. *Occupational safety and Health Guidelines for the health sector in Kenya 2014*
3. *International Agency for Research on Cancer (IARC) (1983). Laboratory decontamination and destruction of carcinogens in laboratory wastes: some hydrazine. Lyon, International Agency for Research on Cancer (IARC Scientific Publications, No. 54)*
4. *International Agency for Research on Cancer (IARC) (1985). Laboratory decontamination and destruction of carcinogens in laboratory wastes: some antineoplastic agents. Lyon, International Agency for Research on Cancer (IARC Scientific Publications, No. 73)*

Scope

This procedure shall apply to, handling, segregation, treatment and disposal of radioactive waste.

Purpose

To guide health facilities to effectively manage radioactive waste

Terms & Definitions

Radioactive waste- is waste that contains radioactive material. Radioactive waste is usually a by-product of nuclear power generation and other applications of nuclear fission or nuclear technology, such as research and medicine.

Geiger counters -are used to detect radioactive emissions, most commonly beta particles and gamma rays.

Common Radioactive Materials Used in Health Facilities and Labs

NAME (SYNONYM)	DESCRIPTION
Cesium-137 (Cs-137, ^{137}Cs)	Commonly used in various sources.
Cobalt-60 (Co-60, ^{60}Co)	Used in various sources.
Nickel-63 (Ni-63, ^{63}Ni)	Used in electron capture devices for gas chromatographs.
Hydrogen-3 (H-3, ^{3}H, tritium)	Used in exit signs and other sources.
Thorium (Th-232, ^{232}Th)	Natural radionuclide used in some sources and old gas mantles.
Uranium (U-238, ^{238}U, U-Nat, EU(%), DU, yellowcake) Uranyl nitrate (common in school labs)	Natural radionuclide unless processed, used in various applications, including old ceramic glazing, sources, and counterweights.
Americium-241 (Am-241, ^{241}Am)	Used in smoke detectors and other sources, including moisture density gauges.
Phosphorous-32 (P-32, ^{32}P)	Used in laboratory research.
Iodine-123 (I-123, ^{123}I)	Used in medical treatments.
Iodine-131 (I-131, ^{131}I)	Used in medical treatments.
Smoke detectors	May emit low amounts of radioactive materials; place unwanted smoke detectors in with solid waste or trash, or return to the manufacturer.

Responsibilities

a. HOD radiation Department

- Develop a training program outlining recognition of radioactive material and management procedures relevant to job duties.
- Develop an emergency contingency plan.

b. Health facility Management

- Procure radioactive materials that are recommended in the national guidelines
- Put in place waste management and disposal procedures
- Provide appropriate PPE for the radiation department staff.

c. Radiation Department Staff

- Follow guidelines and SOPs on handling radioactive material
- Segregate the waste in the recommended bins.

Hazards and Safety Concerns

- Radioactive rays – Care must be taken by ensuring appropriate PPE is worn when handling radioactive material.
- Avoid handling the material and do not disturb the container until preliminary evaluation is completed. Treat suspect material as if it is radioactive and limit the number of staff near immediate area of suspected radioactive materials.
- If radioactive materials are inadvertently received, immediately contact the officer in-charge.
- If a potentially radioactive material is discovered, evacuate all persons from the immediate area until further help or investigation has been completed.

Procedures

Material and equipment

A Geiger counter for measuring ionizing radiation including, absorbed dose delivered by ionizing radiation and detect levels of radioactivity being emitted

A. Waste identification

- Visually inspect all incoming containers to determine if the contents are potentially radioactive.
- Staff shall identify the party responsible for generating the waste.
- Look for markings, key words, or labels indicating “Radioactive.” Laboratory mixtures or solutions containing uranium or thorium.

B. Determine the radioactive level

- Use the detection equipment - Geiger counter following the directions contained in the manufacturer's operation manual to determine the radioactivity level.

C. Segregation

- Radioactive waste should be segregated in a yellow container labelled radioactive waste, marked with a radioactive label

D. Securing/packaging radioactive material

- Gently remove and place radioactive waste in secondary containment or in a specifically staged area away from staff and traffic.
- Package the radioactive waste in a sealed container, clearly marked radioactive level, and its half-life.

E. Storage

- Store the waste in a dark room, as recommended by the manufacturers
- Sort the radioactive waste in accordance to its half-life
- Restrict entry to the storage area.
- Maintain records of each waste in the storage room

F. Transportation

- Radioactive waste must be transported after its half- life has been achieved
- Licensed radioactive contractors should be used to transport the waste

G. Disposal

- Radioactive materials require pre-approval for disposal from Radiation Protection Board of Kenya.
- Facilities should have disposal contracts with the suppliers of the radioactive materials.
- Keep records of all disposed waste for accountability.

References:

1. *National Guidelines for Safe Management of Health care Waste 2011*
2. Kenya OSH guideline 2014
3. *World Health Organization. Guidelines for safe disposal of unwanted pharmaceuticals in and after emergencies. Geneva: World Health Organization; 1999. 31 pp. http://www.who.int/water_sanitation_health/medicalwaste/unwantpharm.pdf*

Scope

This procedure applies to handling and disposal of diapers used for Neonatal, Pediatrics, Adults and Geriatric care.

Purpose

To provide for safe management and disposal of used diapers and sanitary towels

Terms & Definitions

Diaper -is a type of underwear that allows one to defecate or urinate, without the use of a toilet. When diapers become soiled, they require changing, generally by a second person such as a parent or caregiver.

Sanitary towels-an absorbent pad worn by women to absorb menstrual blood.

Responsibilities

a) **Nurse in charge:**
- Oversees the overall availability and appropriate use of diapers & sanitary towels

b) Guardian
- Ensures the appropriate use and disposal of diapers & sanitary towels

c) Nurse
- Issues and ensures appropriate use and disposal

d) Support staff
- Ties, labels, transport the waste to the transfer station and replace the yellow liner bag.

e) Equipment operator (Incinerator /Macerator)
- Appropriate and safe treatment and disposal

Hazards and Safety Concerns

If the above items are not handled properly,theymay lead to;
- Rashes and bedsores
- Skin infections

- Clogged drainage systems, plumbing problems and high maintenance costs
- Environmental degradation

Procedures

Materials and Equipment

- Diapers
- PPE
- Hand hygiene commodities
- Transfer trolleys
- Liner bags
- Waste Bin
- Labels
- Segregation chart
- Incinerator

NOTE: Procurement department shall ensure the purchase of good quality diapers (as per the specifications).

A. Downing a diaper

- Perform hand hygiene
- Wear disposable gloves
- Ensure sanitizer 70% alcohol , protective barrier cream and waste receptacle are within arm's reach
- Prepare the client
  - Child lies on the back
  - Adult lies on side.
- Unstrap the diaper
  - **Adult:** Lift up the upper leg place the diaper in-between the legs; spread the diaper at the back. Turn the patient to lie on the back and strap the diaper.
  - **Child:** lift the legs, place the diaper under and strap.
- Remove gloves and dispose in a yellow liner labelled Infectious Waste.
- Perform hand hygiene

B. Removal of diaper

- Perform hand hygiene
- Wear disposable gloves
- Unstrap the straps
- Remove the diaper from front to back to prevent infection.
- Wipe the patient front to back

- Roll up the diaper
- Dispose off in a yellow bin labelled “diapers”
- Remove gloves and dispose in yellow liner
- Perform hand hygiene

C. Segregation:

- Segregate the diapers in a yellow bin labeled infectious waste

D. Collection and transportation:

- Infectious waste must be collected daily form the point of generation and taken to the waste treatment site.

E. **Treatment and Disposal :**

- Diaper and pads must be incinerated in high temperatures of 11000C

Scope

This procedure shall apply to the disposal of special sharps waste in health care facilities to ensure safety of all health care workers and community

Purpose

To effectively handle and dispose special waste safely in order to prevent hazards associated with poor sharps waste management

Terms & Definitions

Special sharps waste -These are sharps which cannot fit in to the standard sharps safety box, for the purpose of this SOP special sharps will include: trucut biopsy needle, chest tube cannula, central line introducer and cord clumps

Responsibilities

a) HOD Public health

- Has the overall responsibility to ensure that the requirements for safe handling and disposal of special sharps waste are available
- Purchase good quality special safety box (as per the specifications)

b) **Nurse in charge:**

- Oversees the overall appropriate use and containment of special sharps.

c) **Health care workers**

- Ensure segregation of special waste at the point of generation.

d) **Waste Handlers**

- Seal and transport the safety box to the transfer station and replace appropriate safety box

e) **Incinerator operator**

- Appropriate safe treatment and disposal

Hazards and Safety Concerns

Caution to be observed to avoid:

- Sharps injury
- Transmission of blood-borne infections

Procedures

Materials and Equipment

- Special Safety box
- PPE
- Hand hygiene commodities
- Waste transfer trolleys

i. Ensure assembled special safety box

ii. Dispose all the sharps at the point of generation in rigid, leak proof sharps container labeled as biohazard waste with biohazard symbol and phrase.

iii. Appropriate PPE will always be worn when performing procedures using these sharps.

iv. Ensure that the safety box is in the designated area with the correct label and filled to three quarter full or shall be disposed of once week even if not ¾ full Assemble a new safety box to replace the disposed one

v. Transport sealed safety boxes to the temporary storage area awaiting removal

vi. Incinerate the sharps at 11000Cand dispose the ash into the ash pit.

