



KINGDOM OF LESOTHO



MINISTRY OF HEALTH



VOLUME 1 - ICWMP

INFECTION CONTROL AND WASTE MANAGEMENT PLAN (ICWMP)

January 2016

OTHER REPORTS IN THIS SERIES

This final **INFECTION CONTROL AND WASTE MANAGEMENT PLAN** forms part of a series which is intended to provide complete documentation for the requirements of a holistic management of all forms of infection and types of waste from the different types of health care facilities in the country.

This report contains the findings of a study conducted using the Rapid Assessment Tool developed by the WHO and the plan has been developed on the basis of the local conditions and findings.

The following documents form the series:

1. **Infection Control and Waste Management Plan for Lesotho
Volume 1: The Action Plan - ICWMP**
2. **Infection Control and Waste Management Plan For Lesotho
Volume 2: The Standard Operating Procedures**

Report no.	001
Issue no.	001
Date of issue	26/01/16
Prepared	Sibekile Mtetwa
Checked	World Bank
Checked	MoH
Approved	

THIS REPORT IS AVAILABLE FROM:

The Minister of Health
Attention: The Secretary of Health
Ministry of Health
Maseru
Lesotho



TABLE OF CONTENTS

TABLE OF CONTENTS.....	ii
LIST OF ANNEXES	i
LIST OF FIGURES.....	i
LIST OF TEXT TABLES	i
ABBREVIATIONS AND ACRONYMS.....	ii
EXECUTIVE SUMMARY	iii
1. INTRODUCTION	8
1.1 BACKGROUND	8
1.2 PROJECT DESIGN CONSIDERATIONS.....	11
1.3 PROJECT STRUCTURE.....	11
1.3.1 COMPONENT 1:.....	11
1.3.2 COMPONENT 2:.....	12
1.3.3 COMPONENT 3:.....	13
2. BASELINE DATA	1
2.1 INTRODUCTION	1
2.2 GENERAL LESOTHO GEO-PHYSICAL CONDITIONS	2
2.2.1 Location, Size, and Extent	2
2.3 BASELINE DATA AND BACKGROUND OF HEALTH CHALLENGES.....	3
2.4 THE STRUCTURE OF THE HEALTH CARE SYSTEM.....	3
2.5 HEALTH CARE DELIVERY SYSTEM	5
2.6 THE HEALTH SECTOR REFORM PROCESS.....	6
2.7 WASTE MANAGEMENT IN LESOTHO	8
2.7.1 Categorisation of HCW in Lesotho	8
2.7.2 Overview of the present HCWM System in Lesotho.....	9
2.8 HANDLING AND TREATMENT OF HCW.....	11
2.9 LEVEL OF AWARENESS OF GOOD HCWM PRACTICES	11
2.10 THE CERTIFICATION SYSTEM	12
2.11 THE LESOTHO QUALITY ASSURANCE SYSTEM	13
2.12 INFORMATION SYSTEM AND LICENSING	14
3. CONTEXT OF THE HCWM PLAN	15
3.1 INTRODUCTION	15
3.2 THE POLICY FRAMEWORK	15
3.2.1 Poverty Reduction Strategy (PRS).	16
3.2.2 National Health Policy (2011)	16
3.2.3 Lesotho National Environmental Policy (1998).....	16
3.2.4 Healthcare Waste Management Policy (2010)	17
3.2.5 National Tuberculosis Programme: NTP Policy and Manual	17
3.2.6 Lesotho Science and Technology Policy 2006-2011 (2006).....	18
3.2.7 ICT Policy for Lesotho - 4 March 2005	18
3.2.8 National Health Sector Strategic Plan - 2012 - 2017.....	19
3.2.9 Infection Prevention and Control Policies & Guidelines (2006)	20



3.2.10	Consolidated Lesotho National Health Care Waste Management Plan	21
3.2.11	National Implementation Plan for the Stockholm Convention	21
3.2.12	Health Telecommunications Technical Assistance Project.....	22
3.2.13	The Health Services Decentralisation Strategic Plan (2009).....	22
3.2.14	Human Resources Development Strategic Plan 2005–2025 (2004).....	23
3.3	LEGAL FRAMEWORK.....	23
3.3.1	Constitution of Lesotho.....	23
3.3.2	The Environment Act No 10 of 2008.....	23
3.3.3	The Public Health Order No. 12 of 1970	25
3.3.4	The Water Act 2008 - Water and Sewage Authority – (WASA)	25
3.3.5	Local Government Act 1997.....	25
3.3.6	The Labour Code Order 1992 - Ministry of Employment and Labour	26
3.3.7	The Hazardous and Non-Hazardous Waste Management Act, 2008	27
3.4	REGULATIONS.....	27
3.5	INTERNATIONAL CONVENTIONS AND TREATIES	28
3.5.1	The Basel Convention.....	28
3.5.2	Stockholm Convention on Persistent Organic Pollutants	28
3.5.3	The convention of biological diversity	29
3.5.4	The convention concerning the protection of world and natural heritage.	29
3.5.5	African convention on conservation of nature and natural resources.....	29
3.5.6	Summative comment on legislation for HCWM	30
3.6	INSTITUTIONAL FRAMEWORK.....	30
3.6.1	Department of Environment.....	30
3.6.2	Ministry of Health (MoH)	31
3.6.3	Ministry of Labour and Employment (MOLE)	31
3.6.4	Participating Ministries	31
3.7	PRIVATE SECTOR PARTICIPATION.....	32
3.8	FINANCIAL RESOURCES ALLOCATION.....	32
4.	DESCRIPTION OF THE ICWMP PROJECT	33
4.0	INTRODUCTION	33
4.1	THE ICWMP GOAL	33
4.2	THE ICWMP OBJECTIVES	33
4.3	THE ICWMP STRATEGIC OBJECTIVES.....	34
5.	ASSESSMENT OF HCWM IN THE COUNTRY	35
5.0	INTRODUCTION	35
5.1	THE ASSESSMENT PROCESS.....	35
5.2	THE RAPID ASSESSMENT OF THE INSTITUTIONS.....	35
5.3	SELECTION OF HEALTH CARE FACILITIES	36
5.4	BASELINE INFORMATION OF THE SELECTED FACILITIES	36
5.4.1	General observations	36
5.5	SUMMARY OF THE ANALYSIS	38
5.6	GENERAL RECOMMENDATIONS.....	39
6.	TRAINING NEEDS ASSESSMENT	40
6.0	INTRODUCTION	40



6.1	TRAINING NEEDS FOR HEALTH CARE STAFF	40
6.2	TRAINING NEEDS - GENERAL PUBLIC/NON HEALTH CARE STAFF	42
6.3	TRAINING STRATEGY	44
6.4	PUBLIC AWARENESS STRATEGY	46
7.	THE INFECTION CONTROL AND WASTE MANAGEMENT PLAN (ICWMP)	48
7.1	MAJOR OBJECTIVES OF THE ICWMP	48
7.2	THE ICWMP ACTION PLAN	56
7.3	SUMMARY OF COSTS.....	65
8.	BUDGET FOR THE ICWMP	66
8.1	INTRODUCTION	66
8.2	ESTIMATED COST OF IMPLEMENTING THE ICWMP	66
8.3	MOH CONTRIBUTION TO THE IMPLEMENTATION OF THE ICWMP	68
8.4	CONTRIBUTION FROM IDA PROJECT	68
8.5	CONTRIBUTIONS FROM OTHER SOURCES/PARTNERS	68
8.6	PROJECT FUNDING SUMMARY.....	68
9.	ICWMP IMPLEMENTATION MODALITIES.....	69
9.1	INSTITUTIONAL FRAMEWORK	69
9.2	RESPONSIBILITIES	69
9.3	INSTITUTIONAL ARRANGEMENTS FOR ICWM IMPLEMENTATION	71
9.4	IMPLEMENTATION TIMEFRAME.....	74
9.5	POTENTIAL PARTNERS AND FIELD OF INTERVENTION	75
9.6	INVOLVEMENT OF PRIVATE COMPANIES IN ICWM	75
10.	HANDLING HEALTH CARE WASTE STREAMS.....	77
10.1	RECOMMENDED SYSTEM FOR HANDLING WASTE	77
10.2	SUMMARY OF THE WASTE HANDLING SYSTEM.....	81
11.	DETERMINATION OF TREATMENT SYSTEMS AND TECHNOLOGIES.....	85
11.1	INTRODUCTION	85
11.2	SOLID WASTES TREATMENT.....	85
11.2.1	Comparative analysis of solid HCW treatment systems	88
11.2.2	Recommendations for Solid Wastes Treatment	90
11.3	LIQUID WASTES TREATMENT	94
12.	DETERMINATION OF DISPOSAL SITES.....	95
12.1	CHOICE OF LANDFILL SITES	95
12.2	DECISION TREE SCENARIOS	95
13.	THE MONITORING PLAN	96
13.1	PRINCIPLE AND OBJECTIVE.....	96
13.2	METHODOLOGY.....	96
13.3	MEASURABLE INDICATORS.....	97
14.	REFERENCES	98



LIST OF ANNEXES

ANNEX 1	NUMBER OF HEALTH FACILITIES BY CATEGORY	100
ANNEX 2	BASELINE INFORMATION OF THE SELECTED FACILITIES.....	101
ANNEX 3	GENERAL WASTE MANAGEMENT PRACTICES	110
ANNEX 4	MODEL OF “WHO” INCINERATOR MADE WITH LOCAL MATERIALS.....	122
ANNEX 5	CONCRETE LINED PIT - HOME BASED CARE WASTE DISPOSAL	123
ANNEX 6	CONCRETE LINED PIT - SHARPS AND INFECTIOUS DISPOSAL	124
ANNEX 7	HCW FACILITIES OPERATING SCENERIO 1	125
ANNEX 8	HCW FACILITIES OPERATING SCENERIO 2	126
ANNEX 9	HCW FACILITIES OPERATING SCENERIO 3	127
ANNEX 10	HCW FACILITIES OPERATING SCENERIO 4	128
ANNEX 11	HCW FACILITIES OPERATING SCENERIO 5	129

LIST OF FIGURES

Figure 10-1	Temporary storage for waste	79
Figure 10-2	Poor example of a centralized storage.	80
Figure 10-3	Example of a hazardous waste transportation vehicle.	80
Figure A.3-1	the three bin system.	110
Figure A.3-2	Sharps Containers in common use.....	111
Figure A.3-3	General Waste Containers in common use.....	112
Figure A.3-4	Obsolete equipment piling up at a Health Facility.	113
Figure A.3-5	Temporary storage for General Waste.	114
Figure A.3-6	infectious waste Temporary Storage in large hospital.....	115
Figure A.3-7	infectious waste temporary Storage in Sluice Room	115
Figure A.3-8	infectious waste Temporary Storage in cage next to incinerator	115
Figure A.3-9	Cold room and freezer for temporary storage of anatomic waste.....	116
Figure A.3-10	Temporary storage for sharps containers,.....	116
Figure A.3-11	Means of transporting infectious and non-infectious waste	117
Figure A.3-12	Municipal Landfill	118
Figure A.3-13	Open pit burning	118
Figure A.3-14	Government Hospital incinerators.....	119
Figure A.3-15	Sharp boxes, and infectious waste.....	120
Figure A.3-16	Pit latrines at a Minor Health facility	121



LIST OF TEXT TABLES

Table 2-1	<i>Demographic and Socio-economic Statistics:</i>	2
Table 2-2	<i>Health Status Statistics Mortality:</i>	3
Table 2-3	<i>Health Care Providers (2006)</i>	5
Table 2-4	<i>Distribution of HC Providers per population (2002)</i>	5
Table 2-5	<i>Distribution of HCFs by Administration (2009) ^x</i>	6
Table 2-6	<i>Distribution of HC Facilities per District (2009)</i>	6
Table 2-7	<i>Legal requirements for collection, treatment and disposal of HCW</i>	11
Table 2-9	<i>Excerpt of certification results relating directly to HCWM in hospitals.</i>	12
Table 2-10	<i>Excerpt of certification results relating directly to HCWM in HCs.</i>	13
Table 5-1	Visited health Related Institutions.....	36
Table 5-2	Summary of issues found at institutions.....	38
Table 6-1	Topics of training and public awareness -Health Staff	41
Table 6-2	Topics of training and public awareness guide (Non-Health Facility Staff)	43
Table 7-1	ICWMP ACTION PLAN - LEGAL	56
Table 7-2	ICWMP ACTION PLAN - INSTITUTIONAL ARRANGEMENTS.....	57
Table 7-3	ICWMP ACTION PLAN - SITUATION ANALYSIS AND IMPROVEMENT.....	59
Table 7-4	ICWMP ACTION PLAN - TRAINING AND GENERAL PUBLIC AWARENESS.	61
Table 7-5	ICWMP ACTION PLAN - PRIVATE SECTOR PARTICIPATION	63
Table 7-6	ICWMP ACTION PLAN - FINANCIAL AND OPERATIONAL ISSUES.....	64
Table 7-7	Summary of costs	65
Table 8-1	Implementation costs of the ICWMP	66
Table 8-2	Annual costs of the ICWMP implementation	67
Table 8-3	MHSW Contribution to the Implementation of the ICWMP	68
Table 8-4	Contribution From IDA Project.....	68
Table 8-5	Contributions from Other Sources/Partners	68
Table 8-6	Project funding summary	68
Table 9-1	MOH Estimated Annual Expenditure on ICWM	70
Table 9-2	Implementation Responsibilities by Component.....	73
Table 9-3	Implementation Timetable	74
Table 9-4	Potential field of intervention.....	75
Table 10-1	Categories, Labelling And Containers For Health Care Waste.....	78
Table 10-2	Treatment And Disposal Methods	81
Table 10-3	Summary on how to improve HCW handling	83
Table 11-1	Comparative analysis of solid HCW treatment systems.....	89
Table 11-2	Comparative analysis of sharps treatment systems.....	93
Table 11-3	Comparative analysis of liquid waste treatment systems	94
Table 13-1	Implementation Plan for M&E.....	96



ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immuno-Deficiency Syndrome
CBO	Community Based Organization
DHMT	District Health Management Team
EHS	Environmental Health Services
EHD	Environmental Health Department
EmONC	Emergency Obstetric and Neonatal Care
GAVI	Global Alliance for Vaccine Initiatives
GDP	Gross Domestic Product
HCF	Health Care Facility.
HCGW	Health Care General Waste
HCRW	healthcare Risk Waste
HCW	Health Care Waste
HCWM	Health Care Waste Management
HCWMP	Health Care Waste Management Plan
HDI	Human Development Index.
HepB	Hepatitis B
HepC	Hepatitis C
HIV	Human Immunodeficiency Virus
HSSP	Health Sector Strategic Plan
ICWM	Infection Control and Waste Management
ICWMP	Infection Control and Waste Management Plan
IMR	Infant Mortality Rate.
LG	Local Government
MDG	Millennium Development Goals
MTEC	Ministry of Tourism, Environment
MMR	Maternal Mortality Rate.
MoH	Ministry of Health
NEA	National Environmental Agency
NCDs	Non-Communicable Diseases
NGO	Non-Governmental Organization
POA	Plan of Action
STC	Short Term Consultant
SOPs	Standard Operating Procedures
STI	Sexually Transmitted Infections
WB	World Bank
WHO	World Health Organization



EXECUTIVE SUMMARY

The Government of Lesotho has been working continuously on improving the health status of its people. Through the Ministry of Health's National TB Program is in the process of preparing for a regional TB Project with World Bank technical and financial support. The proposed project will result in more effective TB control programmes for Lesotho. A major off shot from the roll out of the improved TB control programme will be the generation of increased volumes of Health Care Waste (HCW). The proper management of all health care waste that will be generated is of prime importance, thus the development of the Health Care Waste Management Plan (HCWMP) for Lesotho.

Health Care Waste (HCW) is waste generated during the course of the delivery of health care services. It is defined as the total waste stream from a healthcare facility (HCF) that includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices and radioactive materials. Most of it (**75-90%**) is similar to domestic waste. This fraction referred to as healthcare general waste (HCGW) is made of paper, plastic packaging, food preparation, etc. that haven't been in contact with patients. A smaller proportion (**10-25%**) is infectious/hazardous waste that requires special treatment. This fraction referred to as healthcare risk waste (HCRW) is the one which is of concern at Health Care Facilities (HCF) due to the risks that it poses both to human health and the environment. Poor management of this HCRW exposes healthcare workers, waste handlers and the community to infections, toxic effects and injuries. Exposure to HCRW can result in diseases or injury.

To combat the HCW menace, the Lesotho Government developed a number of instruments to support its efforts. One of the major initial initiatives was the adoption of the Primary Health Care strategy for service provision in 1979. It then developed the National Health Policy (2012 – 2020), and then developed a Health Sector Strategic Plan (HSSP) with various facets for addressing the country's health sector challenges of which HCWM is a part. The policy acknowledged that the health sector is under great pressure due to a number of factors: high population growth rate, increasing morbidity and mortality, insufficient financial and logistic support, deterioration of physical infrastructure, inadequacies of supplies and equipment, shortage of adequately and appropriately trained health personnel, high attrition rate as well as inadequate referral system (**GoL, 2012**). This pressure is resulting in high prevalence of communicable and non-communicable diseases. **However, the Policy points out that most of these diseases can easily be prevented if appropriate environmental and lifestyle measures are taken, with more attention paid to development of health promotion and prevention actions than merely focusing on curative care alone.**

To buttress the HSSP GoL developed instruments like the National HCWM plan of 2005. This was followed by (i) the Situational Analysis (COWI) (2009); (ii) HCWM Policy (July 2010); (iii) HCWM Strategic Plan; (iv) HCWM Implementation Plan; (v) HCWM Monitoring Plan and (vi) HCWM Support Document. In **August 2012, the Consolidated Lesotho National Health Care**



Waste Management Plan (CLNHCWMP) was developed as part of the World Bank funded Maternal and Newborn health Performance-Based Financing Project. It was a result of a synthesis of the various documents ((i) to (v) above) that had been developed as part of the updated HCWM and basically updated the National HCWM plan of 2005. The Plan provided a detailed consolidated overview of the management of healthcare waste in Lesotho.

The advent of the Tuberculosis and Health Systems Support Project has necessitated the review current instruments and the development of the Infection Control and Waste Management Plan (ICWMP) for Lesotho. The current plan brings in the holistic approach to HCWM to embrace the legal and institutional aspects and to involve all the appropriate stakeholders in the sector.

The current report elaborates the current status of HCWM in Lesotho, assesses the gaps in technology and information and explores options for solutions. The resultant Infection Control and Waste Management Plan (ICWMP) sets out the requisite playing field for an effective HCWM programme, starting with a clear legal and institutional framework, appropriate technology, empowered workforce and an enlightened public.

The ICWMP was developed as a result of an assessment of Health Care Waste Management (HCWM) in a sample of the Health Care Facilities of Lesotho. The Health care services are provided by three main institutions: (i) Ministry of Health (MoH) Hospitals; (ii) Private for profit Hospitals, (iii) Private non-profit Hospitals. The Health Care Facilities were divided into several categories;

1. Referral Hospitals
2. Large Hospitals
3. Health Centres
4. Private For Profit
5. Private Non-Profit (NGO)
6. MDR TB clinic (Multiple Drug resistant TB)

And the other institutions which are related to them and generate similar waste are:

1. Veterinary Hospitals
2. Pharmaceuticals
3. Blood Transfusion Services
4. Local Authorities
5. Analytical Services Providers (Laboratories)

The formal system of Lesotho health facilities are divided into the national (tertiary), district (secondary), and community (primary) levels. The community level includes both health posts and health centers. The district level comprises hospitals that receive patients referred from the community level and filter clinics. The national level consists of one referral and two specialized hospitals. Any patients with conditions that cannot be addressed at the national level are referred to South Africa for care, through the national



referral hospital. In Lesotho, 42 percent of the health centers and 58 percent of the hospitals are government owned, 38 percent of the hospitals and 38 percent of the health centers fall under the control of the Christian Health Association of Lesotho (CHAL), and the remaining facilities are either privately owned or operated by the Lesotho Red Cross.

In addition to the hospitals, filter clinics, health centers, and health posts recognized within the Government of Lesotho (GOL) system of health facilities, there is also an extensive network of private surgeries, nurse clinics and pharmacies providing care and/or medicines.

In order to come up with a holistic HCWM Plan, the situation at all the health care facility categories, including the associated institutions was assessed and the desired level of operations determined. This was done by selecting a sample for each category of facility and then carrying out a rapid assessment of the sampled institutions using the Rapid Assessment Tool that was developed by WHO. The rapid field assessment observed the following constraints on the HCWM system:

- Non formalization of HCWM in the institutions
- Absence of specific operational policy about HCW;
- Weak HCWM legislative regime
- Absence of standard HCWM operational procedures
- Inadequate budgetary resource allocations;
- Limited qualified human resources;
- Technological challenges in handling, treatment and disposal facilities.
- Subdued and insufficient knowledge about HCW (staff and public).
- Absence of private sector participation

In terms of HCWM the Ministry of Health is assisted by Lesotho Millennium Development Authority (LMDA) for collection and treatment of HCW in its facilities. LMDA has sub-contracted other companies for this function. The contracted companies are expected to supply the health facility with waste management equipment (container, liners). It collects HCW from the Health facilities for treatment at the incinerator at the hospitals. It is also mandated to maintain day to day running of the incinerator. They are again expected to collect and transport general waste from the hospital for disposal at a designated disposal site.

To address these shortcomings, an ICWMP was then crafted. It was crafted in such a way as to initiate a process and support the national response to the shortcomings. It focuses on preventive measures, mainly the initiatives to be taken in order to reduce the health and environmental risks associated with mismanaged waste. It also focuses on the positive proactive actions, which, in the long term, will allow a change of behaviour, sustainable ICWM, and protection of actors against risks of infection.



The ICWMP is organized around the following objectives:

1. To reinforce the national legal framework for ICWM.
2. To improve the institutional framework for ICWM.
3. To assess the ICWM situation, propose options for health care facilities and improve the ICWM in health care facilities.
4. To conduct awareness campaigns for the communities and provide training for all actors involved in ICWM.
5. To support private initiatives and partnership in ICWM
6. To develop and operationalize specific financial resources to cover the costs of the management of healthcare wastes.

These actions should be accompanied by complementary measures, mainly initiated by governmental programs, in terms of **ICWM** upgrading in health facilities. **The estimated cost of implementing the ICWMP and enhancing this process of proper handling, disposal and management of medical waste is US \$ 1 609 000.00.** The estimated costs of implementation for the ICWMP will be covered by the MOH, the IDA project and other development partners. The IDA project will cover the cost of training and general public awareness (\$300 000.00), Thus MoH will require external support from other developing partners to be able to implement the ICWMP effectively.

The cornerstone of the management of waste is that it must be **consistent** from the point of generation “cradle” to the point of final disposal “grave”, following a defined waste stream which is standard and acceptable. The relative risk approach was used in determining the treatment systems and technologies to be used at each HCF. The criteria for deciding on the system are that it protects in the best way possible, healthcare workers and the community as well as minimize adverse impacts on the environment. The use of a burial pit or a small-scale incinerator, although clearly not the best solution, is much better than uncontrolled dumping. The following recommendations were drawn:

- Modern pyrolytic incinerators at Referral hospitals, District hospitals, other Hospitals, and the Local Authorities, because of its fairly low cost and operating skills requirements;
- Local incinerators (built with local material) in Health Centres, Private Health Centres and other Public Health Units because of its very low cost and small quantities of HCW produced in these facilities;
- Stabilized concrete lined pits in Health Centres, other Public Health Units and for home based care, because of very low HCW production.

The handling of the final incineration residues is also very important and it was recommended that in big cities this can be disposed of at the public municipal landfills and at District and local level, the remaining wastes can be buried within the premises or in lined pits, away from patient treatment areas.



The implementation schedule of the ICWMP is over a five year period and the lead agent, the Environmental Health Department of the MoH will coordinate the implementation and apply a multi-stakeholder approach to embrace all the relevant players that include the Ministry of Environment (MTEC), Local Authorities, the Veterinary Department, NGOs, and other private players.

Above all, the ICWMP emphasizes on monitoring and evaluation of the system. The monitoring of ICWM is part of the overall quality management system. To measure the efficiency of the ICWMP, as far as the reduction of infections is concerned; activities should be monitored and evaluated, in collaboration with concerned institutions: MoH, MTEC, Local Authorities, NGOs, etc. This can only be possible if it becomes mandatory to keep records of ICWM at all institutions and then maintain a reporting system of the same.



1. INTRODUCTION

1.1 BACKGROUND

Healthcare waste (HCW) is defined as the total waste stream from a healthcare facility (HCF) that includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices and radioactive materials. Most of it (**75-90%**) is similar to domestic waste. This fraction referred to as healthcare general waste (HCGW) is made of paper, plastic packaging, food preparation, etc. that haven't been in contact with patients.

A smaller proportion (**10-25%**) is infectious/hazardous waste that requires special treatment. This fraction referred to as healthcare risk waste (HCRW) is the one which is of concern at Health Care Facilities (HCF) due to the risks that it poses both to human health and the environment. Poor management of this HCRW exposes healthcare workers, waste handlers and the community to infections, toxic effects and injuries. Exposure to HCRW can result in diseases or injury.

Further, if these two basic categories of waste aren't segregated (separated) properly, the entire volume of HCW must be considered as being infectious according to the precautionary principle, hence the importance of setting up a safe and integrated waste management system.

In 2005, the Government of Lesotho (GoL) prepared a National Health Care Waste Management Plan (NHCWMP) as part of the World Bank Health Sector Reform Project to increase access to, and quality delivery of, essential health services in Lesotho.

This update takes into consideration the review (see below the paragraph on the situational analysis) carried out between December 2009 and March 2010 by

Between December 2009 and March 2010, the Ministry of Health (MoH), with technical input provided by the Millennium Challenge Account - Lesotho (MCA-L) carried out a review (Situational Analysis) of the 2005 NHCWMP. The review was done through the appointed consulting firm, COWI A/S. To buttress the NHCWMP the MoH subsequently developed the Health Care Waste Management Policy in July 2010; Health Care Waste Management Strategic Plan in August 2010 and the Health Care waste Management Implementation Plan in November 2010.

In August 2012, with the advent of the Lesotho Maternal and Newborn health Performance-Based Financing Project, MoH undertook an exercise to consolidate the various HCWM instruments and policies to come up with one Health care management plan. The consolidated HCWM Plan intended to synthesize the various documents that were developed as part of the updated HCWM, including: (i) the Situational Analysis; (ii) HCWM Policy; (iii) HCWM Strategic Plan; (iv) HCWM Implementation Plan; (v) HCWM Monitoring Plan and (vi) HCWM Support Document.



The document provided a detailed consolidated overview of the management of healthcare waste in Lesotho, and was geared to be used as the safeguards instrument accompanying the Lesotho Maternal and Newborn health Performance-Based Financing Project. The generation of increased healthcare waste as a result of project-financed activities mandated the need for such a consolidated HCWM plan to accompany the project.

The consolidated HCWM plan was not applied to the project alone but became a national document. However the implementation of the plan was faced with immense challenges as the health sector is under great pressure due to a number of factors: high population growth rate, increasing morbidity and mortality, insufficient financial and logistic support, deterioration of physical infrastructure, inadequacies of supplies and equipment, shortage of adequately and appropriately trained health personnel, high attrition rate as well as inadequate referral system. This pressure is resulting in high prevalence of communicable and non-communicable diseases such as Malaria, Diarrhoea, Upper Respiration Tract Infection, Tuberculosis, and HIV/AIDS and its spread. **However, the HCWMP points out that most of these diseases can easily be prevented if appropriate environmental and lifestyle measures are taken, with more attention paid to development of health promotion and prevention actions than merely focusing on curative care alone.**

The Government is cognisant of the effects of the environment on the socioeconomic growth and development including health. Environmental health and safety is an important determinant of health outcomes and still remains a major challenge for the Ministry of Health and partners. Hence one of MoH's policy drives is to reduce the frequency of environmental health and safety related diseases/conditions. This will be achieved through enforcement of environmental health related Acts, and Instituting proper management of solid, gaseous and liquid wastes.

As part of this main component, the proper management of all health care waste is of prime importance, thus the development of the Health Care Waste Management Plan (HCWMP) for Lesotho.

The current plan then brings in the holistic approach to HCWM to embrace the legal and institutional aspects and to involve all the appropriate stakeholders in the sector. Such a plan is necessary in order to prevent and mitigate the environmental and health impacts of Health Care Waste on Health Care Staff and the general public.

The objective of this report is to elaborate an Infection Control and Management Plan (ICWMP) appropriately assessed, with clear institutional arrangements for proper implementation. The plan of action was developed as a result of an assessment of Health Care Waste Management (HCWM) in a sample of the Health Facilities in Lesotho. The Health Care Facilities can be divided into several categories;

1. Referral Hospitals
2. Hospitals



3. Reproductive and Child Health (RCH) Clinics
4. Minor Health Centres
5. Major Health Centres
6. Private For Profit
7. Private Non-Profit
8. Primary Health Care (PHC) - Key Villages
9. Primary Health Care (PHC) - Villages

And the other institutions which are related to them and generate similar waste are:

1. Veterinary Hospitals
2. Pharmaceuticals
3. Blood Transfusion Services
4. Local Authorities
5. Analytical Services Providers (Laboratories)
6. Medical Research Council
7. Regional Health Teams

In order to come up with a holistic HCWM plan, the situation at all the health care facility categories, including the associated institutions was assessed and the desired level of operations determined. The following is an outline of the situation and the final plan of action that was derived from the exercise.



1.2 PROJECT DESIGN CONSIDERATIONS

The broad design considerations for the project includes three mutually reinforcing components which will assist Lesotho on its part, to mount an effective response to the burden of TB, with emphasis on TB in the mining sector. The project will apply the following approaches:

- (i) Using a phased project implementation approach to enable the roll-out of the interventions gradually before going to full scale;
- (ii) Targeting the poor and vulnerable with evidence-based interventions via innovative service delivery strategies. The project will provide targeted interventions to underserved populations with a high burden of TB, using innovative delivery strategies.
- (iii) Strengthening TB and occupational health services as well as broader health systems. These include strengthening laboratory systems, skilled human resources and disease surveillance capacity, whose benefits cut-across health systems.

Implementation and coordination arrangements would be as simple as possible; performance-based with clear responsibilities and accountability; and strategies to encourage innovations and scaling up of successful interventions would be incorporated.

1.3 PROJECT STRUCTURE

The International Development Association (IDA) is financing the Southern Africa Tuberculosis and Health Systems Support Project (P155658). The project will be effected in four countries; Lesotho, Malawi, Mozambique, and Zambia. Lesotho will be supported by an amount of US\$15 million equivalent.

The project objectives will be achieved through the implementation of two technical components and one component dedicated to management, coordination and monitoring. It should be noted that **the first two technical components raise the principal safeguards issues associated with the project.** The three components of the project are outlined below:

1.3.1 COMPONENT 1:

INNOVATIVE PREVENTION, DETECTION AND TREATMENT OF TB SERVICES

The proposed activities will be derived from the National TB and Leprosy Programme strategic plan, with a vision of making the Kingdom of Lesotho free of TB through the provision of quality TB prevention, diagnosis, treatment and care services with due attention to universal access, equity, affordability and gender mainstreaming. The overall goal is to reduce TB prevalence and mortality rates by 25% and 50% respectively relative to the 2012 rates. This component has the following sub-components:



Subcomponent 1.1: Harmonized Package of TB services

- 1.1.1 Points of Care/One Stop Shop services
- 1.1.2 Patient Referral System
- 1.1.3 TB control in correctional services
- 1.1.4 Decentralization of occupational health services
- 1.1.5 Provision of Nutritional support

1.3.2 COMPONENT 2:

STRENGTHEN REGIONAL CAPACITY FOR DISEASE SURVEILLANCE, DIAGNOSTICS AND MANAGEMENT OF TB AND OCCUPATIONAL LUNG DISEASES

This component will cover retaining experts and skills in Lesotho by improving the health care infrastructure and equipment and their general working conditions. It has the following sub-components:

Subcomponent 2.1: Human Resources for Health

- 2.1.1 Retain specialized expertise and skills to support Ministry of Health
- 2.1.2 Capacity building for surveillance and other public health events through short and long term training, mentoring, training institution capacitation
- 2.1.3 Capacity building on mine health and safety

Subcomponent 2.2: Disease Surveillance

- 2.2.1 Support the TB prevalence survey
- 2.2.2 Purchase ICT and software programmes for use to strengthen cross border disease surveillance

Subcomponent 2.3: Strengthen Diagnostic Capacity

- 2.3.1 Strengthen laboratory information systems and networking
- 2.3.2 Procure diagnostic technology for TB and TB/HIV
- 2.3.3 Upgrade Laboratories (physical)
- 2.3.4 Laboratory supplies
- 2.3.5 Biomedical waste management

Subcomponent 2.4: Strengthen Regulatory Capacity

- 2.4.1 Mapping of the local mining landscape using geomapping tools
- 2.4.2 Develop guidelines for mine health inspection, occupational health and compensation systems
- 2.4.3 Procurement of dust monitoring equipment



1.3.3 COMPONENT 3:

STRENGTHEN LEARNING, KNOWLEDGE AND INNOVATION

This component would establish effective programme management and administrative systems, ensuring coordination between the programme and other initiatives and national institutions in the sector. The proposed structure would include the following sub-components:

Subcomponent 3.1: Project Management and implementation, monitoring and evaluation

- 3.1.1 Staff salaries for running the project implementation unit - PIU (project coordinator, financial management specialist, procurement specialist and M&E specialist)
- 3.1.2 Support for operations of the PIU
- 3.1.3 Training on financial management, procurement and risk based auditing
- 3.1.4 Attendance at regional meetings
- 3.1.5 Support the M&E systems (project M&E and NTP M&E?)
- 3.1.6 Annual level joint review – National
- 3.1.7 National steering committee – training and meetings

Subcomponent 3.2: Support evidence based policy analysis and health financing innovations

- 3.2.1 Operations research
- 3.2.2 Monitoring and evaluation
- 3.2.3 Policy Analysis and Advocacy (Chiefs, research organizations, CSOs, NGOs, FBOs, traditional healers, private sector, social partners)

Subcomponent 3.3: Innovation – Centres of Excellence

- 3.3.1 Operation Screening of all members of households for TB



2. BASELINE DATA

2.1 INTRODUCTION

Lesotho is endowed with diverse natural resources, which include some of the most fertile soils, forest and water resources which accommodate diverse species of flora, fauna and fish resources. However these resources are currently challenged by complex interaction of several factors which include the rapid rate of population growth of about 21% per annum, the slow economic growth, and the TB - HIV/AIDS disease burden amongst many other pressures.