Scope

This SOP provides information on classification of chemical wastes, proper containerization and labeling, storage, disposal and special handling procedures for various chemical wastes generated in health care facilities.

Purpose

To ensure safe management of chemical waste to protect human health and the environment

Responsibilities

a) Health care workers

- Ensures that chemicals waste is segregated into a brown container and liner marked with Biohazard sign, and labelled Chemical waste.
- Read and be well acquainted with the MSDS for each chemical

b) Lab manager

- Ensures that appropriate and adequate chemical waste management practices are in place and that all staffs are trained and adhere to the procedures and policies provided.
- Ensure all chemicals received in the laboratory have MSDS.
- To report any breaches in safe chemical waste handling practices that might harm human health or the environment.

c) Laboratory workers

- To determine and identify hazardous chemical waste by following appropriate guidelines on disposal of various chemical waste.
- Properly label and store chemicals
- Read and be well acquainted with the MSDS for each chemical

d) Biosafety programs officer

- They should provide guidance and training for laboratory workers on proper hazardous chemical waste management.

- The team should establish systems to monitor compliance with the agreed-upon chemical waste procedures;
- The department should conduct regular and routine audits of waste handling system.

Target Chemicals:

Chemicals that are commonly found in health care settings include:

Laboratory chemicals, cleaning products, ethidium bromide gels, ethidium bromide contaminated waste(gloves, paper towels etc), phenol/chloroform contaminated waste, chemically contaminated sharps, mercury, mercury containing bulbs and thermometers, x-ray film, oil, paint cans, aerosols, batteries, silica gel, pesticides and herbicides, flammable and combustible liquids, 10 or 20 L solvent cans, lead, asbestos, etc. but does not include explosives, or materials containing or contaminated with polychlorinated bi-phenyls (PCB's).

Hazards and Safety Concerns

- Broken Glass Equipment (broken beakers, pipets, etc. that are waste) should be promptly swept up and disposed of in rigid containers. When the container is full tape it shut.
- Broken Thermometers (Mercury).
  - Immediately clean up broken glass and spilled mercury from broken thermometers.
  - Do not handle mercury by hand.
  - Enclose thermometer pieces in a sealed jar with a small amount of water over the mercury and follow chemical waste packaging instruction for disposal.

Expired Chemicals-That are flammable, corrosive and explosive in nature.

Procedures

A. **Chemical Waste Identification**
   - Label each container you package with its identity – Material Safety Data Sheet (MSDS)
   - Attach a properly, completed Chemical Discard Tag on each waste container.

B. Segregation
   - Segregate the chemicals considering chemical compatibility when packaging.

C. Storage
   - Store chemicals in closed containers that will not leak.
   - Store liquids separately from solids.
   - If you have multiple containers of the same chemical, pack your chemicals in a strong chemical waste receptacle.

D. Collection

- Chemical waste must be collected by specialized chemicals waste collectors.
- Collectors must be licensed and they should know how to request for the collection of chemical /hazardous waste.

E. Disposal

- Always refer to MSDS when disposing chemicals for guidance on the best method of disposal.
- Small amounts of pharmaceutical waste may be incinerated with the other wastes.
- Disposal of chemical waste and contaminated items to trash and/or municipal sanitary/ sewer must be done after pre-treatment of chemicals waste all the times.

CHAPTER 6: WASTE TREATMENT AND DISPOSAL

MINISTRY OF HEALTH	WASTE TREATMENT AND DISPOSAL 6.1 Diesel Fired Incinerator Operation SOP	SOP/MOH /HCWM-6/001 VERSION : 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

An outline of operations and safety procedures of a diesel fired incinerator

Purpose

To provide procedures for operating and monitoring of a diesel fired health care waste incinerator

Terms and definitions

Diesel fired incinerator- an incinerator that requires a fossil fuel (diesel) to operate and continuous electric power supply

Emissions-The production and discharge of pollutants especially gas or radiations

Residue-any solid waste remaining after incineration or processing that is not completely burnt or recovered including any of the following; grate sifting, dross, skimming', slug or sludge solids and ash

Fire die down: This is extinguishing fire

Responsibilities

a) Facility Management Team

- Provide the waste treatment equipment; fuel and operational budget and vaccinations for the incinerator operators
- Ensure there is adequate trained manpower

b) The waste management officer

- To ensure healthcare waste is segregated, stored, and transported to the treatment facility before disposal
- Securing of site and final disposal of ash
- Monitoring of waste emissions and residue

c) Maintenance officer

- Regular inspection, servicing and maintenance of the incinerator and ensuring that PPM is in place
- To attend to any repair request raised by the operator

d) Waste handlers

- Removal of waste from generation points and transportation to the incinerator site

e) Incinerator Operator

- Operate the incinerator and maintain records of waste treated and disposed
- Ensure proper maintenance of sanitation within the incinerator area
- Report any malfunctions of the incinerator to the maintenance officer

Hazards and Safety Concerns

- **Burns –** The incinerator operator must follow operation guidelines and wear appropriate PPE (Leather Gloves)
- **Spillages –** Spillage of HCW may occur when loading the waste in the incinerator. Spill kit and training on management on spillages must be provided at incineration area.
- **Explosions –** Care must be taken to ensure explosive materials are not incinerated.
- **Smoke and fumes** – Incineration produces smoke and fumes, therefore the Incinerator operator must be provided with adequate and recommended PPE's at all-time i.e. Fume masks

Procedures

Materials and Equipment's

- Tool box to include monitoring equipment
- Personal Protective Equipment (PPE)
- Incinerator Burn log
- Maintenance Records and registers

A. Before starting operation

- Check the maintenance log in case a previous user has experienced a problem that will prevent the incinerator being used as usual.
- Check that the Incinerator Logs (Daily and Monthly) are up to date and record any new data relevant to the upcoming run including the amount and type of waste to be incinerated.

- Don PPE before handling any waste or performing maintenance. Avoid contamination during doffing of PPE
- Check that enough fuel is available for operating the incinerator.
- Perform any routine maintenance checks and record the results in the maintenance log.
- Remove any ash from the incinerator combustion chamber
- Rake ash into a heat-proof, puncture-proof container.
- Dispose the ash in the ash pit or package and label appropriately for of site disposal.

B. Before burning waste

- Preheat the incinerator for 20- 30 minutes or as per the manufacturer's instructions.

C. Loading the waste

- Load one-quarter of the incinerator's hourly capacity every 15 minutes. Poke the waste before additional loading.

D. Monitor the Combustion Process

- Do not leave the incinerator unattended during operation.
- Monitor the following; (i)temperature, (ii)air inlet, (iii)fuel injection, (iv)clogging of the flume throughout the combustion process.
- Monitor the color of the smoke emitted at the chimney.

NOTE: The following materials should not be incinerated: chemical residues, genotoxic and radioactive waste, inorganic compounds, pressurized containers, halogenated plastics and waste with high content of heavy metals.

E. Burn down

- Add the last load batch and burn for 30 minutes.
- Turn off the burners and leave the blower fans running for at least one hour.
- Shut off the fuel supply and allow the fire to die down.
- Do not leave the incinerator until the fire has died down completely.
- Ensure that the area is clean and that all materials, including PPE, are cleaned and put away at the end of the day.
- Take a bath before leaving work.

F. Documentation

Record all incineration activities in an Incinerator Burn log; Type of waste treated, quantities in (Kgs), operating temperatures and incineration time

NOTE: Kindly go to Appendix 5 below for Diesel incinerator burn log and maintenance schedule template

References

1. *Ministry of Health; The National Health Care Waste Management Plan, Kenya 2008-2012*
2. *World Health Organization; Small-scale incinerators for health-care waste. WHO/SDE/WSH/04.07. World Health Organization, Geneva; http://www.who.int/water_sanitation_health/medicalwaste/smallincinerators/en/*

Scope

This covers an outline of operation, safety procedures, testing and validation of an autoclave.

Purpose

To provide guidance to safely operate and test medical waste autoclaves to ensure effective disinfection of waste

Terms and definitions

Autoclave – an equipment which uses heat, steam and pressure to inactivate microorganisms and sterilize medical waste

Validation – Autoclave validation is a quality assurance procedure used to ensure that the autoclave reaches adequate temperature for an adequate amount of holding time to sterilize biological agents and wastes

Responsibilities

a) **Facility Management Team**
   - Provide autoclave equipment; operational budget and vaccinations for the autoclave operator(s).
   - Ensure adequate trained man power.

b) **The waste management officer** and **laboratory manager**
   - To ensure safe use of the autoclave.

c) **Autoclave Operator** –
   - To safely operate the autoclave as per the laid down procedures,
   - To conduct tests to validate the sterilization for every loading

d) **Maintenance officer** –
   - To carry out PPM activities
   - To attend to any malfunctions as may be raised by the operator

Hazards and Safety Concerns

Risks

- Substantial heat and pressure generated by the autoclave
- Heat from steam, hot liquids and other materials, including containers, the autoclave chamber and door
- Falling items e.g., heavy containers of waste being put into/removed from autoclave
- Infectious waste, including untreated waste and waste from a failed treatment cycle
- Sharps, when glassware has broken or has been placed in bags rather than puncture-proof containers
- Possible explosion of the autoclave

Safety Concerns

- Never autoclave materials that contain toxic agents (e.g., disinfectants), corrosives (e.g., acids, bases, bleach, phenol), solvents or volatiles (e.g., ethanol, methanol, acetone, chloroform), or radioactive materials.
- Training of autoclave operatorson equipment safety measures e.g. potential burn hazard, emergency switch, safety valves, electrical isolators, and the use of fire extinguishers.

Procedures

Materials and Equipment

- Autoclave material
- Autoclave containers/bins
- Autoclave bags
- Autoclave tape
- Integrator strips
- Self-contained biological indicators (SCBIs)
- Personal protective equipment (PPE)
    - Latex or rubber gloves for handling cool waste and other potentially infectious materials
    - Thick, elbow-length, heat-resistant gloves for handling any hot materials
    - Safety glasses
    - Overall
    - Lab coat
    - Safety shoes/boots

A. Autoclave operation

i. Wear appropriate PPE (gum boots, overall, gloves, safety glass).

ii. Perform routine maintenance checks.

iii. Prepare waste to be autoclaved

- ✓ Check state of waste bag: closed, not overfilled or damaged, labeled no sealed bottles.
- ✓ Bag should be closed by process test strip to confirm sterility after autoclaving.

iv. Record the weight / number of safety boxes and bags to be treated and log in the operation log.

v. Autoclave preparation:

- ✓ Connect the power: Plug the power, turn on the switch.
- ✓ Add demineralized water into the water container inlet
- ✓ Set sterilizing temperature and time.

vi. Loading:

- ✓ Put the waste bags into the loading bins,
- ✓ Do not overfill.
- ✓ Add chemical indicator in the load
- ✓ Put the baskets/loading bin into the autoclave chamber
- ✓ Close the autoclave;

NB: do not tighten the lid too much to avoid damages of the rubber seal.

vii. Record the time when Sterilization begins

viii. Chart the pressure readings in the operation log

ix. Record the time when sterilization stops

x. Allow Aeration/cooling of the autoclave after sterilization is complete

xi. Wait until pressure gauge falls to zero.

xii. Unloading of the waste

- ✓ Wear heat-insulating gloves, eye protection, lab coat, and closed-toe shoes.
- ✓ Ensure that the cycle has completed and both temperature and pressure have returned to a safe range.
- ✓ Stand back from the door as a precaution and carefully open door no more than 1 inch. This will release residual steam and allow pressure within liquids and containers to normalize.

- ✓ Allow the autoclaved load to stand for 10 minutes in the chamber to allow steam to clear and trapped air to escape from hot liquids.
- ✓ Do not agitate containers of super-heated liquids or remove caps before unloading.
- ✓ Remove items from the autoclave.

xiii. Shut autoclave door and turn off from power source.

xiv. Remove PPE and perform personal and hand hygiene.

xv. Secure the area.

B. Documentation

- Autoclave Operation Log – for recording operation procedures, each cycle must be recorded.
- Autoclave Validation and Challenge Test Log -

NOTE: For more information about the (i) Autoclave Operation Log and (ii) Autoclave testing and validation log go to Appendix 6 & 7 respectively

References

1. *Ministry of Health,2015: Guide for training health care workers and health care waste management*
2. *PATH 2010: The incinerator guide book: A practical guide for selecting purchasing, installing operating and maintaining small scale incinerators in low resource settings*

MINISTRY OF HEALTH	WASTE TREATMENT AND DISPOSAL 6.3 Medical waste shredders	SOP/MOH /HCWM-6/003 VERSION : 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

An outline of the operations, procedure and safety concerns to be followed when operating a shredder.

Purpose

To provide guidance to the operators and maintenance officers on how to safely operate the medical waste shredders

Terms and definitions

Waste Shredder- This is a machine used to break large waste particles before disposal

Shredder hopper- Part of the shredder used for loading waste before shredding

Chipper chute- A vertical or inclined plane, channel, or passage through which waste particles are moved by means of gravity into the shredder

Discharge chute- An inclined channel through which the shredded waste gets discharged from the shredder

Responsibilities

a) **The Waste Management officer**
   - Responsible for the safe use of the shredder.

b) **Shredder Operator**
   - Safely operate the shredder as stated in the procedures

c) **Maintenance officer**
   - Carry out preventive maintenance activities and attend to any malfunctions raised by the operator.

Hazards and Safety Concerns

- Rotating cutting blades
- Noise

- Entanglement
- Eye injuries
- Flying debris
- Pricks

Procedure

Materials and Equipment

- Eye and hearing protection
- Foot wear
- Overall
- Helmet
- Gloves
- Heavy duty Boots

A. Pre-operational safety checks

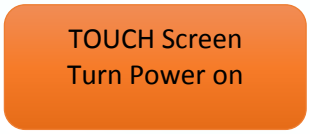
a) Check all bolts and screws for proper tightness to ensure the machine is in safe working condition.
b) Ensure all guards are fitted, securely attached and functional.
c) Never operate without the shredder hopper, chipper chute, or discharge chute properly attached to the machine.
d) Be familiar with all controls and their proper operation.
e) Faulty equipment must not be used, report suspected faulty machinery immediately

B. Shredder Operation

1. Wear PPE (Helmet, Google/face shields, respirators, Overall, Apron, Protective gumboots)
2. Perform Daily clean up procedures in the Shredder room.
3. Perform Daily maintenance checks

a. Check Oil levels at the gear reducer, Shredder gearbox oil and the tipper oil.
b. End plate bearings fitting.
c. Check for any loose fasteners
d. Check the discharge chute/screen for any remaining materials

1. Make sure there are no people in the shredder room
2. Turn the main power switch **"ON".** Turn the control power switch on. The screen should turn RED. The screen read



3. The screen will read MCR not Reset. Press the "**MCR ON RESET"** Button in the control panel. This will turn on the Master control relay. If the relay button does not turn on, make sure the Emergency STOP button at the control panel is pulled out.
4. Press and Hold the Shredder Start/RUN button. A warning horn will sound for 5 seconds, at the end of the 5 seconds the shredder will start.(***The knives will run anticlockwise for 5 seconds to clear any debris in the knives then it will run normally)***
5. Load the Shredder
   a) To load the Shredder, use the tipper system. Do not load the shredder by hand.
   b) Ensure the power supply to the tipper is on and the Emergency stop button is pulled out.
   c) Turn "**ON**" the start button at the control panel
   d) Wheel the trolley/Aluminum bin to the loading cart.
   e) Use the lever to dump the waste by "PULL UP" and " PULL DOWN"
   f) To continue loading.
   g) Feed the shredder steadily

IF there is a jam the "**SHREDDER JAM**" light will glow; this means the PLC has shut the shredder down.

Determine the cause of the JAM

- If it's a non-shreddable item in the cutting chamber, shut off and lock out the main power supply, remove the object and restart the Machine
- If the Machine is overloaded, RESET and start the shredder; DO NOT feed any more material into the hopper until the current material is cleared
- To reset the Shredder jam, Press and Hold the "SHREDDER JAM" button, press the "fault reset" button in the touch screen, or turn the control power key switch to OFF and back to ON and Restart the shredder normally.

6. Stopping the shredder
   - Stop feeding the shredder
   - Keep running the shredder until the cutting chamber, discharge chutes and conveyer belts are empty
   - Press the **"STOP"** button on the control panel

     DO NOT USE THE EMERGENCY STOP,
     It's only for EMERGENCIES
   - Turn the panel key switch to "**OFF"** and remove the key
7. Remove the shredded waste and pack to liners ready for final disposal.
8. Remove the PPE, clean and perform personal hygiene
9. Secure the building and leave.

C. Documentation

- Shredder operation log

References

1. *PATH 2010: The incinerator guide book: A practical guide for selecting purchasing, installing operating and maintaining small scale incinerators in low resource settings*

MINISTRY OF HEALTH	WASTE TREATMENT AND DISPOSAL 6.4 Microwave Treatment of Medical Waste	SOP/MOH /HCWM-6/004 VERSION : 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

This covers an outline of operation, safety procedures, testing and validation of a Microwave Treatment of Medical waste

Purpose

To provide guidance on how to safely operate and test medical waste Microwave to ensure effective disinfection of waste

Terms and definitions

Medical Waste Microwave – an equipment which disinfects medical waste by exposing it to microwave radiation in the electromagnetic spectrum.

Responsibilities

a) Facility Management Team

- Provide Microwave equipment; operational budget and vaccinations for the operator(s).
- Ensure adequate trained man power.

b) The waste management officer

- To ensure safe use of the Waste Microwave

c) Waste Microwave Operator –

- To safely operate the Waste Microwave as per the laid down procedures,
- To conduct tests to validate the sterilization for every loading

d) Maintenance officer

- To carry out PPM activities
- To attend to any malfunctions as may be raised by the operator

Hazards and Safety Concerns

Risks

- Direct microwave exposure
- Substantial heat generated by the Microwave
- Infectious waste, including untreated waste and waste from a failed treatment cycle
- Sharps, when glassware has broken or has been placed in bags rather than puncture-proof containers

Safety Concerns

- Never Microwave materials that contains toxic agents (e.g., disinfectants), corrosives (e.g., acids, bases, bleach, phenol), solvents or volatiles (e.g., ethanol, methanol, acetone, chloroform), or radioactive materials.
- Training of Microwave operator on equipment safety measures e.g. potential burn hazard, emergency switch, safety valves, electrical isolators, and the use of fire extinguishers.