The current and estimated TB - HIV/AIDS burden have had and will continue to have devastating effects on life expectancy and productivity. This is imposing ever intensive pressures on the economy, natural resources utilisation, leading to unsustainable natural resources utilisation, loss of biodiversity, heavy soil erosion and water pollution. Furthermore, the country's health system is challenged by this relentless increase of the disease burden, and a lack of expertise and human resources.

Lesotho has the third highest prevalence rate of HIV/AIDS in the world, which according to recent estimates, is about 27%. It also has high TB incidence of approximately 960 cases per 100,000 people, a 74% HIV/TB rate of co-infection and significant numbers of MDR-TB cases. The disease burden has reduced the average life expectancy to 40 years for men and 44 years for women mainly because it is burdened by HIV and AIDS. (UNAIDS 2006 Report on the Global AIDS Epidemic,)

The national TB program faces several challenges, including: a reduction in case notifications, while MDR-TB and other resistant strains are on the increase; and limited access to services in terms of operating clinic hours and distance to health centers.

Efforts to combat the epidemic have been stemmed by the nation's lack of infrastructure needed to fully deal with such a disease burden. Further, Lesotho is struggling to retain its medical staff as many physicians and nurses are drawn away to Britain, Canada, and South Africa by better pay and infrastructure.

The following paragraphs review some of the key country's background information on environmental and social issues as regards the Health delivery system.



2.2 GENERAL LESOTHO GEO-PHYSICAL CONDITIONS

The following is an outline of the general geo-physical conditions of the project area:

2.2.1 Location, Size, and Extent

Lesotho is a land locked state in Southern Africa which is completely surrounded by the Republic of South Africa. It is situated approximately between 28° S and 31°S latitudes and longitude 27° E and 30° E. Lesotho is a predominantly mountainous country, with an average altitude of more than 1600 metres above sea level. It covers approximately 30 350 square kilometres and has limited natural resource endowments (GoL, 2006). Lesotho's highlands constitute two-thirds of territory; less than 10% of which is suitable for cultivation.

Lesotho has a population of 2.2 million growing at an average rate of 21% per annum, mainly with a literate but largely unskilled labour force. Some 70% of the total population lives in the fertile lowlands, where the land can be most readily cultivated; the rest is scattered in the foothills and the mountains. It was estimated by the Population Reference Bureau that 28% of the population lived in urban areas in 2001. The capital city, Maseru, had a population of 373,000 in that year. Other large towns are Leribe, Berea, and Mafeteng. The urban population growth rate for 2000– 2005 was 4.6% (EoN, 2015a).

More recently, the World Health Organization Statistics 2006 have recorded the following statistics relevant to this report as follows:

Table 2-1 Demographic and Socio-economic Statistics:

Population - 2005	1 795 million
Annual growth rate 1995 - 2004	0.6%
Population in urban areas - 2005	18%
Adult literacy rate 2000-2004	81.4%
Net primary school enrolment ratio males 1998 – 2004	83%
Net primary school enrolment ratio females 1998 - 2004	89%

The prevalence of HIV/AIDS has had a significant impact on the population of Lesotho. The United Nations estimated that 30.1% of adults between the ages of 15 to 49 were living with HIV/AIDS in 2001. The AIDS epidemic increases death and infant mortality rates, and lowers life expectancy (EoN, 2015a).

In Lesotho in 2001, the United Nations recorded 25% of people between the ages of 15 and 49 were infected with HIV/AIDS and this rate has increased each year.

Lesotho's major health problems, such as pellagra and kwashiorkor, stem from poor nutrition and inadequate hygiene. As of 2000, 44% of children under five years of age were considered malnourished. Famines have resulted from periodic droughts. In 2000, 91% of the population had access to safe drinking water and 92% had adequate sanitation.



Tuberculosis and venereal diseases are also serious problems. In 1994, children up to one year old were vaccinated at the following rates: tuberculosis, 55%; diphtheria, pertussis, and tetanus, 58%; polio, 66%; and measles, 82%. There were an estimated 542 cases of tuberculosis per 100,000 people in 1999 while the rates for DPT and measles were 85% and 77% respectively. About 43% of children suffered from goiter in 1996 (EoN 2015b).

The World Health Organization Statistics of 2006 recorded the following health status statistics mortality:

Table 2-2 Health Status Statistics Mortality:

Indicator	
Life expectancy Females 2004	44 years
Life expectancy Males 2004	39 years
Probability of dying per 1 000 live births under 5 years 2004	82
Infant mortality rate (per 1 000 live births) 2004	55
Maternal mortality (per 100 000 live births) 2000	550

2.3 BASELINE DATA AND BACKGROUND OF HEALTH CHALLENGES

The government of Lesotho is working to rehabilitate some hospitals and is making an overall effort to strengthen health care services. However it is facing an acute human resource for health (HRH) crisis. A third of MoH labour force consists of support staff. Nurses constitute 73.3% of the workforce in MoH followed by physicians at 6% with other health cadres constituting a low percentage of the workforce. While there is a general shortage of staff, it should be emphasized that Lesotho generally experiences an acute shortage of specialized health cadres. (Lesotho National Health Strategic Plan)

Laboratory services in the health sector remain understaffed and laboratory personnel who are specialized are very few in the system. As a result of this shortage, at health centers level health center staff collect specimen for processing at the district hospital. In addition to lack of personnel, there are interrupted supplies of commodities and some gaps are being filled by development partners who purchase laboratory reagents among other things. (Lesotho National Health Strategic Plan).

2.4 THE STRUCTURE OF THE HEALTH CARE SYSTEM

The formal system of Lesotho health facilities are divided into the national (tertiary), district (secondary), and community (primary) levels. The community level includes both health posts and health centers. The district level comprises hospitals that receive patients referred from the community level and filter clinics. The national level consists of one referral and two specialized hospitals. Any patients with conditions that cannot be addressed at the national level are referred to South Africa for care, through the national referral hospital. In Lesotho, 42 percent of the health centers and 58 percent of the hospitals are government owned, 38 percent of the hospitals and 38 percent of the health centers fall under the control of the



Christian Health Association of Lesotho (CHAL), and the remaining facilities are either privately owned or operated by the Lesotho Red Cross.

In addition to the hospitals, filter clinics, health centers, and health posts recognized within the Government of Lesotho (GOL) system of health facilities, there is also an extensive network of private surgeries, nurse clinics and pharmacies providing care and/or medicines.

In terms of HCWM the Ministry of Health is assisted by Lesotho Millennium Development Authority (LMDA) for collection and treatment of HCW in its facilities. LMDA has sub-contracted other companies for this function. The contracted companies are expected to supply the health facility with waste management equipment (container, liners). It collects HCW from the Health facilities for treatment at the incinerator at the hospitals. It is also mandated to maintain day to day running of the incinerator. They are again expected to collect and transport general waste from the hospital for disposal at a designated disposal site.

National level: At the national level, Lesotho has three tertiary-level hospitals: Queen Momahato Hospital, Mohlomi Mental Hospital, and Bots'abelo Leprosy Hospital. Queen Momahato Hospital is the national referral hospital. It is a large tertiary public-private partnership hospital. Any cases that cannot be treated at Queen Momahato are referred to South Africa. It is linked to a network of filter clinics.

District level: Districts have filter clinics and district hospitals. Filter clinics are a first point of care intended to lighten the load of district hospitals and function as “mini-hospitals,” offering curative and preventive services and limited inpatient care. Unlike health centers, filter clinics are staffed by doctors and some have pharmacy technicians. They also offer selected laboratory and radiology services (administered through the hospitals).

Although district hospitals provide both inpatient and outpatient care, their services vary widely depending on the availability of financial resources, equipment, and human resources. Treatment and diagnostic services are more complex at this level. These facilities provide minor and major operative services, ophthalmic care, counseling and care of rape victims, radiology, dental services, mental health services, and blood transfusions as well as preventive care. Some specialized care is also available for TB, HIV, and non-communicable diseases.

Community level: Communities offer health posts and health centers. Health centers are the first point of care within the formal health system. Staffed by nurse clinicians with comprehensive skills in preventive and curative care and in the dispensing of medication, health centers offer curative and preventative services, including immunizations, family planning, and postnatal and antenatal care on an outpatient basis (with the exception of services to expectant mothers). Their mandate also extends to supervising the community public health efforts and training volunteer community health workers (CHWs).



Health posts provide community outreach services and are typically managed by volunteers. Generally, health posts are opened at regular intervals (not daily) and provide promotive, preventive, and rehabilitative care in addition to organizing health education gatherings and immunization efforts. Volunteer CHWs include traditional birth attendants and community-based condom distributors, among others.

2.5 HEALTH CARE DELIVERY SYSTEM

Tuberculosis is straining the health-care system to maximum capacity. The government is sponsoring aggressive prevention, control, and screening programs for both tuberculosis and venereal diseases. In 2000, the World Bank issued a US\$6.5 million credit to improve access to quality preventive, curative, and rehabilitative health care services (GoL 2005 and GoL 2012).

The number of health service providers in Lesotho is low as illustrated by the statistics in Table 2-3.

Table 2-3 Health Care Providers (2006)

Health Care Provider	Number
Physicians	89
Nursing and midwifery personnel	1,123
Dentists and technicians	16
Pharmacists and technicians	62
Other health workers	23
Public and Environmental Health Workers	55
Lab Technicians	146
Health Management and Support workers	18

Source: WHO Country Health System Fact Sheet 2006 Lesotho

The statistics on the number of nursing and midwifery personnel per 1000 people shows that the human resources available to provide a health care service to the population is very limited as is shown in Table 2-4.

Table 2-4 Distribution of HC Providers per population (2002)

Distribution per 1,000 population	Number
Physicians	0.05
Nursing and midwifery personnel	0.6
Dentists and technicians	<0.04
Pharmacists and technicians	<0.04
Other health workers	<0.04
Public and Environmental Health Workers	<0.04
Lab Technicians	0.08
Health Management and support workers	<0.04

Source: WHO Country Health System Fact Sheet 2006 Lesotho

The health system in Lesotho consists of 21 Hospitals and 192 Health Centres (clinics) administered by different bodies. The Christian Health Organisation of Lesotho (CHAL) has, through a memorandum of understanding with the GOL, reached an agreement to remove



fees at clinic level and apply uniform tariffs in CHAL hospitals. The GOL in return pays CHAL salaries and compensates CHAL for basic health care services provided. A similar agreement was entered into in November 2009, with the Lesotho Red Cross Society (LRCS).

Table 2-5 *Distribution of HCFs by Administration (2009) ^x*

Administered by	Hospitals	Health Centres
Government of Lesotho (GOL)	12	79
Christian Health Association of Lesotho (CHAL)	8	75
Lesotho Red Cross Society (LRCS)	0	4
Maseru City Council (Maseru CC)	0	2
Private	1	33
Total	21	192

The HCFs are distributed throughout Lesotho, with GOL owning 45%, CHAL 37% LRCS 3%, with 17% being privately owned. Table 2-6 shows a summary of the distribution of hospitals, health centres and filter clinics per district.

Table 2-6 *Distribution of HC Facilities per District (2009)*

Distribution of Health Facilities in Lesotho				
District	Hospital	Health Centre	Filter Clinics	% of Total
Maseru	7	48	1	26
Berea	2	21	1	11
Leribe	2	26	1	13
Botha Bothe	2	12	0	6
Mokhotlong	1	12	0	6
Thaba-Tseka	2	17	0	9
Qacha's Nek	2	11	0	6
Quthing	1	9	0	5
Mohale's Hoek	1	15	0	7
Mafeteng	1	21	0	10
Total	21	192	3	

2.6 THE HEALTH SECTOR REFORM PROCESS

The Government of Lesotho has been working continuously on improving the health status of its people. One of the major initial initiatives was the adoption of the Primary Health Care strategy for service provision in 1979. However many of its initiatives haven't been very effective as mentioned in the Health and Social Welfare Policy (2003) which stated that during the 15 years preceding 2003, the initial improvements seen in health indicators had shown a decline due to the TB – HIV/AIDS burden, general economic decline and unhealthy lifestyles.



For this reason the MoH embarked on a restructuring of the health system under the Lesotho Health Reforms Plan 2000. The Health sector reform was also a response to the rapid increase in demand for health services coupled with dwindling resources for the sector. The intended outcome of the process was to improve management systems in the sector so that the scarce resources would be used more efficiently.

The reform process, which was a ten year phased programme, was implemented in 2002 following wide consultations with all stakeholders of the sector. The key partners supporting the programme were Lesotho Government, Development Corporation of Ireland, European Union, World Health Organisation, African Development Bank and the World Bank

Phase One (2002 – 2005) focused on institutional capacity building; Phase Two (2005 – 2009) on policy and institutional reform; Phase Three (2010 ---) involved sector-wide implementation of guidelines and protocols developed in the first two phases.

The reform programme entailed a rearrangement of structures and definition of policies so that the service delivery system becomes more responsive to the needs identified at the community level. It set out to achieve a sustainable increase in access to quality preventive, curative, and rehabilitative health care services. Specifically, the program targeted a huge imbalance between over-crowded government health centers and the non-governmental health centers, the high cost of medical care, long distances to medical facilities in mountain areas, and the insufficient numbers of health personnel, especially in rural areas.

The project not only assembled and deployed outreach-based District Management Health Teams to deliver community health services, but it was highly instrumental in the launch of the first-ever Public-Private Partnership (PPP) among International Development Association (IDA) African countries for replacing the national hospital. Under the PPP, the government of Lesotho selected Netcare, one of Africa's largest health care providers through a bidding process to design, construct, and operate a new national hospital for 18 years. The government's payments to Netcare will be performance-based. This PPP is expected to improve both access and quality of clinical services in the country.

The Health Sector Reform Program has successfully helped the country improve essential health care services for the poor through improved antenatal care, reduced hospital waiting time, a higher tuberculosis cure rate, and expanded access to services preventing mother-to-child transmission of HIV/AIDS

Health Care Waste Management is a cross-cutting issue and spans several components of the plan, one of the more important components for HCWM being the District Health Package where environmental health (which incorporates HCWM) is included as part of the Essential Health Service package.



2.7 WASTE MANAGEMENT IN LESOTHO

2.7.1 Categorisation of HCW in Lesotho

Health Care Waste (HCW) is usually divided into the two main categories: Health Care General Waste (HCGW) and Health Care Risk Waste (HCRW). HCGW consists of the general household (domestic) waste and much of this waste can be recycled. HCRW is the more hazardous part of the waste generated from health care facilities and comprises: infectious waste; sharps; anatomical; pharmaceutical; chemical; and radioactive waste (GoL 2005 and GoL 2012).

The need for correct segregation is determined by the different treatment methodologies required for the safe and environmentally friendly treatment and disposal of the different waste streams.

In Lesotho, the Hazardous (Health care) Waste Management Regulations of 2012 defines HCRW as waste that is hazardous or which is capable of producing disease, injury or pollution and includes the following:

- (a) infectious waste;
- (b) pathological waste;
- (c) sharps waste;
- (d) pharmaceutical waste; and
- (e) genotoxic waste;

In Health Care Facilities in Lesotho, the following categories of waste are observed:

- i. **Healthcare general waste:** This comprises of the normal 'household' waste and is mainly waste coming out of a healthcare facility that has not come into contact with patients, such as plastic bags, boxes, paper, food waste etc. A large portion of this waste can be recycled.
- ii. **Infectious waste:** All waste that is likely to contain pathogens (in sufficient concentration to cause diseases to a potential host). These include blood bags, urine, body secretions, etc.
- iii. **Pathological (anatomical) waste** is waste that comprises of body parts and blood and includes placentas
- iv. **Pharmaceutical waste:** These include expired medication, unused pharmaceutical products, drugs, vaccines, etc.
- v. **Chemical waste:** These consist of chemicals that are generated during disinfecting procedures or cleaning processes.
- vi. **Sharps:** These consist of all items that can cause cuts for puncture wounds, such as



needles, syringes, scalpel blades and slides;

- vii. **Highly infectious waste:** This group consists of waste from laboratories, in microbial cultures, and stocks with viable biological agents, etc.
- viii. **Radioactive waste:** Includes liquids, gases and solids that spontaneously emit radiation.

2.7.2 Overview of the present HCWM System in Lesotho

As part of the World Bank Health Sector Reform Project to increase access to, and quality delivery of, essential health services in Lesotho, an environmental assessment in the form of the National Health Care Waste Management Plan (NHCWMP) (March 2005) was prepared. This NHCWMP evaluated impacts which included: solid waste management; waste water disposal; health care waste generation at hospitals and health centres; determination of disposal sites; communities' response. As a result of these impacts the report outlined the mitigation measures that included: the development of a Healthcare Waste Management plan that would stop the theft of plastic bucket type medical bins; maintain hospital grounds in a manner deserving of a health care institution; the introduction of a three-bin system with appropriate colour coding for medical staff to separate all hospital waste accordingly; that all infectious waste including sharps and used needles must be incinerated before disposal; employ a system of Medical Wastewater Management that ensures that no chemicals and pathogens from health facilities are dumped into the sewage system; and finally develop and implement a training and awareness education plan for health facilities and relevant institutions' personnel (GoL 2005 and GoL 2012).

This plan recommended that the three-bin system be implemented for the management of HCW using black and yellow waste bags located in separate places away from patient areas. Subsequently a decision was taken by the NHCWM Committee that red would be the colour for the HC infectious waste and black for the HC general waste. A consignment of yellow liners donated by World Bank in 2009 has now created some confusion (in areas where the consignment has not been depleted) as to the recognized colour scheme for the Lesotho HCWM System.