Procedures

Material

- Microwave Equipment
- Microwave containers/bins
- Microwave bags
- Self-contained biological indicators (SCBIs)
- Personal protective equipment (PPE)
    - ✓ Latex or rubber gloves for handling cool waste and other potentially infectious materials
    - ✓ Thick, elbow-length, heat-resistant gloves for handling any hot materials
    - ✓ Safety glasses
    - ✓ Overall
    - ✓ Lab coat
    - ✓ Safety shoes/boots

➢ **Below is a figure describing a step-by-step operation of the Microwave as approved by the WHO**

Figure 1. Source: www.Sterilwave.com

NOTE: Kindly visit Appendix 8 and 9 for understanding parts of a waste microwave in details and a the step-by-step operation of the Microwave

Documentation

The system is monitored by a software which ensures a full tracking of each cycle. i.e.

- ✓ The Machine produces a Printed ticket after each cycle
- ✓ Daily record with all operations done can be collected with a SD memory card.
- ✓ Connection through an IP address to remotely track the maintenance operations.
- ✓ Several languages available up to the end-user preference.

References

1. *Ecostery Waste Microwave; A Step- by-Step- How it Works;* http://ecosteryl.com/our-process/#
2. *Sterilwave process description;* http://www.sterilwave.com/technology/process-description

MINISTRY OF HEALTH	WASTE TREATMENT AND DISPOSAL 6.5 Healthcare Waste Land disposal	SOP/MOH /HCWM-6/005 VERSION : 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

An outline of operations and safety procedures for safe disposal of medical Waste

Purpose

To provide procedures for safe disposal of medical waste

Terms and definitions

Encapsulation- involves mixing waste with cement and other substances before disposal in order to minimize the risk of harmful waste injuring people who come into contact with it

Responsibilities

a) Waste Management Committee

- Provide the waste disposal equipment, operational budget and vaccinations for the Waste disposal Handlers

b) The waste management officer;

- To ensure healthcare waste is segregated, stored, and transported to the treatment facility before disposal
- Securing of the disposal site and final disposal of Treated Waste

c) Waste handlers

- Removal of waste from generation to Treatment points and transportation to the disposal site

d) Waste Disposal Officer

- Manage the Disposal site
- Ensure the medical waste is well segregated before disposal
- Ensure proper disposal of medical waste at demarcated disposal sites
- Report any concerns arising from the waste to be disposed or the disposal site to the Waste Management Office

Hazards and Safety Concerns

- Scavenging in sanitary landfills must be prevented
- Open Dumping of medical Waste is highly discouraged
- In a situation where there is no land fill you are advised to dump the medical waste in a controlled dumping site and thearea must be protected from scavengers.
- Encourage Encapsulation to minimize contamination injuries and environmental damage

Procedures

Materials and Equipments

- Land for Disposal
- Septic or Liquid waste treatment system
- Registered transporting vehicles to the disposal site(Off-site disposal)
- Personal Protective Equipment (PPE)
- Waste Disposal Records and registers

A. Healthcare Waste Land disposal

Open dumps

- Health-care waste should not be deposited on or around open dumps. The risk of either people or animals coming into contact with infectious pathogens is obvious, with a further risk of subsequent disease transmission, either directly through wounds, inhalation, or ingestion, or indirectly through the food chain or a pathogenic host species

Sanitary landfills

- It is the most preferred method of disposing less infectious medical wastes.
- Some essential elements for designing and operation of sanitary landfills include:
  - ✓ Access to site and working areas possible for waste delivery and site vehicles.
  - ✓ Presence of site personnel capable of effective control of daily operations.
  - ✓ Division of the site into manageable phases, appropriately prepared, before landfill starts.
  - ✓ Adequate sealing of the base and sides of the site to minimize the movement of wastewater (leachate) off the site.

- ✓ Adequate mechanisms for leachate collection, and treatment systems if necessary.
- ✓ Organized deposit of wastes in a small area, allowing them to be spread, compacted, and covered daily.
- ✓ Surface water collection trenches around site boundaries.
- ✓ Construction of a final cover to minimize rainwater infiltration when each phase of the landfill is completed.

- In the absence of sanitary landfills, any site from a controlled dump sites could accept health-care waste and avoid any measurable increase in infection risk. The minimal requirements would be the following:

  - ✓ An established system for rational and organized deposit of wastes which could be used to dispose of health-care wastes;
  - ✓ Some engineering work already completed to prepare the site to retain its wastes more effectively;
  - ✓ Rapid burial of the health-care waste, so that as much human or animal contact as possible is avoided.

- It is further recommended that health-care waste be deposited in one of the two following ways;

i. In a shallow hollow excavated in mature municipal waste in the layer below the base of the working face, and immediately covered by a 2-metre layer of fresh municipal waste. *(Scavenging in this part of the site must be prevented.)*

ii. In a deeper (1–2m) pit excavated in mature municipal waste (i.e. waste covered at least 3 months previously). The pit is then backfilled with the mature municipal waste that was removed. *(Scavenging in this part of the site must be prevented.)*

NOTE: Before health-care wastes are sent for disposal, it is prudent to inspect landfill sites to ensure that there is sensible control of waste deposition.

References:

1. *USAID, 2011, Namibia Integrated Health Care Waste Management Plan*
2. *World Health Organization; Treatment and disposal technologies for health-care waste*

MINISTRY OF HEALTH	WASTE TREATMENT AND DISPOSAL 6.6 Healthcare waste water Disposal	SOP/MOH /HCWM-6/006 VERSION : 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

An outline of operations and safety procedures in safe disposal of medical Waste Water

Purpose

To provide procedures for safe disposal of medical waste

Terms and definitions

Inertization- involves mixing waste with cement and other substances before disposal in order to minimize the risk of toxic substances contained in the waste migrating into surface water or groundwater.

Responsibilities

a) Waste Management Committee

- Provide the waste disposal equipment, and operational budget and vaccinations for the Waste disposal Handlers

b) The waste management officer;

- Monitor the level of hazardous HCW water being generated at the facility before Treatment and disposal

c) Waste Water Treatment and Disposal Officer

- Manage the Water Treatment and Disposal site
- Ensure the liquid waste is well treated before disposal into main water bodies
- Report any concerns arising from the waste water to be treated and disposed or the Water treatment and disposal plant site to the Waste Management Office

Hazards and Safety Concerns

- Strict limit on the discharge of hazardous liquids to sewers.
- Only in an outbreak of acute diarrheal diseases should excreta from patients be collected separately and disinfected.
- Where water use is commonly high, sewage is usually diluted.
- For effluents treated in treatment plants, no significant health risks should be expected, even without further specific treatment of these effluents.
- Excreta from patients being treated with cytotoxic drugs may be collected separately and adequately treated (as for other cytotoxic waste).
- During outbreaks of communicable diseases, effluent disinfection by chlorine dioxide (chlorine powder) or by any other efficient process is recommended.
- Encourage Inertization to minimize contamination of ground water

Procedures

- The health-care establishment should ideally be connected to a sewerage system.
- Where there are no sewerage systems, technically sound on-site sanitation such as the simple pit latrine, ventilated pit latrine, and pour-flush latrine, and the more advanced septic tank with soakaway or the aqua-privy should be provided.
- In temporary field hospitals during outbreaks of communicable diseases, other options such as chemical toilets may also be considered
- If the final effluent is discharged into coastal waters close to shell fish habitats, disinfection of the effluent will be required throughout the year.

Components of Healthcare waste water

i. Wastewater from health-care establishments is of a similar quality to urban wastewater, but may also contain various potentially hazardous components.

ii. The principal area of concern is waste-water with a high content of enteric pathogens, including bacteria, viruses, and helminthes, which are easily transmitted through water.

iii. Contaminated wastewater is produced by wards treating patients with enteric diseases and is a particular problem during outbreaks of diarrheal disease.

iv. It may also contain various potentially hazardous components, such as microbiological pathogens, hazardous chemicals, pharmaceuticals and radioactive materials which are discussed below:

- ✓ Small amounts of chemicals from cleaning and disinfection operations are regularly discharged into sewers.
- ✓ Small quantities of pharmaceuticals are usually discharged to the sewers from hospital pharmacies and from the various wards.
- ✓ Radioactive isotopes should be discharged into holding tanks by oncology departments
- ✓ The toxic effects of any chemical pollutants contained in wastewater on the active bacteria of the sewage purification process may give rise to additional hazards.

References:

1. *USAID, 2011, Namibia Integrated Health Care Waste Management Plan*
2. *World Health Organization; Treatment and disposal technologies for health-care waste*

CHAPTER 7: OCCUPATIONAL HEALTH AND SAFETY IN HCWM

MINISTRY OF HEALTH	OCCUPATIONAL HEALTH AND SAFETY IN HCWM 7.1 Handling of Infectious Waste Spills SOP	SOP/MOH /HCWM-7/001 VERSION : 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

Covers safe handling of infectious waste spills which includes preparation for clean-up and handling of solid spillages

Purpose

To safeguard personnel who may get into contact with infectious waste spills.

Responsibilities

a) Facility managers

- Provide spill kits and appropriate PPE with the guidance of the facility biosafety officer

b) Biosafety Officer

- Train health workers on how to properly handle spillage.

Hazards and Safety Concerns

- No cleaning action should be initiated without proper use of appropriate and approved PPE.
- Always cordon off the area with the spill before cleaning

Procedures

Materials and Equipment

- **Personal protection equipment**
    - Impervious safe disposable gloves
    - Goggles and/or face shield
    - Safety shoes
    - Apron
    - Masks/Respirators

- **Spill kit**
    - Effective disinfectant agent (i.e., 10% bleach made fresh daily, clidox, 2% amphyl, etc.)
    - Absorbent paper towels; may also include spill pillows for large spills
    - Small disposable broom with dustpan
    - Infectious medical waste bags
    - A waterproof copy of spill response and cleanup procedures

A. Solid infectious waste spills (e.g. a waste bin or sharps box is spilled)

- Evacuate the area around the spill and cordon off the area.
- Prevent further spill.
- Do not touch or step on the waste.
- Wear appropriate PPE using tongs, a dustpan and brush or other suitable tools, clear up the spilled waste. A magnet can be useful for picking up spilled needles from a needle or hub cutter.
- Collected in the most appropriate container that is readily available. , Wash and disinfect the floor according to normal procedures.
- Ensure that the waste is packaged and labeled appropriately.
- Wash and disinfect the tools that were used in the cleanup.
- Wash and disinfect hands thoroughly.

B. Spot cleaning of small surface area liquid spills (biological)

- Pour alcohol on a paper towel or cloth
- Allow 10-15 minutes contact time of and wipe up the spill
- Discard all contaminated materials, including the gloves in the waste container for infectious medical waste.
- Wash and disinfect hands thoroughly.

C. Cleaning after larger surface area liquid spill

- Use an appropriate spill kit.
- Pour alcohol on a paper towel or cloth
- Allow 10-15 min contact time and wipe up the spill area.
- Use absorbent material to absorb the blood and/or body substances.
- Use dustpan and scraper to collect the absorbent materials and spill.

- Remember that absorbed materials have the same properties and hazards as the original spilled materials.
- Dispose of all collected material into the containers for infectious medical waste.
- Wipe the area with a damp paper towel.
- Mop the area with a detergent solution.
- Wipe the site with disposable towels soaked in a solution of 1% (10,000 ppm) available chlorine.
- Clean and disinfect pan, scraper, mop and bucket.
- Dispose of gloves and paper towels (without chlorine) into the container for infectious medical waste.
- Dispose of paper towels soaked in chlorine solution into the bin for normal waste (as chlorine can damage autoclave for treatment of medical waste).
- Clean and disinfect re-usable personal protection equipment immediately after use.
- Wash and disinfect hands thoroughly.
- The spill kit is re-stocked and returned immediately after the cleaning.

E. Reporting and Recordkeeping

- When the contaminated area has been cleaned, complete the Incident Reporting Form

Reference

1. Guidelines for Anti-Retroviral Therapy in Kenya, 4th Edition

MINISTRY OF HEALTH	OCCUPATIONAL HEALTH AND SAFETY IN HCWM 7.2 Post Exposure Prophylaxis (PEP) SOP	SOP/MOH /HCWM-7/002 VERSION : 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

All healthcare waste handlers within the facility and plant/equipment operators

Purpose

To ensure that all the people exposed to need-stick injuries and body fluid flashes or accidental cuts are taken through post-exposure prophylaxis procedure

Responsibilities

1) **Hospital Management**

- Ensure that PEP infrastructure is in place; Drugs available 24 hrs, staff to administer the drugs and provide adequate counselling.

2) All waste handlers and health workers exposed to needle stick injuries

- Stick injuries shall immediately report to their supervisors

Hazards and Safety Concerns

- Exposure to infectious waste can lead to HIV/AIDS, Hepatitis B & C, tuberculosis, tetanus, Ebola and viral hemorrhagic fevers infections.
- Physical injuries from sharps

Procedures

Materials and Equipment

- HIV/AIDS tests kits
- ARVs

A. Exposure to Need-stick Injury

i. Encourage bleeding from the site but do not scrub or cut the site, washing it with soap and water.Do not use iodine,bleach or alocohol as they may irritate the wound and make it worse.

ii. Report the injury to your supervisor

iii. Determine risk associated with exposure

- Evaluate the source and exposed person
- Assess the potential risk of infection
- Both the source and exposed person need to be counseled for HIV-testing. A known source should be tested for HIV; if the source person is not willing to be tested, he/she should not be coerced into having the test.
- Discarded sharps/needles should not be tested

iv. The exposed person should not receive ARV drugs without being tested. However, where immediate testing is not feasible, treatment should not be delayed since HIV testing can be carried out the following day or soon thereafter. Counseling and support should be provided to the exposed and for those who decline to be tested; they should be offered further appropriate support.

v. HIV test should be done at baseline, at 3 months and at 6 months for person exposed.

vi. Offer PEP as appropriate

vii. Treatment should not be continued if status of exposed individual remains undetermined

viii. Hepatitis B vaccination should be offered to non-immune persons where available.

ix. Review staff health and safety: evaluate exposure and determine whether local preventive procedures could be improved

x. Provide follow up testing and counseling for the exposed person

xi. Proper documentation and reporting of event and patient management

xii. Post exposure prophylaxis in not indicated if:

- If the exposed person is HIV-positive
- Exposure to intact skin with potentially infectious material, any exposure to noninfectious material (e.g. faces, urine, saliva and sweat)
- If the exposure occurred more than 72 hours previously

Reference

1. *Guidelines for Anti-Retroviral Therapy in Kenya, 4th Edition.*

MINISTRY OF HEALTH	OCCUPATIONAL HEALTH AND SAFETY IN HCWM 7.3 Immunization for Hepatitis B and Tetanus	SOP/MOH /HCWM-7/003 VERSION : 00 REVIEW DATE……..…/……. /….. DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

All healthcare waste handlers within the facility and will include waste handlers and plant/equipment operators

Purpose

To ensure that all the people involved in healthcare waste are protected against hepatitis B & tetenus

Responsibilities

a) Hospital management

- Ensure that appropriate and adequate vaccines are available
- Ensure all staff working at the hospital are fully vaccinated

b) All Hospital Staff

- *E*nsure that they are fully vaccinated as required

Hazards and Safety Concerns

- Any contact with body fluids, tissues and sharps is a potential of transmission of hepatitis B & tetenus.

Procedures

Materials and Equipment

i. Hepatitis B vaccines
ii. Tetanus Vaccines
iii. Syringes & needles,

iv. Refrigerators,

v. Sharps containers

A. Hepatitis B Vaccine (HBV)

- All New & old staff not immunized to undergo HBV vaccination
- Staff to present themselves for vaccination
- Use 0, 1 and 6 months schedule of 3 injections.
- Assess the risk of HBV exposure and determine the immune status of the patient
- Booster doses not necessary.

B. Tetanus

- Injured staff to irrigate injured area/part with water
- Injured staff to present themselves to vaccination center
- Treat exposure site appropriately
- Give tetanus immunization or booster if more than ten years have passed since immunization

MINISTRY OF HEALTH	OCCUPATIONAL HEALTH AND SAFETY IN HCWM 7.4 Personal Protective Equipment for Healthcare Waste Handlers –Sop	SOP/MOH /HCWM-7/004 VERSION : 00 REVIEW DATE 21/11/2016 DIVISION OF ENVIRONMENTAL HEALTH AND SANITATION

Scope

All healthcare waste handlers within the facility and will include waste collectors and plant/equipment operators

Purpose

To ensure that all the people involved in healthcare waste are protected against occupational diseases and accidents

Responsibilities

a) The Hospital management

- Shall ensure that the appropriate PPEs are provided for all workers in healthcare waste stream

b) All waste handlers

- Shall wear appropriate PPE while on duty

c) Materials and Equipment

- Surgical gloves, heavy duty gloves, protective boots, apron, overalls, goggles, helmet, surgical masks and particulate respirators.

Hazards and Safety Concerns

- Exposure to infectious waste can lead to HIV/AIDS, Hepatitis B & C, tuberculosis, tetanus, Ebola and viral hemorrhagic fevers
- Physical injuries from sharps

Procedures

***A.* Putting on of PPE**

I. Gown/Apron

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist

II. Mask Or Respirator

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

III. Goggles Or Face Shield

- Place over face,eyes and adjust to fit

IV. Gloves

- Extend to cover wrist of isolation gown

B. Removal of PPE

I. Gloves

- Outside of gloves is contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist
- Peel glove off over first glove
- Discard gloves in waste container

II. Goggles Or Face Shield

- Outside of goggles or face shield is contaminated!
- To remove, handle by head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container

III. Gown/Apron

- Gown front and sleeves are contaminated!
- Unfasten ties
- Pull away from neck and shoulders, touching inside of gown only

- Turn gown inside out
- Fold or roll into a bundle and discard

IV. Mask

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- Grasp bottom, then top ties or elastics and remove
- Discard in waste container

C. Hand Hygiene

I. Putting on PPE

- Wash hands
- Dry hands adequately
- Put on PPEs in this order; gloves, Mask, Goggles,face mask/respirator, Headgear/helmet, Overall, Boots and Apron

II. Removal of PPE

- Remove as follows Gloves, Goggles ,Apron/overall/dustcoat, face mask/respirator, Headgear/helmet, ,, Boots, Wash hands