The examples of "Potentially Infectious Waste" given in this NHCWMP included all "waste materials contaminated or possibly contaminated with body fluids" and included the pre-treated highly infectious waste from the medical laboratory, isolation patients, human tissue and body parts (GoL 2005 and GoL 2012)

The 3-bin concept was therefore introduced to cater for the general Infectious waste (for example, intravenous lines/bags, gloves, dressings, gauze, swabs, urine and blood bags, sump tubes, sanitary napkins) as well as placentas, body parts, isolation waste and pre-treated highly infectious laboratory waste. No differentiation is made between the laboratory waste, isolation waste and pathological / anatomical waste. Sharps are placed into sharps containers



and HCGW into black liners.

Elements of the existing HCWM System described in the NHCWM Plan include (GoL 2005 and GoL 2012):

- The 3-bin system introduced into all the HCFs and placed at all generation points comprises of the following:
 - one container with a red liner for the infectious waste,
 - one yellow container or “sharps container” for the sharps and
 - one container with a black liner for the general waste.
- The black and red/yellow liners should be sealed prior to transportation to a temporary storage area.
- All the HCW should be collected in rigid two-wheeled containers (120 to 240 litres) with a lid.
- These wheeled containers are to be used for transportation of waste directly to the treatment area for the infectious waste and to the temporary central storage area for the general waste.
- Infectious waste should be sent for treatment every 24 hours or at least every 48 hours in the case of unforeseen delays.
- Every HCF should have ‘storage’ at least in the form of 4-wheeled 1.1m³ “euro bins” or skips with lids that can easily be carried by a truck or tractor to the final disposal site.
- Central storage areas should not store infectious waste or sharps; only the ash and general waste must be collected there and emptied at least once a week.
- All waste handlers at all levels, cleaners, porters, gardeners and incinerator operators must wear appropriate protective clothing
- Designated personnel in each unit must be made responsible for monitoring the HCWM System and ensuring that all bags are sealed when full or before removal. They must also supervise the removal to the temporary storage or treatment areas.

NOTE: The suitability of “small bins” was raised as an issue because of the increasing misuse by the public (and possibly, staff) where even the plastic sharps containers are emptied and used in homes for various domestic purposes including fetching water (GoL 2009 b).

All Healthcare facilities must have access to a functional waste treatment facility e.g. an incinerator and the ash disposed of appropriately together with the HCGW.

The HCWM Plan further describes the requirements for collection, treatment and disposal of the HCW from the HCFs under the headings of Urban, Peri-urban and Rural Areas. Lesotho has also specified minimum requirements for the management of HCRW starting from the generation point to the final disposal. The regulations are to be applied throughout the country, with variations allowed for facilities that are classified as rural or inaccessible. These are summarised in table 2-7 below.



Table 2-7 *Legal requirements for collection, treatment and disposal of HCW*

Urban	Peri-urban	Rural
Infectious waste incinerated on site every 24 hours or at least every 48 hours	Infectious waste incinerated on site every 24 hours or at least every 48 hours	As the quantities do not warrant an incinerator at the HCFs, sharps containers must be securely stored for transport by a hospital vehicle or the flying doctor service to a central hospital on a monthly basis.
Collected by the local municipality for final disposal at an established sanitary landfill	For HCFs generally accessible by vehicles but where there is no local authority refuse removal service, can be collected by a private contractor and taken to a landfill once every two weeks	Infectious waste can be buried in a secure, restricted, well-lined and ventilated "septic tank" type pit where biodegradation can occur.

2.8 HANDLING AND TREATMENT OF HCW

The basic setup for HCWM is in place in most of the Health care Facilities it is characterized by a number of deficiencies which include the following:

- Lack of formalization of HCWM issues;
- Non inclusion in budgets;
- lack of plan or internal procedures;
- no responsible person/team designated to follow up on HCW management;
- absence of data about HCW production and classification;
- insufficiency of appropriate collection materials and protective equipment;
- ageing equipment and infrastructure;
- lack systematic segregation of HCW and mixing with household wastes;

2.9 LEVEL OF AWARENESS OF GOOD HCWM PRACTICES

Generally, staff responsible for handling waste throughout the whole chain, i.e. the administrators, Head Nurses, the Waste collectors, the orderlies, the grounds man, are not adequately trained and do not have sufficient knowledge for good HCWM behavior and practices.

This is aggravated by the thrust which was on curative medicine, completely sidelining the preventative side. HCWM systems are thus not well known or followed, which is very often a source of accidents, causing wounds and infection. There is a poor level of knowledge and appreciation of the risk associated with HCW; causing staff to deal with HCW casually, store it inappropriately, mix it with general waste and dispose it anyhow.

As for the public in general (scavengers, children, and people at landfill sites) the knowledge on risks linked with the handling of HCW is very weak. For these actors, it is necessary to develop information and public awareness programmes on risks linked with HCW.



2.10 THE CERTIFICATION SYSTEM

In 2005, Medical Care Development International (MCDI) was hired by the Government of Lesotho to provide technical assistance in the design of a certification system (GoL 2012). The standards, indicators and methods of scoring were developed using the Joint Commission International Accreditation Standards for Hospitals as a basis. The first round of accreditation surveys was implemented during 2006-2007. Sixteen hospitals, three filter clinics and 145 health centres were surveyed to provide a baseline against which the health care institutions could gauge their performance status and against which they would be able to monitor their quality improvement relative to the attainment of accreditation. A second survey followed after the previous one to document performance progress among both CHAL and GOL facilities. It included 4 Red Cross health centres. A total of 163 facilities was assessed: 16 hospitals (8 for GOL and 8 for CHAL) and 147 health centres (72 for GOL, 71 for CHAL and 4 for Red Cross).

The set of certification standards is comprehensive, covering the principal areas or domains of hospital and health centre function. The standards are divided into eleven domains which include: (1) Access and Continuity of Care, (2) Patient and Family Rights, (3) Assessment of Patient, (4) Care of Patients, (5) Patient and Family Education, (6) Organization Management, (7) Estate Management and Safety, (8) Management of Information, (9) Staff Qualifications and Education, (10) Prevention and Control of Infections, and (11) Quality Improvement and Patient Safety (GoL 2012).

In the certification standards an emphasis is placed on infection control that includes the management of hazardous material and the development of a waste management plan. The tables below are excerpts from the Summary of Result report on aspects that are related to the management of health care waste.

Table 2-8 *Excerpt of certification results relating directly to HCWM in hospitals.*

CODE	DESCRIPTION	Met (%)	Partially (%)	Unmet (%)
COP 2.1	There are policies and procedures in place for blood and blood products	88%	0%	13%
EMS 1.4	A hazardous materials and waste management plan is in place	50%	25%	25%
PCI 1.1	The organization has an active program to reduce risks of non-socomial infection	69%	0%	31%
PCI 1.2	The organization designates an individual to oversee all infection control activities	38%	0%	63%
PCI 1.3	The organization has an established infection control committee	19%	0%	81%
PCI 1.4	Running water, soap and hand-drying capacity is available at all service delivery points and bathrooms	31%	31%	38%



PCI 1.5	Supplies to control infection are available	38%	50%	13%
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Table 2-9 Excerpt of certification results relating directly to HCWM in HCs.

CODE	DESCRIPTION	Met (%)	Partially (%)	Unmet (%)
EMS 1.4	A hazardous materials and waste management plan is in place	23%	35%	42%
EMS 1.9	Organization cleanliness is assured	53%	27%	20%

The Accreditation Survey revealed that there were qualitative deficiencies that needed to be addressed to improve the performance of the Health Care Facilities. Some of the deficiencies required significant supplementary resources to remedy them. However, the majority of the deficiencies could be corrected with organization development efforts within each institution. MoH then set itself to increase its support to improve the deficiency areas.

2.11 THE LESOTHO QUALITY ASSURANCE SYSTEM

With the assistance of the Council for Health Service Accreditation of Southern Africa (COHSASA), two sets of comprehensive Lesotho accreditation standards for hospitals and health centres respectively are currently being developed and piloted in four hospitals and 8 health centres by the Quality Assurance Unit of the Clinical Services Department of MoH^{xxii}. These are expected to replace the current standards by the end of 2010 (GoL 2009 c, GoL 2012).

The standards address HCWM more comprehensively than the current MCDI-based standards: they include a requirement for written policies, plans and procedures on handling, storage and disposal of healthcare waste for specific clinical and housekeeping services within a health care facility. HCWM standards are also included in the health and safety and infection prevention and control policies and procedures. Training in HCWM is specified in these standards to ensure that all staff are trained in providing a safe and secure patient care facility.

There are further requirements for a representative infection control committee (or appropriate mechanism) with qualified, competent persons to chair the body and to undertake the role of infection control programme coordinator. This body must report on health care data and ensure that communications on the infection control programme are continuous and proactive. The individual, committee, or other mechanism must also monitor those housekeeping and other support service practices which may lead to the spread of infection e.g. waste disposal. Each health facility must have a plan for the handling, storage, treatment and disposal of healthcare and other wastes which is included in the facility's risk management plan. Housekeeping staff work with the infection control coordinator to ensure colour-coded waste segregation, proper management and security of the waste storage activities and safe waste disposal.



2.12 INFORMATION SYSTEM AND LICENSING

At present there is no system to collect data on quantities and types of waste being generated, treated or disposed of in HCFs.

A recent study done on investigating how an electronic Health Management Information System will be implemented in Lesotho identified an array of indicators and parameters that will be incorporated into the broader HMIS (GoL 2012). No mention was made at all of a Waste Information System, only scant mention of data relating to environmental health.



3. CONTEXT OF THE HCWM PLAN

3.1 INTRODUCTION

Over the last fifteen years, The Government of Lesotho has adopted a new republican constitution, and a number of new policies and legislation with the ultimate aim of promoting and consolidating sustainable socio-economic development in the country through the mainstreaming of environmental considerations in project planning and implementation. These include: the National Environmental Action Plan, the National Environmental Policy, the National Health Policy, Healthcare Waste Management Policy, The Health Act, the Environmental Act, and Local Government Act among others.

Health is articulated as one of the principles of Equality and Justice in the Constitution of Lesotho of 1993 in Chapter III. As regards Health, the Constitution states that Lesotho shall adopt policies aimed at ensuring the highest attainable standard of physical and mental health for its citizens, including policies designed to - (a) provide for the reduction of stillbirth rate and of infant mortality and for the healthy development of the child; (b) improve environmental and industrial hygiene; (c) provide for the prevention, treatment and control of epidemic, endemic, occupational and other diseases; (d) create conditions which would assure to all, medical service and medical attention in the event of sickness; and (e) improve public health.

Government further committed itself to equitable access to standard quality health service in Lesotho in its Vision 2020 statement which reads: “The country will have a good quality health system with facilities and infrastructure accessible and affordable to all Basotho, irrespective of income, disabilities, geographical location and wealth. Health personnel will provide quality health service.”

Thus the National Constitution and the Government expressed vision set a good note for the implementation of good health care delivery for all. This chapter describes the context of the Infection Control and Waste Management Plan (ICWMP) for the Kingdom of Lesotho. It highlights the contrast between the relatively developed curative side of the Health Care System as opposed to the poorly developed preventive side suffering from inequitable and unsustainable resource allocation.

3.2 THE POLICY FRAMEWORK

Various policies and strategies relevant to Infection Control and Waste Management (ICWM) have been used to inform this ICWMP report. The following is a summary of some of the relevant policies and strategies:



3.2.1 Poverty Reduction Strategy (PRS).

The Poverty Reduction Strategy of Lesotho includes the following; employment creation and income generation, Agriculture and Food security, infrastructure development - roads, water, electricity and communication, deepening democracy, governance, Safety and Security, improving quality of and access to essential health-care and social welfare service, improving quality and access to education, managing and conserving the environment and improving public service delivery. The *crosscutting issues* are scaling up the fight against HIV/AIDS and gender, youth and children.

Improving quality of and access to essential health care and social welfare service are a major pillar in the strategy and improved ICWMP is an essential component of its execution.

3.2.2 National Health Policy (2011)

The National Health Policy (2011) commits the Government to equitable access to a standard quality of health services for all. This will be implemented through the District Health Package which provides Essential Health Service package components free of charge or highly subsidized to all citizens. The vision of the policy is to have a healthy nation, living a quality and productive life. Its mission is to enhance a system that will deliver quality health service efficiently, effectively and equitably to all Basotho. The general objectives of the policy include the following:

- To reduce morbidity, mortality and human suffering among the Basotho.
- To reduce inequalities in access to health services.
- To strengthen the pillars of health system

Its overall objectives are expressed in a series of fourteen components which include; (i) Communicable Disease Control (ii) Sexual & Reproductive Health and rights, (iii) child survival and development (iv) Nutrition (v) Environmental Health (vi) Emergency and Humanitarian action (vii) Occupational health (viii) Health Education & Promotion (ix) Pharmaceutical services and medical technologies (x) Oral Health services (xi) Mental Health Services (xii) Clinical, Diagnostic and Nursing Services, (xiii) Referral services outside the country, and (xiv) Traditional Health Services.

Environmental health and Occupational Health are major components of the Policy and the Government committed its self to ensure the same by promoting safe water and sanitation, vector control, workplace safety, waste disposal, food hygiene and port health'. Thus Infection Control and Waste Management feature highly in this Policy.

3.2.3 Lesotho National Environmental Policy (1998)

The National Environmental Policy (1998) was crafted to protect the environment in the face of all developmental activities that may be undertaken in Lesotho. Its mission is "to



promote and ensure that the present and future development of Lesotho is socio-economically and environmentally sustainable", while its goal is to protect and conserve the environment with a view to achieving sustainable development for Lesotho. The policy has sixteen (16) objectives but its main thrust is embodied in the first three which are outlined below:

- a) To secure for all Basotho a high quality of environment to enhance their health and well being.
- b) To use and conserve the environment and natural resources for the benefit of present and future generations.
- c) To halt environmental degradation, and to restore, maintain and enhance the ecosystems and ecological processes essential for the functioning of the biosphere and to preserve biological diversity.

The policy objectives have a direct bearing to the issues of Infection Control and Waste management in Health Care Facilities. The increased Health Care delivery activities after the refurbishments of Health care Facilities and the expanded roll out of the TB-HIV/AIDS programme will generate more Health Care Waste. Good management of Health Care Waste will go a long way in realizing the provisions of this policy.

3.2.4 Healthcare Waste Management Policy (2010)

The Health Care Waste Management Policy (June 2010) embodies the vision of Health Care Waste Management in Lesotho, essentially as to minimise the adverse impacts of HCW on the environment and on public health in a sustainable way that will reflect a balance of the economic, social and ecological needs of Lesotho. Its vision, mission and overall objectives are expressed in twelve policy statements which cover (i) Prevention of Pollution of Natural Resources, (ii) Waste Minimisation and Recycling, (iii) HCWM Planning, (iv) Improved Infrastructure and equipment, (v) Appropriate Treatment technologies, (vi) Disposal technologies, (vii) Institutional Arrangements, (viii) Collaboration and partnerships, (ix) Capacity building and Awareness Raising, (x) Financial Management, (xi) Development of Enabling Mechanisms, and (xii) Monitoring and Evaluation

The policy emphasises that HCWM will be consistently monitored and enforced through a comprehensive monitoring and evaluation system that ensures compliance with HCWM regulations, standards, guidelines, environmental management systems and quality assurance requirements. The Tuberculosis and Health Systems Support Project will cause an increase in the HCW generated from the health care facilities as they operate with the improved systems. Thus its implementation will be absolutely necessary to avoid any pollution from HCW.

3.2.5 National Tuberculosis Programme: NTP Policy and Manual

(Last reviewed 2006): Tuberculosis Infection Control in Health Care Setting



This policy and procedure manual gives guidance on how the risk of tuberculosis infection can be reduced by work practice and administrative control measures, and by environmental control measures. The provisions of this policy will be directly triggered by the expanded roll out of the Tuberculosis and Health Systems Support Project and will have a direct bearing on the Health Care waste that will be generated from the Health Care Delivery programmes.

3.2.6 Lesotho Science and Technology Policy 2006-2011 (2006)

The Science and Technology Policy recognises that technical and scientific aspects are critical to the health sector making it essential to have trained, qualified, competent and highly motivated personnel to operate effectively; well-serviced, modern equipment and laboratory facilities; and affordable medicines. It highlights the MoH's roles in training, community education, research and outreach.

Its provisions are directly linked with the objectives of the Tuberculosis and Health Systems Support Project which seeks to improve the healthcare facilities including their laboratories. The enlightened staff will also be in a position to handle health care waste professionally.

3.2.7 ICT Policy for Lesotho - 4 March 2005

The Ministry of Communications, Science and Technology is the custodian of this policy. The Policy provides the nation with a vision and strategy for becoming a fully integrated member of the Information Society. It is intended to unite Government, industry, civil society and the general public in the achievement of its national development goals and endeavours to reduce the digital divide between the "haves" and the "have nots," to promote gender equality, protect the environment and to improve food security and the standard of living of all Basotho. **It further strives to promote a healthy society capable of exploiting the full potential of ICTs.**

The vision of the ICT policy is "To create a knowledge-based society fully integrated in the global economy by 2020." While its mission is "To fully integrate information and communications technologies throughout all sectors of the economy in order to realise rapid, sustainable socio-economic development."

The policy has nine overall objectives but the most relevant for the Health sector is to "Promote usage of ICTs throughout all sectors of society including disadvantaged groups." The policy then outlines the role of each sector in implementing it.

It then highlights Health as one of the ten (10) cross cutting catalysts that provide the strategic framework needed to guide the successful implementation of the ICT policy and to realise national development goals. ICTs can play an important role in strengthening of health institutions in order to ensure efficient and effective service delivery. It can also provide an effective and cost-efficient means for distributing health and disease prevention



information to the public and can further assist health care workers by improving health care administration and management as well as accessibility to medical research, information sharing and training through on-line educational programs.

The objectives of e-health are to

- Build a health network that will enable institutions and individuals to exchange electronic records, share information and deliver quality services in both urban and rural areas.
- Improve the performance of health care facilities through the deployment of Health Management Information Systems (HMIS).
- Use electronic systems to ensure an efficient and standardised process for recording patient information.
- Increase access to health information for all Basotho through the innovative use of ICTs.
- Empower health professionals with the knowledge and use of ICTs.

The most appropriate policy measure for the Health sector is to “Use appropriate ICTs to dialogue among infected groups and health care providers.” This will be greatly promoted in the expanded roll out of Health Care delivery and will be used to effectively distributing health, HCWM and disease prevention information to the public.

3.2.8 National Health Sector Strategic Plan - 2012 - 2017

The Health Sector Strategic Plan (HSSP) takes into account all the relevant policies, legislation and other mandates for which the Ministry of Health is responsible. It also reflects the strategic outcome, oriented goals and objectives which the Ministry of Health will endeavour to achieve over the period 2013–2017. It is also a guiding plan that focuses towards attainment of the Health Policy objectives as outlined in the National Health Policy.

The National Health Sector Strategic Plan (HSSP), is the operational manual for the National Health Policy and provides the situation analysis, defines broad goals and articulates the objectives of the strategic plan. Its mission is to enhance a system that will deliver quality health services efficiently, effectively and equitably to all basotho. Its strategic objectives include the following:

- To contribute to improved health status through equity and access to quality health care in both public and private domains guided by the principles and strategies of Primary Health Care.
- To attain and maintain deployment of right numbers and skills mix of appropriately trained and motivated HRH.
- To ensure availability and management of financial resources for improved access to health services and utilization of health facilities.



- To ensure that essential, safe, efficacious, acceptable quality and affordable medicines and other therapeutic products, medical devices and technologies are available all the times in health facilities and are accessible to all.
- To provide timely, relevant, accurate and complete health information on a sustainable and integrated basis.
- To improve delivery of health services by tapping into expertise and skills from the private sector, focusing on the output based partnerships and ensuring an optimal allocation of risk between the private and public sectors.
- To ensure that health physical infrastructure are properly designed and constructed and that equipment are properly procured, installed and maintained in accordance with health.

This plan will guide the implementation of the ICWMP in its endeavour to create clean, healthy facilities free of re-infections and pollution of the environment.

3.2.9 Infection Prevention and Control Policies & Guidelines (2006)

The infection prevention and control policy and procedures also deal with HCWM. It covers basic HCWM policies and procedures and is based on the generic document developed by World Health Organisation (WHO). The HCWM policy statements that it outlines include the following:

1. National regulations and legislation shall be observed when planning and implementing waste treatment and disposal guidelines.
2. Every health care facility shall develop a healthcare waste management plan and shall designate a staff to co-ordinate its management.
3. All health care facility and setting staff have a responsibility to dispose of waste in a manner that poses minimal hazard to patients, visitors, health care workers, and other facility workers and community.
4. Infectious waste material shall be treated properly to eliminate the potential hazard that these wastes pose to human health and environment.
5. All sharps especially those contaminated with blood, and body fluid and untreated microbiological waste require special handling and treatment.
6. Sharps shall be contained in a puncture-resistant container
7. Sharps and microbiological wastes shall be incinerated or burned and the ashes disposed of in a pit.
8. Infectious waste shall be stored in a designated location with access limited to authorized personnel.
9. Written policies and procedures to promote safety of waste handlers shall be defined with inputs from persons handling the waste.
10. Waste handlers shall wear protective equipment appropriate to the risk (e.g. protective foot wear and heavy work gloves)
11. All health facility staff shall be offered Hepatitis B immunization
12. A “biohazard” symbol is required on all waste packaged for incineration in line



with the national guidelines. Regulations regarding colour coding vary from country-to-country.

13. All health care workers shall be familiar with the National Public Health Regulations governing disposal of biohazard wastes.
14. All health care workers and other facility workers shall receive orientation and in-service training on health care facility waste management.

These generic guidelines also set out HCWM roles and responsibilities; how to develop a HCWM plan for a facility; how to manage HCWM through containerization; handling of different kinds of waste, transporting, treating and disposing of it; record keeping; training and worker health and safety.

3.2.10 Consolidated Lesotho National Health Care Waste Management Plan

Consolidated Lesotho National Health Care Waste Management Plan for the Lesotho Maternal and Newborn Health Performance ----Based Financing Project August 2012

The **Consolidated Lesotho National Health Care Waste Management Plan (CLNHCWMP) (August 2012)** was developed as part of the World Bank funded Maternal and Newborn health Performance-Based Financing Project. It was a result of a synthesis of the various documents that had been developed as part of the updated HCWM, including: (i) the Situational Analysis (COWI); (ii) HCWM Policy; (iii) HCWM Strategic Plan; (iv) HCWM Implementation Plan; (v) HCWM Monitoring Plan and (vi) HCWM Support Document. The Plan provided a detailed consolidated overview of the management of healthcare waste in Lesotho, and was meant to be used as the safeguards instrument accompanying the Lesotho Maternal and Newborn health Performance-Based Financing Project. The generation of increased healthcare waste as a result of project-financed activities mandated the need for such a consolidated HCWM plan to accompany the project.

3.2.11 National Implementation Plan for the Stockholm Convention

The National Implementation Plan for the Stockholm Convention is a compilation of national objectives and action plans aimed at capacitating Lesotho towards implementation and meeting the obligations of the Stockholm Convention. This document is the basis for policy and implementation of sound management of toxic and hazardous synthetic chemical substances known as Persistent Organic Pollutants (POPs). These substances pose a risk to humans and animals, since they are bio-accumulative in organisms through the food chains, and can be transported over long distances from the points of their release through various environmental media such as air, water and migratory species.



3.2.12 Health Telecommunications Technical Assistance Project

MCA Final Project Report: Health Telecommunications Technical Assistance Project (2009)

This report presents a design of a health information systems and communication network for the Health Sector in Lesotho. It aims to support the Information and Communication Technology Infrastructure of the Ministry of Health for Year 2010 and beyond, within the framework of the MCA Health Strengthening project. It is proposed that the health information systems and communication networks shall be implemented in two phases. Phase I aims at building the major infrastructure and introducing hospital information systems and an integrated health information system while Phase II aims at consolidating the connectivity and the information systems by focusing on broadband connectivity, hospital intranet, national health portal and introducing advanced modules that support a hospital information system. A Health Care Waste Information System must be integrated into this system (GoL 2012).

3.2.13 The Health Services Decentralisation Strategic Plan (2009)

The Health Services Decentralisation Strategy addresses three important policy issues in intergovernmental relations to achieve equity in the delivery of health services:

- How to balance the need to provide this basic service with macroeconomic constraints that limit the available resources
- How to objectively determine the equitable sharing of available resources between the different levels of government
- What resources need to be allocated for capital spending in a way that is consistent with the answers to the first two questions.

Decentralisation strategy aimed to improve the overall health through the following inter-linked strategic objectives:

- Promote community participation in health development
- Provide quality primary health services
- Strengthen health support systems including its governance
- Improve technical and managerial competence of staff for attainment of decentralisation objectives

The Strategy adopted an incremental change approach in line with the phases of the overall government of Lesotho which were:

- Transition phase: Two years in 2004-05 leading to the introduction of the District Councils and Community Councils and devolution of some functions.
- Development Phase: Five years in 2008-11, when additional functions are decentralised.
- Consolidation phase. Five years in 2012-16, when operations of the local government are refined and efficiency and effectiveness improved.

In this regard, MOH was to decentralise in phases described as follows:



- Internal de-concentration: Two years in 2004-2005 (pilot districts) and in two years in 2005-2007 (all districts)
- Partnership: actions and collaboration with the councils in 2004-2008
- Gradual delegation to the Local Government Councils in 2008-2016

MOH is still in the process of implementing this strategy and is supposed to be in the consolidation phase (2012 -16), which is more of refinement of a systems that's fully set. On the ground MoH has restructured at Central level and is in the process of implementing the new structures. There are DHMTs in all districts although without the proposed District Director and the DHTs are being populated and accommodated in designated offices to enable effective service delivery. The sector has included decentralisation process indicators in the monitoring system to track implementation progress. However the progress of decentralization is being stalled by the readiness of the local authorities to take up these functions which need to be decentralized.

3.2.14 Human Resources Development Strategic Plan 2005–2025 (2004)

The MoH Human Resources Development and Strategic Plan 2005-2025 is part of the Health Sector Reform initiative. The strategy is still in force and amongst other recommendations, it sets out the approach to strengthening substantive pre-service and post-basic training capacity and developing a National Continuing Education (CE) Program. However the strategy is rather silent on environmental health needs.

3.3 LEGAL FRAMEWORK

HCW issues are to one extent or another dealt with under a number of laws. The following sections give an overview of the relevant legislative instruments which support the Infection Control and Waste Management Plan:

3.3.1 Constitution of Lesotho

Section 36 of the Constitution of Lesotho lays the foundation for environmental legislation and stipulates that Lesotho will adopt policies designed to protect and enhance the natural and cultural environment of Lesotho for the benefit of both present and future generations and shall endeavour to ensure for all citizens, a sound and safe environment adequate for their health and well-being. Health care delivery and TB-HIV/AIDS control activities in particular have a potential to disrupt the wellbeing of the environment by generating infectious health care waste. Thus the development of the ICWMP will help the Health Care delivery system to conform to the requirement of the Constitution.

3.3.2 The Environment Act No 10 of 2008

The Environment Act *No 10 of 2008* makes provisions for the protection and management



of the environment from any negative impacts that may be exerted by any activity such as health care waste generation. It also provides for the conservation and sustainable utilization of natural resources of Lesotho.

The act is based on sixteen fundamental principles of which the relevant one are:

- (a) To assure every person living in Lesotho the fundamental right to a clean and healthy environment;
- (b) To ensure that sustainable development is achieved through the sound management of the environment;
- (c) to use and conserve the environment and natural resources of the Basotho Nation for the benefit of both present and future generations, taking into account the rate of population growth and the productivity of available resources; and
- (h) To ensure that waste generation is minimized and safely disposed of;

The Act also imposes a corrective duty to protect, maintain and enhance the environment and defines a “citizen-right” to take legal action against acts or omissions damaging to the environment.

The Health Care delivery programmes such as the TB-HIV/AIDS control roll out will generate substantial amounts of waste which can very easily impact on the environment. The relevant clauses that cover the environment’s protection and management follow below:

Part VI: Environmental Quality Standards: Makes provision for soil, water, air, waste, noise, ionization, and other radiation, control of noxious smells, guidelines for environmental disasters and other standards.

Part VII: Pollution control: Makes provision for prohibition of discharge of hazardous substances, chemicals and materials or oil into the environment and defines the spiller's liability.

Part IX: Environmental Management: Makes provision for identification and protection of various natural environments including land use planning and natural heritage sites.

Part X: Environmental restoration order: Makes provision for issuance of environmental restoration orders.

Part XII: International Environmental Conventions: Covers environmental conventions or agreements to which Lesotho is a party.

The Department of Environment is charged with the responsibility to co-ordinate the functions and activities of all line ministries on environmental issues without interfering with their day to day activities and has the power to review and approve environmental impact assessments.



3.3.3 The Public Health Order No. 12 of 1970

The Order sets out the functions of the Ministry of Health shall, as to promote the personal health and environmental health within Lesotho; to prevent and guard against the introduction of disease from outside; to prevent or control communicable disease; to advise and assist district administrations and local authorities in regard to matters affecting public health; to promote or carry out researches and investigations in connection with the prevention and treatment of human diseases; to prepare and publish reports and statistics or other information relative to the public health; to report on the work of the Ministry to the Minister who may submit such report to the Council of Ministers each year; to provide for the appointment of advisers, advisory bodies or councils to assist the Minister in all matters concerning public health; and generally to administer the provisions of this Order

It stresses the notification of Communicable diseases and non-Communicable diseases, the inspection of premises where a person suffering from such a diseases may have entered and the cleansing thereof.

The Order also specifies that the Minister may make regulations applicable to all communicable diseases or only to such communicable diseases as may be specified therein regarding the following matters-

- the imposition and enforcement of isolation or of medical observation and surveillance in respect of persons suffering from communicable disease
- the duties, in respect of the prevention of communicable disease and in respect of persons suffering or suspected to be suffering there from, of occupiers of land on which persons reside
- the measures to be taken for preventing the spread of or eradicating smallpox, typhus fever, typhoid fever, cholera, yellow fever, plague, poliomyelitis, tuberculosis or any other communicable disease requiring to be dealt with in a special manner
- the conveyance of persons suffering from or the bodies of persons Who have died of a communicable disease

Generally the Order makes provisions for all matters concerning public health in Lesotho.

3.3.4 The Water Act 2008 - Water and Sewage Authority – (WASA)

The Water Act 2008 provides for the prevention of pollution of water resources through measures such as the control of processes causing pollution, the control or prevention of movement of pollutants, compliance with prescribed standards or management of waste, and the elimination of any sources or potential sources of pollution. These provisions have direct relevance to the activities of the National TB-HIV/AIDS control roll out as a potential source of pollution if not properly handled.

3.3.5 Local Government Act 1997.

The Act is in the process of being enforced and in the government has been decentralizing its services to the districts. Under the Act, the government has established the Local Government Service and the interest of the Central Government at district level will be



represented by the District Administrator, who coordinates the duties and functions of all public officers in the district. Indeed, all public officers in the district function under the direct supervision of the District Administrator. It should be noted that the district technical staff report administratively to the DA but functionally to the line ministries. The District Administrator reports to the Minister of Local Government.

An amendment to this act in 2004 gave legal mandate for the community, rural, municipal and urban councils. These councils are coordinated by the District Development Coordinating Committee (DDCC). The Act also provides for a Local Government Service Commission that recruits, appoints, promotes transfers, dismisses, retires, and interdicts staff in consultation with the relevant local authority (Ref. Health Services Decentralisation Strategic Plan Feb 2009).

According to the Local Government Act 1997, Local Authorities are charged with the responsibility of refuse collection and disposal. To this end, local authorities have the power to make by-laws in relation to public health and sanitation (including waste management). Fines for offences committed at the local level with regard to pollution of the environment are dealt with through the by-laws. Further the final disposal sites for the general and treated waste are the sanitary landfills which are run by the local authorities.

3.3.6 The Labour Code Order 1992 - Ministry of Employment and Labour

The order, among other things emphasises the Health and safety of employees. However some mines which are generally covered by the Mine Safety Act 1981. However to the extent that any activity involving mining, tunnelling or excavating is not covered by a specific provision of the Mine Safety Act 1981 or regulations made under that Act, this order applies.

The order sets out that every employer shall, so far as is reasonably practicable, ensure the safety, health and welfare at work of all of his or her employees, by providing and maintaining plant, systems of work, and a working environment for his or her employees that is clean, safe, without risks to health and adequate as regards sanitary facilities and arrangements for their welfare at work; and making arrangements for ensuring, safety and absence of risks to health in connection with the use, handling, storage and transportation of articles and substances.

The employers are also required to ensure that persons not in his or her employment who may be affected thereby are not exposed to risks to their safety or health.

There are two sets of relevant regulations which were written under Section 100 of the Labour Code Order. One is the Construction Safety Regulations and the other is the Chemical Safety Regulations.

Of particular note is the Chemical Safety Regulations which provide for the establishment of



safety and health committees in all work establishments that have a staff complement of more than 15 employees to deal with issues of safety within the working environment. It also stipulates that employees who work under conditions that could pose a risk to them should be issued with personal protective equipment, for which such employees will not be charged.

The order also provides for the notification of the Labour Commissioner of any industrial accidents and dangerous occurrences that may have happened at his workplace.

It also provides for the notification of industrial diseases, where a medical practitioner suspects or finds that any person is suffering from any industrial disease specified in the First Schedule to the Workmen's Compensation Act 1977, shall notify the employer of that person and the employer shall further notify the Labour Commissioner of the same.

3.3.7 The Hazardous and Non-Hazardous Waste Management Act, 2008

The Hazardous and Non-Hazardous Waste Management Act covers all aspects of waste management, i.e. both the general or non-hazardous waste and the hazardous waste. It addresses Health Care Waste, - both general and risk waste.

The objectives of this Act are to make provision for the generation, transportation, storage, importation, exportation, recycling and disposal of both hazardous and non-hazardous waste. It also makes provision for institutional measures for the control and management of hazardous and non-hazardous waste.

3.4 REGULATIONS

3.4.1 Hazardous (Health Care) Waste Management Regulations (2012)

The purpose of the Hazardous (Health Care) Waste Management Regulations (HHCWM) is to operationalise relevant sections of the Environment Act, 2008 in respect of hazardous waste management, specifically Health Care Risk Waste (HCRW) as a component of hazardous waste. Secondly, the regulations will control the manner in which HCRW is managed from the point of generation to ultimate disposal.

The HHCWM Regulations apply to all persons and/or institutions that generate, collect, receive, store, transport, treat and dispose of health care risk waste. They make a distinction between minor and major HCW generators and they also impose different requirements on inaccessible health care facilities as opposed to their accessible counterparts. The relaxed requirements for inaccessible HCF will be in force until the facility has been removed from the list of such facilities as it would now be deemed as accessible.

The HHCWM Regulations make provisions for: separation at point of generation, internal transport, interim storage, central storage, transportation to a treatment facility, treatment



and disposal of HCRW, among other provisions. The central goal of the regulations is to minimize risk to human health as well as the environment.