APPENDICES

Appendix 1: HCWM Facility Plan Template

Name of The Hospital _____

County _____

Period of the HCWM Plan_____

A. Staffing Plan

A– 1 Roles and Responsibilities

Cadre	Roles and Responsibilities
Medical Superintendent:	
Nursing Officer In-Charge:	
Health Care Workers (Doctors ,Clinicians,laboratory technologist and Nurses)	
Public health officer:	
Biosafety officer:	
Maintenance Officer:	
Hospital Administrator:	
IPC Committee	
Incinerator operator:	
Waste Handlers	

A-2 Staff List

Designation	Number
Consultants doctors/MOH	
Nurses	
Laboratory staff	
Patient attendants	
Waste handlers	
Incinerator Operators	
Clinicians	
HAO	
Store keepers	
Telephone operators	
Drivers	
Records officers	
Personnel officers	
Pharmacist	
Plaster technicians	
Physiotherapist	
OT	
Mortuary attendants	
Nutritionist	

Bio-medical engineers	
Social workers	
Public health officers	
Total	

B. Quantifying Healthcare Waste

Type	Quantity per week(in kg/no of SB/bin liners)
Non-infectious waste/General Waste	
Infectious waste	
Highly infectious waste	
Sharps waste	

C. HCWM handling practices

Concept	Practice
Segregation/separation into different colored waste bins	Infectious:
	Anatomical/Highly infectious:
	Sharps:
	General:
	Food:
Storage of waste awaiting disposal	Safety boxes:
	Infectious waste:
	Highly infectious/Anatomical:
	General waste:

C-1 Guidelines for Bin Placement

Ward/Department	Black	Yellow	Red
TOTAL			

D. Treatment and Disposal Procedures

Category of Waste	Treatment Method	Disposal Method
Sharps		
Highly Infectious/ Anatomical Waste		
Infectious Waste		
General Waste		
Food Waste		

E. Schedule for Treatment and Disposal of Waste

Day	Incineration	Burn	Burying
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

Note: ***Anatomical waste is disposed of immediately after generation into protected pits, Safety boxes are collected when ¾ full, Food waste is collected after every meal time.***

F. List the proposed improvements the hospital needs to work on HCWM/ Occupational PEP Systems in order of priority.

1.
2.
3.
4.

G. HCWM supplies and Operational Costs

Supplies	Annual Quantity	Cost per Unit	Total Cost (Kshs.)
Safety boxes			
Color coded bins			
Color coded bin liner bags			
Heavy duty rubber gloves			
Heavy duty leather gloves			
Goggles			
Helmet			
Apron			
Heavy duty boots			
Respirators/masks			
Hand broom			
Waste Transfer Trolleys			
Shovel			
Ash rake			
Equipment maintenance costs			
Fuel for incinerator (Quarterly)			
TOTALS			

H. Training and capacity building on HCWM through CME's

Cadre of Staff	Frequency	Mode (departmental/hospital CMEs)
Waste handlers		
Incinerator operators		
Health Care Providers		
PEP Providers		

I. Monitoring Schedule

Cadre of Staff	Supervisor	Frequency
Waste handlers		
Incinerator operators		
Healthcare providers		

J. Budget Allocation

Hospital budgetary allocation for HCWM per Quarter (3months) List other potential sources of funds?

1.
2.

K. Outline the key steps to be taken to operationalize the Facility HCWM Plan

L. Organization structure and reporting authority for HCWM in the facility

M. Annual Work plan

NO	OBJECTIVE	ACTIVITY	DATE	PERSON RESPONSIBLE	RESOURCES NEEDED	BUDGET	SOURCE OF FUNDING
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Appendix 2: Procedure for conducting facility HCWM audits

Waste auditing: the five steps		
***A.* PLAN**	**1. Define the study area.**	• Agree on schedule of audit with the management. • Set audit objectives and method. • Determine locations to be audited (entire facility or part of it). • Determine types and approximate quantities of waste to be audited.
	1. Collect background information.	Visit locations and record: • Number of employees in each location • Number, types and locations of bins (infectious and hazardous waste bins should not be located in public areas) • Types of waste seen • Who empties bins and when
	3. Prepare for the audit.	• Collect auditing equipment (PPE, scale) and tools. • Finalize questionnaire for the staff, if any. • Brief/train cleaners and handlers. • Finalize waste collection details. • Double-check locations of bins.
***B.*COLLECTION**	**1. Waste Collection**	• Waste handlers must wear PPE. • Collect all waste daily. • Label bin/bags showing location and day. • Record relevant collection details.
	2. Transport the waste to the area for segregation.	• Store waste on site if possible, otherwise transport to secure location using a licensed transporter. • Liquid waste should be transported separately and very carefully. It may not need to be segregated but will need to be classified and quantified.
C. SEGREGATION	**1. Prepare the segregation area.**	• Ensure PPEs are used before handling waste. • Cover tables with plastic for solid waste. • Set up tables and scales. • Collect buckets, bins, brooms, etc. • Have water and first aid kit at hand.
	2. Segregate the solid waste.	• Count and/or weigh individual bags containing waste materials. • Record findings on data sheet. • Dispose of waste.

	3. Carry out clean-up and decontamination at the end of each day.	• Dispose of waste. • Clean and disinfect tables. • Clean buckets and disinfect other equipment. • Sweep and disinfect floor. • Shower and change clothes.
D. TREATMENT and DISPOSAL		• Auditor should visit treatment facilities and final disposal area (either on-site or off-site) to collect information. • Check if the incinerator, if used, meets the standards. • Record how they treat the chemical and liquid waste. • If the lab has a sewage treatment plant (STP) or effluent treatment plant (ETP), check to see if it meets all the requirements.
E. ANALYSE	**1. Enter and analyze the data.**	• Enter data sheets into spreadsheet. • Do calculations and summaries • Ensure accuracy and consistency in data entry
	2. Prepare an audit report.	• Prepare audit report, including findings and recommendations.

2. Reporting and Recordkeeping

- Auditors should produce an audit report that includes summary findings and recommendations to the HCWM committee and HCWM coordinator
- Completed inspection checklists should be shared with the HCWM oversight committee and the HCWM coordinator.

Appendix 3: Facility Audit Checklist

Activities	Response Check Yes or No		Remarks
Section A: Staff training and safety			
Have all housekeepers/waste handlers of the facility attended training on health care waste management?	Yes	No	
Is the training that the housekeepers/waste handlers received on health care waste management documented?	Yes	No	
Is refresher training available for all housekeepers/waste handlers at least once a year?	Yes	No	
Are personnel training files available and up to date?	Yes	No	
Do housekeepers and waste handlers understand how to correctly use disinfectants to clean the facility?	Yes	No	
Do housekeepers/waste handlers correctly understand the color-coded bins for waste collection?	Yes	No	
Do housekeepers/waste handlers know what to do if there is an accidental spill?	Yes	No	
Are there SOPs for handling spills?	Yes	No	
Can housekeepers/waste handlers correctly explain how to handle infectious waste?	Yes	No	
Can housekeepers/waste handlers correctly explain how to handle sharps waste?	Yes	No	
Do housekeeping/waste handlers use proper PPE (gloves, waterproof gown, and boots)?	Yes	No	
Are PPEs in good condition and ready to use?	Yes	No	
Are all housekeepers/waste handlers properly vaccinated?	Yes	No	
Is there an injury and emergency response procedure available?	Yes	No	
Do all housekeepers/waste handlers understand the injury and emergency response procedure?	Yes	No	
Do housekeepers or waste handlers know how to report accidents and incidents when they occur?	Yes	No	
Section B: Procedures and practices			

Are responsibilities of housekeepers/waste handlers related to collecting and handling waste clearly defined for each ward or department?	Yes	No	
Are SOPs for collection and handling of wastes from the specified ward or department clearly written?	Yes	No	
Are copies of these SOPs available to housekeeping/waste handlers?	Yes	No	
Is a waste collection schedule outlined, including a timetable for each trolley route, the type of waste to be collected and number of wards to be visited clearly defined?	Yes	No	
Is this waste collection schedule posted and/or easily accessible to housekeeping/waste handlers?	Yes	No	
Section C: Segregation and transport			
Are bins clean?	Yes	No	
Are bins color-coded?	Yes	No	
Are bins labeled and posters in place?	Yes	No	
Do bins have correct color tags?	Yes	No	
Is waste segregated correctly?	Yes	No	
Are there separate trolleys for infectious/hazardous waste and for general/recyclable waste?	Yes	No	
Do the waste collection trolleys allow segregation to be maintained?	Yes	No	
Are compartments properly colored and/or labeled?	Yes	No	
Do the trolley compartments have lids?	Yes	No	
Are the trolleys clean?	Yes	No	
Section D: Floor and other areas			
Are floors clean and clear of waste?	Yes	No	
Is there adequate number of waste containers?	Yes	No	
Are signs posted to warn of wet floors?	Yes	No	
Are the mats placed at building entryway cleaned regularly (if available)?	Yes	No	
Are waste containers located where the waste is produced?	Yes	No	
Are appropriate bins available for various waste types (infectious waste,highly infectiouse, noninfectious, and sharps waste)?	Yes	No	
Are waste containers emptied regularly?	Yes	No	
Section E: Toilet and bathroom			