The regulations are specifically for Hazardous (Health Care) Waste, thus they do not apply to; Household/domestic waste, Disposal of animal carcasses, Radioactive and chemical health care waste and; Health care general waste (HCGW).

3.5 INTERNATIONAL CONVENTIONS AND TREATIES

Lesotho is a signatory and party to more than twenty one international, conventions, treaties and protocols. Of the many treaties, the following will be triggered by the generation of waste from the roll out of the Tuberculosis and Health Systems Support Project:-

3.5.1 The Basel Convention

The **Basel Convention Technical Guidelines** gives a narrow approach to the definitions and it is focused on reducing the impacts on health and the environment of biomedical and healthcare wastes that is based on the major classification in Annexes I, II, VII of the Basel Convention, but specified for practical use in the healthcare sector. This guideline focuses on:

- A strict definition and classification of the relevant waste streams
- The segregation at source of the waste
- The access to the best available information for the identification of waste.

The categories of Biomedical and health care waste requiring special attention have been categorised as follows:

- Human anatomical waste (tissue, organs, body parts, blood and blood bags)
- Waste Sharps (Needles, syringes, scalpels, slides, ampoules, etc.)
- Pharmaceutical waste (e.g. expired medicines)
- Cytotoxic pharmaceutical wastes
- Infectious Wastes: Discarded materials or equipment contaminated with blood and its derivatives, other body fluids or excreta from infected patients with hazardous communicable diseases.
- Laboratory waste (cultures and stocks with any viable biological agents artificially cultivated to significantly elevated numbers)

3.5.2 Stockholm Convention on Persistent Organic Pollutants

This is an important convention for the proper management of HCW as it recognizes that persistent organic pollutants possess toxic properties that are transported through air, water and migratory species across international boundaries and are deposited far from



their place of release, where they accumulate into the ecosystems. The dioxins and Furans from the thermal treatment process of incineration is an important contributor.

The Lesotho National Implementation Plan (NIP), produced in May 2005 outlines enabling activities to facilitate early action on the implementation of this convention.

In the NIP under Intervention Area 3.3.1 Institutional and regulatory strengthening measures, the GOL undertook to develop an Integrated Waste Management and Pollution Control policy framework and to amend relevant legislation to ensure significant reduction in the release of dioxins and furans. As part of this plan, the Environment Act 2008 was promulgated.

3.5.3 The convention of biological diversity

The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

The Tuberculosis and Health Systems Support Project will impact on biodiversity as the ecosystems are affected by any construction or refurbishment activities at the Health facilities. These disturbances will tend to be minimal since the renovations will basically be within the footprint of existing establishments.

3.5.4 The convention concerning the protection of world and natural heritage.

The World Heritage Convention aims for the preservation of the cultural and natural heritage sites of outstanding universal value. Each State, party to this Convention recognizes that the duty of ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage situated on its territory, belongs primarily to that State.

The project area is endowed with a lot of natural and cultural heritage sites. Any excavations for construction work may encounter artifacts, fossils and other items of cultural importance. Thus the Tuberculosis and Health Systems Support Project may trigger this convention.

3.5.5 African convention on conservation of nature and natural resources

This Convention focuses on living resources, calling for the creation of protected areas and for the specific conservation measures for listed species. It also provides the grounds for the



conservation of other natural resources such as soil and water, for the consideration of environmental concerns in development plans, and for research and education.

The renovations, refurbishments and construction works of the Health facilities will have a direct impact on the natural resources by clearing of vegetation, and loosening soils. Thus the requirements of this convention have to be considered in the implementation of the Tuberculosis and Health Systems Support Project.

3.5.6 Summative comment on legislation for HCWM

The International conventions, although binding to GOL, are not fully incorporated into the national legislation. It is not possible to prosecute where a breach of these laws has occurred because there are no local laws that deal specifically with items being regulated under these conventions.

The new Environmental Law 2008 does go some way to addressing this gap. The Hazardous and Non-Hazardous Waste Management Act, 2008 also go some way to addressing the gap in the control of HCW.

3.6 INSTITUTIONAL FRAMEWORK

3.6.1 Department of Environment

In 1994, the National Environmental Secretariat (NES) was established to advise the Government on all matters relating to environment management. It spearheaded the development of Lesotho's Agenda 21 action Plan adopted in 1995. In 1998 the Department of the Environment, which was then part of the Ministry of Natural resources, was merged with NES and the new institution became the lead institution in environmental management. The Department of the Environment then appointed Environmental Units in line Ministries in order to strengthen the coordination of environmental activities. The units received some training in different aspects of environmental management but they are not fully effective because of under staffing.

The Department of Environment's principal responsibility is coordination, monitoring and supervision of environmental conservation activities. It also has a cross-sectoral mandate to oversee the conduct of EIAs through issuance of guidelines, regulations and registration of practitioners. It reviews and approves environmental impact statements in consultation with any relevant lead agencies.



3.6.2 Ministry of Health (MoH)

Ministry of Health (MoH) is responsible for all the Health and Health Care delivery activities in the country. It will be the lead implementing agent for the Tuberculosis and Health Systems Support Project through its various departments at Head Office and its District structures. The responsible directorates at head office will be the (DDC) and the Department of Environmental Health (EHD) and at district level each District Health officer (DHO) and his team will be responsible.

A Programme Coordination Unit (PCU) will be established which will be responsible for overall coordination, supervision and monitoring, while programme activities would be implemented by the private sector, NGOs and Government Agencies on the basis of performance-based contracts.

3.6.3 Ministry of Labour and Employment (MOLE)

Ministry of Labour and Employment (MOLE) is responsible for all the labour related issues in the country. It will be heavily involved in the implementation of the Tuberculosis and Health Systems Support Project as it has to see to it that there is fair treatment of labour at the mines. Although currently there is no provision for compensation for work related illnesses like TB, it is imperative that the labour ministry should be concerned with the welfare of all workers.

3.6.4 Participating Ministries

The following Ministries have responsibilities that cover areas relevant to the Tuberculosis and Health Systems Support Project programme implementation:

(i) Ministry of Finance and Development Planning (MFDP),

The Ministry of Finance and Development Planning is a central coordinating Ministry in charge of reducing poverty levels through increased national and household incomes, economic growth, domestic production, employment, wealth and investment. These are to be attained through formulation of effective development, macroeconomic and fiscal policies and their implementation through best plans and programmes. Thus it will be the lead agency in charge of the financing mechanism. In essence it is the Borrower.

(ii) Ministry of Local Government and Chieftainship (MLGC).

The Ministry of Local Government is responsible for creating conditions for sustainable local government, poverty reduction and overall human development in Lesotho. These efforts are anchored on the synergy of policies and programmes for citizens' empowerment and participation, improved management of land and its development, decentralisation of government functions and the pursuit of appropriate rural development technologies.



The Health delivery system hinges on adequate land use planning, thus the Ministry will be very important in the area of land allocations and reallocations for project purposes at all its various levels of local government down to the villages.

3.7 PRIVATE SECTOR PARTICIPATION

Private sector participation in HCWM in Lesotho is an emerging issue. It was basically the responsibility of hospital staff and the local authorities, but they lacked the requisite capacities and ended up mixing all wastes at the landfill. This posed a limitation to managing health care wastes in a professional manner, as the management skills and financial resources of the private sector were not being tapped.

Currently the Ministry of Health is assisted by Lesotho Millennium Development Authority (LMDA) to collect and treat HCW in the Ministry's facilities. To increase its coverage, LMDA has sub-contracted other companies for this function. The contracted companies are expected to supply the health facilities with waste management equipment (containers, liners etc). It collects HCW from the Health facilities in the districts for treatment at the incinerators at the hospitals which have operational incinerators. It is also mandated to maintain day to day running of the incinerators. The companies are also expected to collect and transport general waste from the hospital for disposal at designated disposal sites.

As the private sector slowly realizes that there is business in HCWM they will increasingly take part. Further the proposed action plan for HCWM supports initiatives to develop a partnership between public and private sector with civil society. To accomplish this, it will be necessary to develop sustainable financial resources for HCWM.

3.8 FINANCIAL RESOURCES ALLOCATION

Solid waste management suffers from inadequate financing from the state and local planning authorities. The financial resource allocation at all health Care Facilities is skewed towards curative approaches to the detriment of HCWM. This is the reason why major constraints are encountered at all stages of the HCWM cycle; Collectors are not motivated, equipment is hardly replaced and collection is irregular.

Without a regular budget allocated to HCWM (mainly in health facilities), it is nearly impossible to improve management. Without a sustainable financing mechanism for waste disposal in general, it will not be possible to attract the private sector into playing a greater role for HCWM.



4. DESCRIPTION OF THE ICWMP PROJECT

4.0 INTRODUCTION

The Government of Lesotho has secured a grant amounting to US\$15 million from the World Bank to implement a Pilot Project and prepare an investment operation using the Results Based Financing for Health approach. These operations will be implemented by the Ministry of Health (MoH) and aims at improving the utilization of a minimum package of health and nutrition services.

The Project Implementing Committee intends to apply part of the proceeds of this grant to payments under the Contract to develop an Infection Control and Health Care Waste Management Plan (ICWMP). The ICWMP is a major component of the main Results Based Financing (RBF) program. The main project focuses on building capacity in the health sector which will contribute to delivering adequate health care services to the Lesotho population. It has been designed to accelerate the availability, accessibility and utilization of quality health and nutrition. This approach provides financial reward directly to service providers contingent upon undertaking predetermined actions or achieving certain results or health outcomes.

The objective for the development of the Infection Control and Management Plan (ICWMP) is to identify the level of Health Care Waste Management that will be relevant to help implement and enforce proper health and environmentally sound, technically feasible, economically viable, and socially acceptable systems for management of health care waste during and beyond the implementation of the Project.

4.1 THE ICWMP GOAL

The goal of the ICWMP is to prevent, reduce and mitigate the environmental and health impacts on health care staff and the general public caused by poor health care waste management (HCWM), through the promotion of best practices and the development of safety standards.

4.2 THE ICWMP OBJECTIVES

The ICWMP Goal may be further broken down into the following broad objectives:

- To prevent or reduce infections that may arise from poor HCWM
- To mitigate the impacts of HCW on health care staff and the general public;
- To create an enabling legal environment for conducive and effective HCWM
- To establish a sustainable multi-sectoral institutional framework for a concerted effort in HCWM.
- Improve services in HCWM by mobilizing requisite resources



4.3 THE ICWMP STRATEGIC OBJECTIVES

The rapid field assessment observed the following constraints on the HCWM system:

- Non formalization of HCWM in the institutions
- Absence of specific operational policy about HCW;
- Weak HCWM legislative regime
- Absence of standard HCWM operational procedures
- Inadequate budgetary resource allocations;
- Limited qualified human resources;
- Technological challenges in handling, treatment and disposal facilities.
- Subdued and insufficient knowledge about HCW (staff and Public).
- Absence of private sector participation

To improve HCWM in a sustainable way, the ICWMP should address these main constraints. It should initiate a process and support the national response to these questions. It must focus on preventive measures, mainly the initiatives to be taken in order to reduce the health and environmental risks associated with mismanaged waste. It should also focus on the positive pro-active actions, which, in the long term, will allow a change of behavior, sustainable HCWM, and protection of actors against risks of infection.

To achieve this, the intervention strategy should be organized around the following measures:

- Organize training activities for actors concerned (health staff, HCW handlers, municipal collectors of wastes, managers of public landfills, etc.);
- Implement information and education campaigns about HCW for the general public;
- Reinforce institutional and technical capacities and improve existing regulations;
- Support partnership initiatives between public, private and civil society in HCWM.

These actions should be accompanied by complementary measures, mainly initiated by governmental programs, in terms of HCWM upgrading in health facilities.



5. ASSESSMENT OF HCWM IN THE COUNTRY

5.0 INTRODUCTION

The basic assumption is that it is possible - in a short period of time (usually 10-15 days), by questioning main stakeholders and by selecting a number of health care facilities, representative of the country - to gather the essential data necessary to have a sufficient understanding of the situation regarding ICWM at a national level.

By analysing the role of each stakeholder along the ICWM stream it should be possible to identify where problems remain and what simple, practical actions should be undertaken to solve them.

5.1 THE ASSESSMENT PROCESS

The assessment process that was utilized followed four steps to ensure that the procedure is useful, feasible, ethical and accurate:

- 1) Engaging all relevant stakeholders,
- 2) Describing the situation at each facility as observed during visits,
- 3) Gathering credible evidence of defined quality and quantity of operational parameters at each facility in a systematic manner,
- 4) Availing all field data collected as Justification of conclusions drawn.

The ICWM information was collected in a logical and chronological manner by starting at *national* (organisations, ministries...) level down to the *local* (the health facilities) and from the *start* of the HCWM stream (waste generation) to the *end* (final disposal).

5.2 THE RAPID ASSESSMENT OF THE INSTITUTIONS

The Rapid Assessment Tool developed by WHO was applied and administered to the representative sample of the institutions that deal with HCW, starting with the responsible Government Ministries to the Clinics.

So as to be able to extrapolate collected data, a sufficient number of health care facilities representative of the country were visited. To keep things simple, between one and two health care facilities per size and category of structure (private, public, and NGO), type of area (urban, rural) and by Region were selected. This resulted in eleven (11) health care facilities being visited (Table 5-1).



5.3 SELECTION OF HEALTH CARE FACILITIES

The following institutions were identified as essential stakeholders in the ICWM sector:

Table 5-1 Visited health Related Institutions

CATEGORY OF FACILITY	NUMBER OF INSTITUTIONS	LERIBE	MAFETENG	MASERU	MOKHOHLONG
Referral Hospitals	1			Queen Mamohato Memorial Hospital	
Large Hospitals	2	Motebang Hospital	Mafeteng Hospital		
Health Centres	3	Peka Health Centre	Motsekuoa Health Centre	Ratjomose LDF Health centre	
Private Non Profit (NGO)	1	Mamohau Hospital (CHAL)		TEBA Clinic	
Private for-Profit	1	Dr. Knight Hospital			Letseng Mine Hospital
Pharmaceuticals	1		(NDSO) National Drug Supply Organisation		
Blood Transfusion Services	1			Maseru Blood Bank	
MDR TB clinic (Multiple Drug resistant TB)	1			Botsabelo MDR - TB	

5.4 BASELINE INFORMATION OF THE SELECTED FACILITIES

The selected health care facilities showed that they are at different stages of development in terms of waste disposal services. Some are poorly developed, whilst some displayed state of the art waste handling systems. The outline of the site profile of each of the selected health care facilities is detailed in Annex 2.

5.4.1 General observations

Generally the assessments revealed that:

- All staff were aware of the issue of Health Care Waste Management but were not taking it with the seriousness it deserves. At times segregation was not done properly, spillages were not disinfected, storage areas were not secured and most of the temporary storage area designed for waste were now being used to store other things like mattresses while waste was just being piled outside.
- All the government incinerators and other equipment and treatment facilities need continuous maintenance in order to perform to required levels. Currently most are operating inefficiently and not treating the waste at all.



- Most incinerators are also poorly located, too close to the health facility and in between residential housing.
- HCWM has not been institutionalised in the Health Care delivery system and thus it has been sidelined. Besides such institutions as the Letseng Hospital and the Queen Mamohatu Memorial Hospital, most institutions do not have departments or staff designated to this function.
- Most institutions do not have a functioning system of reporting accidents or even a procedure to follow, in case of one. Theoretically they refer to the Post Exposure Prophylaxis (PEP), but in practice its non functional.
- Most institutions do not have any policies related to HCWM in place and thus have not formalized it.
- The facility operators are in most cases not trained and sometimes do not have proper protective gear. HCWM related training has been minimal and the Ministry of Health hopes to embark on this drive and not only train staff but also to raise the awareness of the general public.
- Generally the final disposal facilities leave much to be desired. The pits are not lined, mostly they are open pits and not secured, exposing the scavenging communities to infections.
- Only Queen Mamohatu Memorial Hospital weighs its waste, thus the amount of waste being generated in the country is difficult even to estimate.
- The sanitary facilities at most health care facilities are generally not sufficient and not in good working condition.
- The private sector is totally excluded from HCWM at all institutions. It is also the aim of the Ministry to rope in the private sector in the HCWM arena so that the nation can benefit from the resulting Public – Private Partnership.
- Currently most of the HCWM facilities are being slowly neglected and starting to malfunction. The first step would be to bring them to good working condition. The next major step would be to update and streamline the legislative side of things to be supportive of HCWM issues. This will then be followed by bringing together all the major players and clearly define each other's roles in the HCWM field. The Health care Staff generally don't want to do anything about HCW. Finally there is need to develop some sustainable financing mechanism to drive the process forward.



5.5 SUMMARY OF THE ANALYSIS

At all the Health Care Facilities issues of concern were noted and the following is a summary of the issues:

Table 5-2 Summary of issues found at institutions

ISSUE	Referral Hospitals	Large Hospitals	Health Centres	Private For Profit	Private Non-Profit	Local Authorities	Analytical Services Providers	Blood Transfusion Services
HCWM not formalised	X	X	X	X	X	X	X	X
No policies or procedures	X	X	X	X	X	X	X	X
HCWM not included in budgets	X	X	X	X	X	X	X	X
No department or staff responsible for HCWM			X	X	X	X	X	X
Staff not trained in HCWM	X	X	X	X	X	X	X	X
Accident reporting not happening	X	X	X	X	X	X	X	X
Waste not being weighed	X	X	X	X	X	X	X	X
HCW handling is not proper	X	X	X	X	X	X	X	X
Consumables like plastic liners always out of stock	X	X	X	X	X	X	X	X
temporary storage of waste not suitable	X	X	X	X	X	X	X	X
Incinerator not functioning properly	X	X	X		X	X	X	X
Incinerator not secured from public								
Incinerator poorly located	X	X		X				
Incinerator operators not trained	X	X	X	X	X	X	X	X
Incinerator operators not protected	X	X	X	X	X	X		
Pit not lined or sealed	X	X	X				X	
Final disposal not suitable	X	X	X	X	X	X	X	X
Final disposal not secured from public	X	X	X	X	X	X	X	X
External players not in place	X	X	X	X	X	X	X	X
Sanitary facilities not sufficient	X	X	X	X	X			
Sanitary facilities not functioning properly	X	X	X	X	X			

KEY

X	Issue affects the facility
	Issue does not affect facility



5.6 GENERAL RECOMMENDATIONS

To alleviate the current low level of Health Care Waste Management in the country, the following recommendations can be made:

1. It is recommended that the following legal instruments be developed:
 - a. ICWM Regulations
 - b. ICWM technical guidelines
 - c. Standard operating procedures
2. ICWM be institutionalized and formalized in all Health Care facilities by making it mandatory that:
 - ICWM be included in Budgets
 - Staff be assigned to this function
 - Records be kept of this activity
 - Control flow of HCW in institutions
 - Regular reporting on ICWM issues at all institutions
 - Accident reporting protocols be adhered to strictly
3. The health care facilities must be provided with adequate HCW handling equipment
 - a. Colour coded bins and liners
 - b. Correct sharps containers
 - c. Full protective gear
4. The treatment facilities to be located/relocated at appropriate places that minimise affecting communities. If there is no space at the health facility, consideration should be given to establishing the facility off site and may be allow private players to run it.
5. Particular attention must be taken to ensure that the final disposal method being employed completely eliminates the possibilities of infections or poisoning.
6. ICWM Training programmes for trainers, medical staff, General staff, supplies staff and any other staff of related fields should be embarked on and pursued vigorously.
7. ICWM awareness raising campaigns should be developed and utilize the following:
 - a. Televised messages
 - b. Radio messages
 - Posters in Health centers
 - Public animation sessions
8. Private players be encouraged to take part in the ICWM programmes to tap into the Public-private partnership programmes.
9. A system to be put in place to monitor and evaluate the progress of implementation of the ICWMP.



6. TRAINING NEEDS ASSESSMENT

6.0 INTRODUCTION

From the general assessment of the Health Care Facilities conducted with the rapid assessment tool critical training requirements were noted.

Correct attitudes for effective ICWM result from knowledge and awareness regarding the potential risk of healthcare and administrative procedures for handling the waste. Apart from a general understanding of the requirements of waste management, each category of actors (doctors, nurses, caretakers, ward attendants, ground workers, administrative staff, environmental health practitioners etc.) working within the health care facility has to acquire his or her own individual waste management skills. Staff must be taught and trained in ICWM approaches. For the training to be successful and to lead to changed behaviour, participants must become aware of the risks linked to ICWM.

The training needs were assessed taking into consideration the two broad groupings, Health Care Facility staff and General Public or non Health Care staff. Both groups displayed certain levels of ignorance which may be solved by training and awareness raising:

6.1 TRAINING NEEDS FOR HEALTH CARE STAFF

This group includes:

- (i) Management and administrative staff;
- (ii) Medical and laboratory staff;
- (iii) Environmental Health Staff;
- (iv) ward attendants, caretakers, ground workers and
- (v) other support staff;

i) **Management and administrative staff**

It is the task of the management to build up the awareness of waste management in each type of health facility. The survey revealed that at times the management itself was not totally aware of all the risks resulting from HCW, and in many cases did not know much about appropriate waste management technologies and procedures.

ii) **Medical and laboratory staff**

Due to their professional training, doctors, nurses and the other medical staff have the broadest knowledge about health risks resulting from HCW. They, in turn, should create awareness among the other members of health facility staff. Although, they may be aware of the health risks, doctors, nurses and other medical staff displayed a



need for training in proper waste management and handling technologies and procedures as these are not their speciality.

iii) Ward attendants, ground workers, caretakers and other support staff

Ward attendants, ground workers, caretakers, cleaners, kitchen and laundry personnel constitute the group of people having the greatest daily contact with HCW and the least knowledge about health risks or waste management practices. The assessment revealed a serious lack of appreciation of risks associated with their tasks. Therefore, they need extensive training and regular supervision to ensure the desired improvement in waste management practices actually occurs.

iv) Environmental Health Staff

These include Environmental Health Officers, Environmental Health Technicians, Health Orderlies and Field Orderlies. They inspect, licence, monitor and evaluate; advise and educate staff and communities.

The following are the needs which were identified for the Health Care Facility staff:

Table 6-1 Topics of training and public awareness -Health Staff

TRAINING SUBJECT	CATEGORY OF TARGET GROUP			
	A	B	C	D
Basic knowledge about HCW				
Waste categories	X	X	X	X
Hazardous potential of certain waste categories	X	X	X	X
Transmission of nosocomial (hospital acquired) infection	X	X		X
Health risk for health care personnel	X	X	X	X
Proper behaviour of waste generators				
Environmentally sound handling of residues	X	X	X	X
Waste avoidance and reduction possibilities	X	X		X
Identification of waste categories	X	X		X
Separation of waste categories	X	X		X
Knowledge about appropriate waste containers	X	X	X	X
Proper handling of waste				
Adequate waste removal frequency	X		X	
Safe transport containers and procedures	X	X	X	X
Recycling and re-use of waste components	X		X	
Safe storage of waste	X		X	
Cleaning and maintenance of collection, transportation and storage facilities	X		X	
Cleaning and maintenance of sanitation facilities, drains and piping	X		X	
Handling of infectious laundry	X		X	
Handling of chemical and radioactive waste, outdated drugs	X	X	X	X
Maintenance of septic tanks and other sewage treatment facilities	X		X	
Maintenance and operation of incinerator for infectious waste	X		X	
Maintenance and operation of waste pit and landfill site	X		X	



TRAINING SUBJECT	CATEGORY OF TARGET GROUP			
	A	B	C	D
Safety regulation in waste management, protective clothing	X	X	X	X
Emergency regulations in waste management	X	X	X	X
Establishment of a waste management system				
Establishment and implementation of a waste management plan	X			
Sampling of waste quantities, monitoring and data collection	X	X		X
Monitoring and supervision of waste management practices	X	X	X	X
Cost monitoring of waste management	X			
Establishment of a chain of responsibilities	X	X	X	X
Set-up of occupational safety and emergency regulations	X	X	X	X
Interaction with Local Authorities or private sector waste handling structures	X			
Public relation and interaction with local community	X			

- A :** Management and administrative staff
B : Medical and laboratory staff
C : Ward attendants, caretakers, ground workers and other support staff;
D : Environmental Health Staff

6.2 TRAINING NEEDS - GENERAL PUBLIC/NON HEALTH CARE STAFF

This group includes:

- (i) Patients and visitors
- (ii) Contracted workers
- (iii) Private players
- (iv) Suppliers

i) Patients and visitors

Due to the permanent fluctuation of patients and visitors, it is virtually impossible to teach this group of people systematically about the principles of ICWM. One possibility may be to offer advice on basic ICWM subjects during the waiting periods. Patients and visitors should be made aware of the proper use of waste containers to dispose of their waste. Attentive hospital staff might guide patients and visitors from time to time regarding their waste management practices. Relevant posters may often provide the public with additional information.

ii) Waste Management Operators

The waste operators have a daily and direct contact with HCW because they are mainly responsible for waste handling. They seemed to be so used to HCW that the risks associated with it were being disregarded. For this reason, they need to be informed on risks and advised about infection prevention and security protection.



vi) Waste Transportation Staff

Waste transportation staff (mainly off-site transportation) were noticed to be very casual about HCW and treated it like general waste. They need to be trained because HCW should be collected in specific containers and specific vehicles. In addition, procedures for HCW handling (loading and unloading) need to be known because of the special characteristics of HCW, and because handling and transportation require specific protection equipment to prevent infection by HCW.

vii) Treatment Systems Operators

HCW treatment systems operators require specific capacities. In all facilities visited this was seriously lacking and the operators were just picked at random. The operators in charge need to be trained in order to master the operating process, to know health and security related to the operating system (mainly the procedures in emergency cases), to learn how to care for the equipment.

viii) Disposal Managers

The staff (municipal staff) who manage the final landfill disposal need to be informed about health and security linked to HCW. At the visited sites the managers were handling HCW like any other waste. They must be aware of the necessity of protection equipment and personal hygiene and they must control scavenging activities and recycling of used instruments inside these specific sites.

The following are the needs which were identified for the non Health Care Facility staff:

Table 6-2 Topics of training and public awareness guide (Non-Health Facility Staff)

TRAINING SUBJECT	CATEGORY OF TARGET GROUP				
	E	F	G	H	I
Basic knowledge about HCW					
Waste categories		X	X	X	X
Hazardous potential of certain waste categories	X	X	X	X	X
Transmission of nosocomial (hospital acquired) infection		X	X	X	X
Health risk for health care personnel		X	X	X	X
Proper behaviour of waste generators					
Environmentally sound handling of residues	X	X	X	X	X
Waste avoidance and reduction possibilities	X	X	X	X	X
Identification of waste categories		X	X	X	X
Separation of waste categories		X	X	X	X
Knowledge about appropriate waste containers		X	X	X	X
Proper handling of waste					
Adequate waste removal frequency		X	X		
Safe transport containers and procedures		X	X		
Recycling and re-use of waste components		X	X	X	X



TRAINING SUBJECT	CATEGORY OF TARGET GROUP				
Safe storage of waste		X	X	X	X
Cleaning and maintenance of collection, transportation and storage facilities		X	X	X	X
Cleaning and maintenance of sanitation facilities, drains and piping		X			
Handling of infectious laundry		X	X		
Handling of chemical and radioactive waste, outdated drugs		X	X		
Maintenance of septic tanks and other sewage treatment facilities		X			
Maintenance and operation of incinerator for infectious waste		X		X	
Maintenance and operation of waste pit and landfill site		X		X	X
Safety regulation in waste management, protective clothing		X	X	X	X
Emergency regulations in waste management		X	X	X	X
Establishment of a waste management system					
Establishment and implementation of a waste management plan		X			
Sampling of waste quantities, monitoring and data collection		X			
Monitoring and supervision of waste management practices		X	X	X	X
Cost monitoring of waste management		X			
Establishment of a chain of responsibilities		X	X	X	X
Set-up of occupational safety and emergency regulations		X			
Interaction with Local Authority or private sector waste handling structures		X			X
Public relation and interaction with local community		X			X

E : Patients and visitors

F : Waste management operators

G : Waste transportation staff

H : Treatment systems operators

I : Disposal managers

6.3 TRAINING STRATEGY

The training program should aim to operationalize the ICWMP by: promoting the emergence of experts and professionals in ICWM; raising the sense of responsibility of people involved with ICWM; and safeguarding health and security of health staff and waste handlers. The training strategy will be articulated around the following principles:

1. Training of Trainers:

This involves training the senior officers in health centres (doctors, EHO, and technical services' supervising staff in Local Authorities). The training sessions will be held in each District, (10 trainers per District, during 5 days, nearly 600 person/day) ;

2. Training health care staffs in health centres (medical staff, nurses),

This should be done by the already trained senior staff members. (80 participants for each Distract, during 3 days, nearly 3000 person/days);



3. Training HCWM supporting staffs

All support staff (ward attendants', ground workers, cleaners) will need this training. These training sessions will be held in each health centre and will be performed by already trained key staff (3000 person/days, with 3 agents during 2 days, for nearly 100 health facilities).

The training modules will deal with risks in the handling of HCW: sustainable management process (collection, storage, transportation, treatment, disposal); good behaviours and practices; caring for installations; protection measures. The training of medical and paramedical staff remains a priority if the program is to have a major impact on ICWM. The recommended content of these training modules is presented below:

1. Training module for waste management operators

- a) Information on the risks; advice about health and security
- b) Basic knowledge about procedures of wastes handling, including the management of risks.
- c) The use of protection and security equipment.

2. Training module for waste transportation staff

- a) Risks linked with waste transportation;
- b) Procedures for waste handling: loading and unloading;
- c) Equipment such as vehicles for waste transportation;
- d) Protection equipment.

3. Training module for treatment systems operators

- a) treatment and operating process guidelines;
- b) health and security related to the operating system;
- c) procedures in emergency cases and help;
- d) technical procedures;
- e) caring for equipment.
- f) control of waste production;
- g) watching over the process and the residues.

4. Training module for disposal managers

- a) Information about health and security
- b) Control of scavenging activities and recycling of used instruments;
- c) Protection equipment and personal hygiene ;
- d) Secure procedures for the management of wastes at the disposal site ;
- e) Measures concerning emergency cases and help.



5. Training modules for HF staff

a. Administrative staff

- 1) Information on the risks
- 2) Advice about health and security
- 3) Basic knowledge about procedures of ICWM; collection, storage, transportation
 - treatment and final disposal including the management of risks.
 - The use of protection and security equipment
 - Health care waste management guidelines
 - Financial resources to be allocated to ICWM.

b. Doctors, clinicians, nurses, midwives, etc.

- 1) Information on the risks; advice about health and security
- 2) Basic knowledge about procedures of ICWM waste collection, storage, transportation, treatment and final disposal including the management of risks.
- 3) The use of protection and security equipment (protective clothes)
- 4) Strategies to control and ensure that used disposable equipment/materials are placed in appropriate disposal and collection facilities and to ensure that all patients are safe from injury or hazards resulting from HCW
- 5) HCW segregation at source
- 6) How to orient the staff on the guidelines for waste management
- 7) Good practices on ICWM

c. Cleaners, ward attendants, grounds attendants, other personnel in touch with waste, etc.

- 1) Information on the risks; advice about health and security
- 2) Basic knowledge about procedures of ICWM waste collection, storage, transportation, treatment and final disposal including the management of risks.
- 3) The collection and transportation of HCW containers
- 4) The use of protection and security equipment (protective clothes)
- 5) Good practices on ICWM

6.4 PUBLIC AWARENESS STRATEGY

The awareness raising strategy will aim at the general public and scavengers. They must be informed about dangers associated with HCW handling. This objective can be achieved through information and awareness campaigns on local radio (120 messages, 2 message per month, during the 5 years period) and television (30 messages, 6 messages per year, during the 5 years period), but mostly, by animation sessions organized by NGOs and CBOs active in health and environment management (nearly 120 animations, 20 per District x 10 Districts). These actions can be reinforced by education campaigns (1000 posters, 20 units for 500 health facilities) in health facilities in other highly frequented places.

Another concern is to ensure that HCW from home care are well-managed. In fact, advances in medicine now allow monitoring family health and treating some sickness at



home. Such activities have the effect of introducing infectious wastes closer to households. These health care wastes include: used razor blades, needles, syringes and lancets, medicine unused or outdated, broken thermometers, etc. These must be managed at home where health care is practiced, to avoid their mingling with household wastes and increasing hazardous risks. It is therefore necessary to elaborate information and awareness programs through most forms of media (newspapers, flyers, radio, television, etc.) towards the health agents (professionals, traditional, and family members) who exercise in the home. The targeted actors must be advised to have specific containers for needles, sharp objects (box, empty bottles, etc.) and other HCW (cotton, gloves, bandages, etc.) and not to mix the HCW with the general household or office wastes.

Used needles, syringes, lancets and other sharps may be safely disposed with other home solid wastes, provided that special care is taken while packaging them. The safe packaging of these wastes may be done very simply at home : one can use rigid plastic bottles (with a tight fitting lid), such as empty laundry detergent bottle; and one must not put sharp objects in any container to be recycled or returned to a store; needles and syringes don't need to be recapped. The rigid bottle will minimize possible needle pricks and when they are full, the lid should be tightly fixed and the bottle placed with other solid waste for disposal.

Unused and expired medicines stored at home are considerable risks for children and careless people. These medicines may be safely disposed of, by throwing them into a flushing toilet or Pit latrine. A thorough cleansing of empty medicine containers with warm water should then be done. After that, close the lid tightly and dispose with other home solid waste. Medicines should be out of reach of children who should not play with unclean empty medicine containers.

Contaminated bandages, pads, gloves, etc., may be double bagged in plastic waste bags and securely fastened. This material should be taken back to the Health Care Facility or be thrown into a Pit latrine. Condoms are not considered as Health Care Waste (they are protective materials against HIV/AIDS infection). It is possible, in the programs for public awareness raising, to draw people's attention to the necessity of managing these wastes well: condoms should not be dropped anywhere; after use, they should be disposed of by throwing them into flushing toilets or throw in a pit toilet

Health agents (both formal and informal) who exercise at home must have collection containers, which they should carry to the nearest health centre for treatment and disposal. They should also have sterilizing products in order to sterilize all the HCW before disposal. The needles must be buried if there is a place for this inside one's premises; if not, they must be put into bottles or other closed boxes, and then evacuated to the public landfill (or health care facility). Other HCW (cotton, gloves, bandages, etc.) could be disposed in the public landfill after sterilization. Gloves should be torn to prevent people from re-using them and risking infection.



7. THE INFECTION CONTROL AND WASTE MANAGEMENT PLAN (ICWMP)

7.1 MAJOR OBJECTIVES OF THE ICWMP

The following is an outline of the major objectives of the ICWMP:

OBJECTIVE 1 : REINFORCE THE NATIONAL LEGAL FRAMEWORK FOR ICWM.