Are toilets and bidets visibly clean without blood or body substances, scum, dust, deposit and smears?	Yes	No	
Are sinks visibly clean with no debris, stains and spillages?	Yes	No	
Is waste removed/ emptied regularly?	Yes	No	
Section E: Waste disposal			
Are waste containers emptied daily?	Yes	No	
Are there separated collection containers for sharps waste?	Yes	No	
Are there separated collection containers for mercury waste?	Yes	No	
Section F: Spill control			
Are there SOPs for spill clean-up?	Yes	No	
Is there a mercury spill clean-up kit?	Yes	No	
Is a spill area surrounded by a barrier to prevent a spill from spreading?	Yes	No	
Are all spills wiped up quickly?	Yes	No	
Are procedures followed as indicated on the material safety data sheet?	Yes	No	
Are used rags and absorbents disposed of promptly and according to relevant SOPs?	Yes	No	

Appendix 4: Service Delivery Point Waste Container Audit Form

Enter name of service delivery point (SDP):	SDP:					SDP:					SDP:				
Enter name/location of waste container (WC): *For each waste container, mark whether the answer is Y=Yes, N=No, NA=Not applicable*	WC:	WC:	WC:	WC:	WC:	WC:	WC:	WC:	WC:	WC:	WC:	WC:	WC:	WC:	WC:
1. Are there color-coded bins in black/yellow/red?															
2. Are the bins labeled?															
3. Are there matching color-coded bin liners?															
4. Are waste segregation containers positioned near the waste generation points?															
5. Are waste segregation containers located away from patients?															
6. Is waste segregated adequately?															
7. Do patient carts have designated containers for collecting waste?															
8. Are patient collection waste containers labeled and devoted to each waste stream (sharps, infection, noninfectious)?															
9. Are sharps containers available in areas where sharps are generated?															
10. Is positioning of sharps containers within arm's reach?															
11. Are there any HCWM posters or other BCC materials posted in the facility/ward?															

Appendix 5: Diesel-fueled Incinerator

A. Incinerator Burn Log

Facility name		Incinerator's name	
Month / Year		Model	
		Serial number	

Day	**Amount of diesel used** *(liters)*	**Daily totals - Type and amount of waste (kg/box)**			**Comments**
		Sharps *(kg or # of boxes)*	**Noninfectious waste** *(kg or # of bags)*	**Infectious waste** *(kg or # of bags)*	
Monthly total					

B. Maintenance Schedule for Diesel Fired Incinerator

Maintenance of Diesel Fired Incinerators.

A. Daily Maintenance

- Check for evidence of cracks in the incinerator metal sheets casing and chamber refractory bricks.
- Check on complete removal of ash.
- Keep the area clean and disinfected.
- Carefully sweep and mop up the area around the incinerator.
- Clean tools and equipment.
- Maintain fuel stock levels available for incineration.
- Check door seals for wear, closeness of fit and air leakage of the burning chamber.
- Blower intake: Inspect for accumulations of lint or debris.
- Check on oil filter and fuel line for leakages.

B. Weekly Maintenance

- Maintain good housekeeping of the ash storage site.
- Ensure the fencing is intact.
- Control panels: Inspect and clean as required.
- Fuel intake: Investigate source of fuel leakage as required.

C. Monthly Maintenance

- External surface of incinerator and stack: Inspect and clean as required. Keep panel securely closed and free of dirt to prevent electrical malfunction.
- Refractory: Inspect external "hot" surfaces. White spots or discoloration may indicate loss of refractory.
- Secondary combustion chamber: Inspect for wear. In case of stainless steel faces a replacement may be required within 1-5 years.
- Burner: Lubricate and inspect like indicated in the manual
- Take an inventory of condition of tools and equipment.
- Lubricate the blowers

D. Yearly Maintenance

- Inform Service Company for yearly check: Overhaul the incinerator; thermocouple, motors-valve and injector, gasket seal, Control panel, burners Oil filter, oil pump corrosion.
- External surfaces: Inspect and paint with high-temperature point as required.
- Perform annual audit and documentation.
- Ensure environmental audits and licenses are obtained and still valid.
- Ensure equipment history sheet if filled whenever service of equipment is done - maintenance Schedule.

E. Reporting and Recordkeeping

- Maintenance Schedule

Appendix 6: Autoclave Operation Log

Autoclave Operation Log	**Document No:**

Department	
Autoclave make	
Autoclave Model Number	
Serial Number	

Date	**Waste Type**	**Weight (Kgs)**	**Heating Phase (mins)**	**Sterilization Phase**					**Test strip from PCD**	**Operators Name**
				Cycle start time (h:min)	Cycle end time (h: min)	Phase duration	Temperature (^{0} C)	Pressure (PSI)		

- **There may be different cycles for liquid and solid wastes, or warm up or testing cycles that run at the start of each day.**

Appendix 7: Autoclave testing and validation log

Test Report Template

Autoclave Tests after Installation

(Photo of the autoclave)

Manufacturer:

Type:

Content

1. General information on the autoclave
   - Description of the process
2. In-house conditions
   - Electricity supply
   - Water quality tests (Hardness, PH and conductivity)
   - Structural and technical prerequisites of the building
3. Delivery check
4. Operation Qualification/Performance Checks
   - Visual inspection
   - Vacuum tests (Bowie- Dick tests)
   - Hollow Load tests
   - Chemical tests
   - Thermoelectric tests
5. Summary of results/ deviations and recommendations
6. Annexes.

A. General Information

Autoclave (manufacturer)			
Location			
Person responsible for overall qualification			
Other inspectors / technician:			
Test date:			
Type of machine:			
Manufacturer:		**Serial Number:**	
Type:		**Year of manufacture:**	

A-1 Description of process cycles tested

Number	Name	Temperature (°C)	Number of evacuations	Holding time (min)

B. In-house conditions

B-1 Water Quality Test

For process optimization, the use of fully de-mineralized or at least softened water is recommended. The following values are recommended as a guide if there is no information from the manufacturer available:

Tap water:

Test	Requirement	Water available	Result
Conductivity	<= 5 µS/cm		
pH value	5 – 7		
Total hardness	<= 0,02 mmol CaO/l		

B-1.1 Structural and Technical Prerequisites at the Operator's Premises

Requirement	Available/ ok	Not available/ not ok	Measures/Remarks
Door is labeled: authorized persons only			
Lightening available			
Ventilation in servicing room			
Condensate drain with trap			
Electric connection available and correct			
Water connection available			
De-mineralized water available			
Structural separation between clean side and decontamination area			
Enough space in decontamination area for storage of waste			
Facilities for hand washing and hand disinfection (washbasin and wall dispenser)			

C. Installation of the autoclave

Requirement	OK	Not OK	Measures/Remarks
Position of the autoclave on level			
Autoclave is installed more than 20 cm away from the walls			

C-1 Delivery check

C-1.1 Correct delivery

Installation qualification		Documentation of scope of order and delivery		
Scope of order			Scope of delivery	Damaged (2)
Article description (1)	Article no.	Quantity	Quantity supplied	Yes / No Comment
Autoclave				
Steam generator				
Sterilization trays				
Sterilization basket				

(1) Whether the articles ordered were supplied is documented

(2) Whether the articles show external damage is documented

C-1.2 Information provided from the manufacturer to the operator (Documents)

Requirement	Available	Not available	Measures/Remarks
Type of products that can be disinfected with the programs			
Values defined for process parameters, e.g., time, temperature, water quantity, water, pressure			
Installation plan			
Wiring diagrams			
Description of specified standard programs and of deviations permitted from the process parameters			
Maintenance and servicing intervals			
Loading specifications for loading trolleys, trays and inserts			
Description of control and display equipment			
Description of settings for safety devices			
Procedure in the event of malfunctioning (trouble shooting)			
Safety operation procedure			

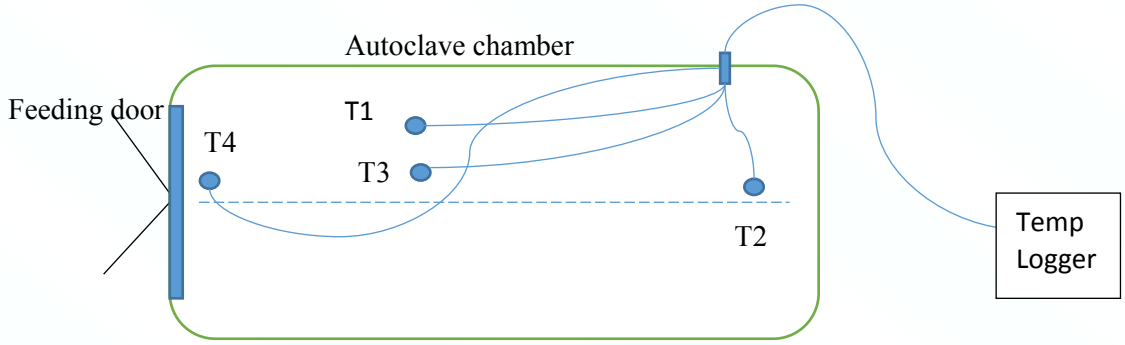
C-2 Operation qualification / Performance checklists

C-2.1 Visual Inspection

Requirement	Set point	Actual State	Not applicable	Measures/Remarks
Cold water inlet function, filling capacity				
Hot water inlet function, filling capacity				
Vacuum Pump function				
De-mineralized water inlet function, filling capacity				
Display screen function				
Temperature reached and process time in accordance to manual				
Temperature reached and process time in accordance to manual				
Requirement				
Emergency stop switch function				
Door functional check / safety				
Piping system tight				
Door tight				
Water level at steam generator / waste heater functional				
Filter check before circulation pump suction (clean, airtight)				
Connections' functional check > loading trolley connected to supply				
Air filter check (HEPA filter)				
Unlock/open doors only at process end				

C-2.2 Temperature testing in the empty chamber – Program check

T1	T2	T3	T4



Testing diagram

Figure 2 **Temperature progression – empty chamber**

Result

D. Waste to be treated – reference load

Check point	Criterion	Tick (x)	Criterion	Tick (x)	Criterion	Tick (x)	Criterion	Tick (x)
Waste to be processed	solid		Liquid		Solid and liquid		others	
	BSL I		BSL II		BSL III		-	
Waste that is difficult to clean	Hollow devices: e.g. tubes, spirals		Drilling shafts / compressed air tubes		Optics			
Hollow devices/lumens tubes	<1mm		>= 3mm		>=5mm		>=10mm	
Waste containerization	Container		Waste bag		bulky		others	

D-1 Reference load:

	Small load	Full load
Packaging		
Content		
Picture		

D-1.1 Specification of programs to be tested

Test	Load (liquid / solid etc.)	Name of Program	Time (min)	Temperature (°C)
1				
2				
3				

D-1.2 Hollow-Load-Test (PCD)

Date ……

Thermoelectric Test 1: Small load solid ……..for ……. min

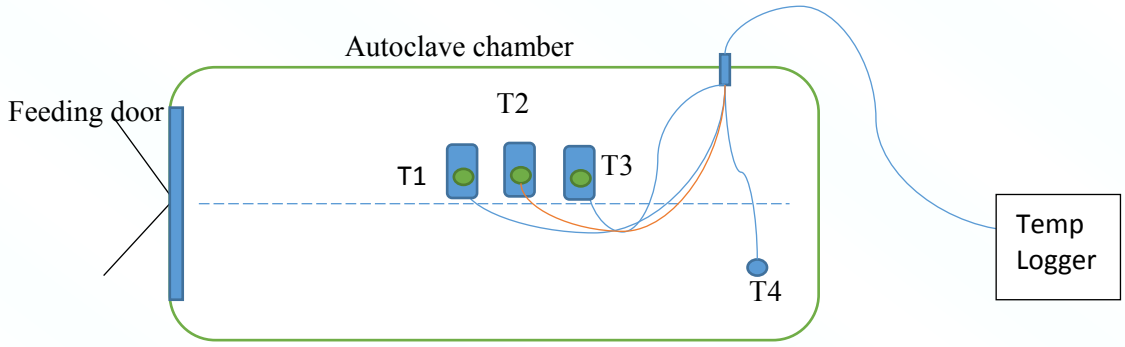
	Result	Test passed		Remarks
		Yes	No	
Temperature during holding time (Sensor 4)				
Biological Test				

Result

Figure 3 **Photo documentation Small Load (PCD)**

1.1.1 Thermoelectric Test 4: liquid …… for …… min

T1	T2	T3	T4



	Result	Test passed		Remarks
		Yes	No	
Temperature during holding time				
Sensor 1				
Sensor 2				
Sensor 3				
Sensor 4				
Biological Test				

Figure 4 Temperature progression – 200, 300, 400 ml liquid test

Result

E. Summary of results / deviation

No. (1)	deviation Area of deviation	Remarks / deviation	Performance outcome (2)	Infrastructure / Delivery Check	Comment
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

(1) Enter the number of remark or deviation

(2) Specify: slight / moderate or severe

For following process cycles the compliance with requirements were checked:

Cycle number	Description	Test temperature	Number of evacuations	Holding time (min)	
1					
2					
3					
4					
5					
6					

Appendix 8; Step-By-Step Operation of the Waste Microwave

A. Weighing and Loading

i. Waste must first be placed in Microwave containers/bins.

ii. An electronic weighting system calculates and records the weight of the waste going to be processed in order to track all operations of the process. *All kind of healthcare waste (solid, soft, cutting, glass, plastic, bandage, dialysis…) can be disinfected by the system*

iii. The handling system then lifts up the container after weighing and dumps it in the loading hopper. The hopper also includes level indicators (hopper full and hopper empty). *All these operations occur automatically.*

B. Grinding/Shredding

i. When the lid of the loading hopper is closed, the content of the loading hopper is gradually pushed by a hydraulic ram (optional) and the shredder is activated.

ii. A screen is placed under the latter to get a homogenous size under 20 mm diameter. *(This may vary depending on the manufacturer)*

iii. The homogenous waste falls to the under-mill hopper before passing to the processing screw, which brings it to the second phase of the process. *This under-mill hopper also includes level indicators*

iv. The temperature then rises up to 70°C with the friction of the blades with a volume reduction of the waste up to 85%. At this point the waste is very thin/fine and unrecognizable.

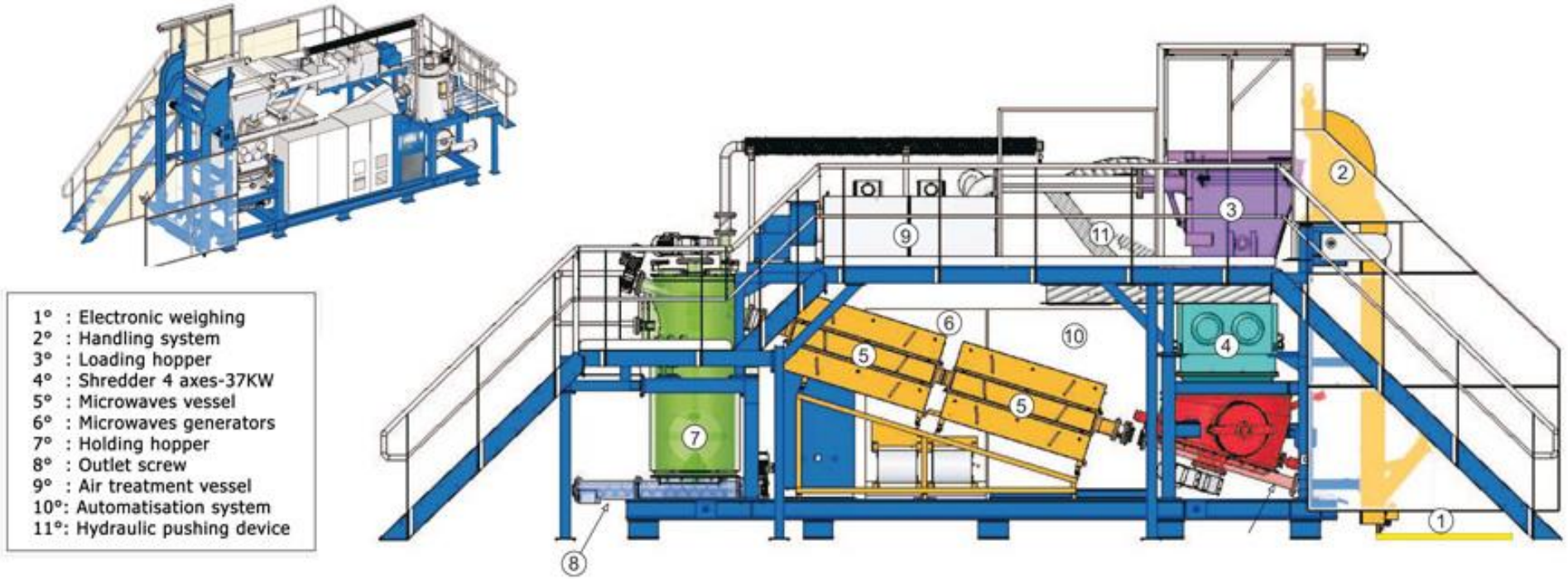
C. Microwaving

i. Waste are exposed to a temperature over 100°C-110°C by High Frequency micro-wave generator and maintained at this temperature for a standardized period in order to inactivate the waste *(Most manufactures design for 20minutes).*
ii. This makes it so possible to heat the products "to the core"
iii. The system provides for a temperature measurement at the Microwave outlet to check the treatment quality.
iv. A control system adjusts the operation of the equipment in order to maintain the desired temperature at the end of the zone *(the microwave power and the screw speed are controlled).*

D. Holding, Treatment and Unloading

i. The waste enters the last hopper where its temperature is maintained. The heat-insulated hopper is kept at its temperature level thanks to external heating resistors.
ii. The waste stays in this hopper for one hour so that the decontamination can be achieved*(Differs based on the manufacturer)*
iii. At the end of the cycle, the treated waste is automatically unloaded in a container located at the bottom of the system.
iv. The trap door of the Microwave opens and the treated waste are automatically transferred out of the machine *(waste are pushed out by the rotating/spiral blades to make sure that vessel will be empty at the end of the cycle)*
v. The waste are then placed in Microwave bags for disposal

Appendix 9: Parts of a standard Waste Microwave



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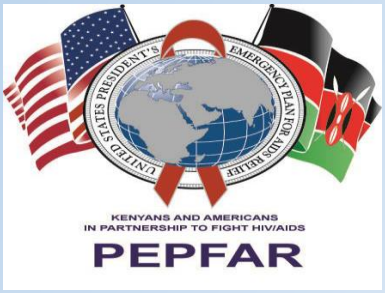
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