The legal framework needs to be improved. In particular, it is necessary to set up a legal regime that spells out the illegality of mismanaging HCW, legal requirements for all persons in the HCW field, including codes of practices and methods of enforcement of the requirements.

Strategy:

a) Creating, consolidating, reviewing and updating laws, bylaws and regulations related to ICWM

ICWM is currently weakly dealt with in various pieces of legislation and a thorough reviewing and consolidation is necessary to bring the whole legal basis for ICWM up to speed with the current developments in the country. The legal update should result in a law that includes the following: a clear definition of roles and responsibilities of such institutions as the MTEC, and MoH and the Municipalities, a clear and properly categorized definition of hazardous waste; detailed legal requirements for all persons who are producers, carriers, or who are engaged in the treatment and disposal of hazardous HCW so as to prevent harm to human health or pollution of the environment; the methodologies for record keeping and reporting; a regulatory system for enforcing the law; the penalties applicable to offenders; and the designation of the law courts where cases will be tried.

The legal system must be laid out in such a way that at each Health Care Facility, the ICWM will be regulated as follows:

- The roles and responsibilities for ICWM will be defined;
- An internal HCW management plan is established and implemented;
- An office responsible for monitoring the ICWM plan is designated;
- The treatment system for the Facility is defined and known;
- Financial provision for ICWM in the health centers budget is scheduled and assured;
- Procedures of positive and negative sanctions for staff, according to their involvement in HCW management are adopted and implemented.



b) Development of technical guidelines for HCWM

The MoH must undertake to develop Health Care Waste Management Guidelines. This should be possible using the information gathered from the rapid assessment programme. The technical guidelines should be practical and directly applicable, and include the following specifications, with a sufficient degree of detail such as:

- i. legal framework covering safe health-care waste management; hospital hygiene and occupational safety and health;
- ii. limits on emissions of atmospheric, land and water resources pollutants and releases into water resources;
- iii. responsibilities of health-care facilities, health-care waste producers, and public waste disposal agencies;
- iv. safe practices for waste minimization;
- v. Segregation, handling, storage and transport practices of health-care waste; recommended treatment and disposal methods for each health-care waste category.

c) Establishing control procedures for HCW management within all institutions generating and handling HCW

Information about any activities at the Health Care Facilities is hard to come by due to lack of standard operating procedures (SOPs). This makes planning a very difficult process as no baseline data can be availed. The following can assist to bring about control and maintenance of records:

- Elaborate specific EIA guidelines for waste management, including HCW;
- Implement clear directives for health control agents;
- Set up a waste generation register for HCW quantities produced by health centers;
- Define the mechanisms of control in needles and sharps collection and disposal process;
- Organize regular monitoring by technical staff in District Health Offices.

OBJECTIVE 2 : TO IMPROVE THE INSTITUTIONAL FRAMEWORK FOR ICWM

The institutional framework needs to be carefully worked on and improved. In particular, it is necessary to set up a structure to coordinate and to follow up the Plan of Action (POA) and to develop specific technical guidelines for the health centers in terms of definition of responsibilities and setting standards and norms for good ICWM practices (e.g., reduction, selection and separation at source), and procedures for storage, handling, transformation, treatment and disposal.

Strategy:



d) Defining and harmonizing the duties and responsibilities of each actor involved in ICWM process at all levels.

The various actors in ICWM are not sure of their parameters and limits to the extent that functions tend to overlap, causing confusion to the clients and at times leaving gaps as people will be unsure whose responsibility it would be. A roundtable of all the players is thus needed firstly to **sensitize them on the Rapid Assessment findings** and then agree on the roles and responsibilities of each player.

e) Establishing of Taskforces/Working Groups (coordination structures) on health care waste management at national level

This structure would include all the actors involved in ICWM (MoH, MTEC, NGOs, Local Authorities, Health facilities, etc.)

f) Facilitating the establishment of inter-sectoral taskforces/working groups and focal points at all operational levels

A similar structure to the national level structure must also be established at operational levels, i.e. a structure which includes all the actors involved in ICWM (MoH, MTEC, NGOs, Local Authorities, Health facilities, etc.)

g) Creating awareness and lobbying for support for the ICWM program

Generally HCW is treated as general waste and the risks associated with it are not taken into consideration. It is thus imperative that awareness levels be raised to acceptable levels and that support be garnered at all possible levels for this program to the extent of being included in national budgets

h) Conducting operational research and development related to ICWM

There are a lot of grey areas in the field of ICWM especially in the area of disposal. It would be worthwhile to at least support one operational research every year. This would go a long way in opening up a once dark and stigmatized field.

i) Developing of Monitoring and Evaluation plan

Implementation of ICWM plans needs to be monitored and evaluated in order to assess success of the program. **Monitoring and Evaluation** tools need to be developed and surveillance be undertaken.

OBJECTIVE 3 : TO ASSESS THE ICWM SITUATION, PROPOSE OPTIONS FOR HEALTH CARE FACILITIES AND IMPROVE THE ICWM IN HEALTH CARE FACILITIES.

The Infection Control and waste management system implementation in the country is generally deteriorating, but the extent of deterioration **needs to be more thoroughly assessed (beyond what the rapid assessment did)** using a well stratified sample of all the



Health Care facilities in the country and then derive the best technical options for HCW segregation, collection, containment, storage, transportation, and disposal according to type of HCW and size and location of Health Care Facility.

The provision of infrastructure and equipment must be attached to strict directives and guidelines that must be adhered to in implementing the programme. A centralized approach in which major equipment is centralized at Municipalities or District Health Teams (DHTs), will help reduce the equipment requirements as the surrounding facilities can all use one set of treatment facility.

Strategy :

j) Carrying out a National Inventory of Health Care Facilities {HCFs} to help establish the ICWM situation in the country.

A well stratified sample of all the health care facilities in the country must be taken and assessed to ascertain the true picture of current status of ICWM.

k) Choosing the best technical options for HCW segregation, collection, containment, storage, transportation and disposal according to (a) type of HCW (b) the size and location of the HCF.

l) Implementing pilot projects.

Before full scale implementation of the ICWMP is developed, it is advisable to carry out pilot programmes to test the feasibility of the proposed plans of action.

m) Providing infrastructure, materials and equipment to HCFs based on conditions on site.

Each Health care Facility requires a different approach to handling HCW. This must be assessed correctly and the best practicable option determined. This will be cost effective and will provide each institution with exactly what it needs:

- Supply the health facilities with collection and storage materials;
- Implement an efficient HCW treatment system (for example modern incinerators for Municipalities, DHTs, Central and Regional Hospitals; local incinerators in minor and major health centers);
- Install liquid waste treatment systems in health facilities (septic pits/tanks with a chemical disinfection system for the District hospitals, health centers; as for central and general hospitals, a physical and chemical treatment is recommended);
- Operate systematic HCW segregation procedures.

Note: The health centers should be supplied with specific containers for needles and other sharp objects. Already used empty bottles (flacons, mineral water bottles, etc.) could replace these boxes. Plastic containers for temporary storage should be supplied to health care rooms.



n) Ensure appropriate protection equipment to health staff

HCW handling is risky business and those involved in it must be properly protected. All necessary protective gears must be availed to them to protect them as they carry out their duties.

OBJECTIVE 4 : TO CONDUCT AWARENESS CAMPAIGNS FOR THE COMMUNITIES AND PROVIDE TRAINING FOR ALL ACTORS INVOLVED IN ICWM

The general public is unaware of the risks associated with HCW and worse still when it is mixed with general waste which they target for scavenging. A serious awareness drive must be targeted at the general public to raise their awareness as they are in danger of handling infectious and toxic wastes unawares.

Awareness programs for the general public should mainly be aimed at scavengers, children playing on the landfills, population performing or receiving home health care, those using recycled objects, and people living near the landfills. NGOs and Community Based Organizations (CBOs) enjoying a large experience in community communication and health activities would be best suited to conduct them.

The staff members of Health Care Institutions also require training so that they can handle HCW appropriately in order not to expose themselves and the general public to infections.

Strategy :

o) Inform population of dangers linked with bad HCW management practices

- messages on television (about dangers related to the handling of HCW);
- radio messages (mainly in local languages);
- National awareness raising campaign (posters in health facilities, billboards, monthly public animation sessions in the Districts).

p) Inform population of dangers linked to scavenged HCW materials

- messages on television (about dangers related to the handling of HCW);
- radio messages (mainly in local languages);
- national awareness raising campaign (posters in health facilities, billboards, and fliers)

q) Inform home-based care givers / traditional healers of risks linked to improper HCW handling

For more detailed information on the target groups and content of the proposed public awareness programs, please see [Chapter 6 on Training needs analysis.](#)

r) Conducting awareness campaigns on proper handling of HCW



Properly structured and planned, targeted awareness campaigns need to be carried out to raise the level of awareness about risks associated with HCW, of all sections of the society to acceptable levels

s) Elaborate training programs and Train trainers

- Identify the training needs and the groups to be trained in the health facilities;
- Train trainers.

- Organising training programmes for all stakeholders involved in ICWM with special emphasis on medical and non medical staff

- a. Train health staff in health facilities, Municipal Technical Services providers and other stakeholders;
- b. Train waste handlers in health facilities (ward attendants, ground workers, cleaners, etc.).
- c. It is recommended to update pedagogical references of training institutions in medicine, midwives, nurses and other health care training institutions by integrating ICWM issues in their pre-service training programs.

t) Evaluate training program implementation

HCW monitoring in health facilities should be carried out regularly, in order to improve waste management and to ensure that good practices are performed after training. Measures should be adopted to ensure that problems and risks involved are identified to enhance safety and preventing the development of future problems. Supervision should be in the following areas:

- i. segregation,
- ii. collection routines and labelling,
- iii. internal treatment system,
- iv. internal storage of HCW,
- v. transportation,
- vi. worker safety measures,
- vii. disposal at sanitary landfill,

OBJECTIVE 5 : SUPPORT PRIVATE INITIATIVES AND PARTNERSHIP IN ICWM

The private sector and other private individuals are currently not involved either in solid waste management or ICWM. Supporting the private sector to participate will be beneficial to the system as this will ensure injection of private sector funds into the system and introduce some business sense in the HCW arena.

Strategy:



u) Inform private companies of the business opportunities in solid waste management

Business is not aware of the potential that awaits it in this sector, which is currently clouded by none funding of the programmes. Once funding start flowing in that direction, private players will be attracted. Government must support and promote this side of things.

v) Develop sustainable financing mechanism for ICWM activities

Innovative means of developing sustainable financing mechanism for the sector must be sought, including attracting the banking sector and NGOs.

w) Set up framework and partnership between public sector and private sector in ICWM

Such a partnership will be beneficial to the sector as financing will become more available and the private sector will have the assurance of the support of the public sector in its endeavours.

OBJECTIVE 6 : DEVELOP AND OPERATIONALISE SPECIFIC FINANCIAL RESOURCES TO COVER THE COSTS OF THE MANAGEMENT OF HEALTH-CARE WASTES

It is absolutely necessary to develop and operationalize specific financial resources to cover the cost of ICWM for the purposes of sustainability. This means having specific budget lines for health care waste management issues from national to local level as a mandatory requirement.

The execution of the plan then needs regular and sustained monitoring and evaluation. This will be done by establishing a reporting structure that has to be adhered to.

Strategy :

- 1. Developing specific budget lines for ICWM at all levels of the accountancy (from national to local).**
- 2. Lobby for prioritization and mandatory budgeting for ICWM.**
- 3. Mobilising financial resources for ICWM capital and running costs.**
Resources can be mobilized nationally by using such instruments as the polluter pays and the user pays principles
- 4. Identifying the appropriate institutions through which the recovery mechanism can be implemented.**
If business sense is brought into the field of ICWM and acceptable segregation practices are adhered to, appropriate institutions can be attracted to engage in recovery programmes.



5. Monthly operational control reports

Regular reporting has to be institutionalized and formalized in all Health Care Institutions. This will assist in the regular monitoring and evaluation of the execution of the programme.

6. Mid-term evaluation (end of year 2)

Regular evaluation will assist in the regular monitoring and assessment of the execution of the programme.

7. Final Evaluation (end yr 5)

There will be a final evaluation at the end of the 5 years.



7.2 THE ICWMP ACTION PLAN

Table 7-1 ICWMP ACTION PLAN - LEGAL

OBJECTIVE 1 : TO REINFORCE THE NATIONAL LEGAL FRAMEWORK FOR ICWM.											
Result 1: Enabling legal environment for ICWM available.											
Strategies	<ul style="list-style-type: none">Developing a national policy for ICWM										
	<ul style="list-style-type: none">Creating, consolidating, reviewing and updating laws, bylaws and regulations related to ICWM										
	<ul style="list-style-type: none">Development of technical guidelines for ICWM										
	<ul style="list-style-type: none">Establishing control procedures for HCW management within all institutions generating and handling HCW							Procedures in place			
Activities	Indicators	Responsible Person	Time frame					Cost \$US			
			2014	2015	2016	2017	2018	UNIT	QNTY	UNIT COST USD	TOTAL COST USD
Analyse all existing laws, bylaws and regulations	-Number of review meetings held. -Number of HCW legal documents analysed.	Working Group	X	X	X	X					65 000.00
Develop regulations and bylaws clearly highlighting the different responsibilities at all levels relating to ICWM	-Availability of gazetted regulations and bylaws	Director Environmental Health	X	X	X						60 000.00
Establishing procedures and roles for controlling the flow/s of HCW and increasing the responsibilities of all stakeholders	-Standard Operating Procedures which define roles and responsibilities in place	Director Environmental Health	X	X	X						80 000.00
Develop the National Healthcare waste Management guidelines.	Final draft for the National guidelines.	Working Group	X	X							45 000.00
SUB - TOTAL											250 000.00



Table 7-2 ICWMP ACTION PLAN - INSTITUTIONAL ARRANGEMENTS

OBJECTIVE 2 : TO IMPROVE THE INSTITUTIONAL FRAMEWORK FOR ICWM											
Result 2: Responsibilities, standards, and sanctions are clearly defined											
Strategies	<ul style="list-style-type: none"> Defining and harmonising the duties and responsibilities of each actor involved in ICWM process at all levels 										
	<ul style="list-style-type: none"> Establishing of Taskforces/Working Groups (coordination structures) on health care waste management at National level 										
	<ul style="list-style-type: none"> Facilitating the establishment of inter-sectoral taskforces/working groups and focal points at all operational levels 										
	<ul style="list-style-type: none"> Creating awareness and lobbying for support for the ICWM program 										
	<ul style="list-style-type: none"> Conducting operational research and development related to ICWM 										
	<ul style="list-style-type: none"> Developing of Monitoring and Evaluation plan 										
Activities	Indicators	Responsible Person	Time frame					Cost \$US			
			2014	2015	2016	2017	2018	UNIT	QNTY	UNIT COST USD	TOTAL COST USD
Organise a national workshop and give feedback on findings of the Rapid Assessment Survey and expected roles and responsibilities of different players	-National workshop held - Workshop report produced	Director Environmental Health	X								5 000.00
Cascade sensitization and formation of taskforces at operational levels	-Number workshops held -Number of taskforce committees formed	Director Environmental Health	X	X							4 000.00
Facilitating conduction of at least one operational research per year on ICWM	-Number of research proposals submitted and funded	All Focal Persons	X	X	X	X	X				30 000.00



	-Number of researches conducted										
Development of Monitoring and Evaluation tools for ICWM including establishment of a surveillance programme on accidents related to ICWM	-Availability of a surveillance system and baseline database on ICWM -Availability of M&E checklists	Working groups	X	X	X						5 000.00
Ensure ongoing and final evaluation and updating of the ICWMP as necessary.	-Updated ICWMP - M & E biannual reports	Director Environmental Health	X	X	X	X	X				6 000.00
SUB-TOTAL											50 000.00



Table 7-3 ICWMP ACTION PLAN - SITUATION ANALYSIS AND IMPROVEMENT

OBJECTIVE 3 : TO ASSESS THE ICWM SITUATION, PROPOSE OPTIONS AND IMPROVE THE ICWM IN HEALTH CARE FACILITIES.											
Result 3:		Appropriate options available for the different categories of Health care facilities and HCW collected and treated in a safe and secure way									
Strategies	• Carrying out a National Inventory of Health Care Facilities {HCFs} to help establish the ICWM situation in the country.										
	• Choosing the best technical options for HCW segregation, collection, containment, storage, transportation and disposal according to (a) type of HCW (b) the size and location of the HCF.										
	• Implementing pilot projects before setting up the ICWMP.										
	• Providing infrastructure, materials and equipment to HCFs based on conditions on site.						Number of equipment				
	• Ensure appropriate protection equipment to health staff						Number of equipment				
Activities	Indicators	Responsible Person	Time frame					Cost \$US			
			2014	2015	2016	2017	2018	UNIT	QNTY	UNIT COST USD	TOTAL COST USD
Conduct a National Inventory of ICWM in Health Care Facilities (HCFs.)	Inventory document	Director DEH	X								80 000.00
Analyze the inventory data and develop options	Report	Working group	X								15 000.00
provision of adequate collection equipment, sanitation and proper disposal of wastewater.	National standard procedures in place.	Working group	X	X							80 000.00
Carry out requisite Maintenance works at the different treatment	Treatment facilities	Working group	X	X	X	X					215 000.00



facilities.	selected										
Build stabilized concrete lined pits in rural health centers, Clinics, and for home based care.	Infrastructure and equipment availed	Steering committee	X	X	X	X	X				110 000.00
SUB-TOTAL											500 000.00



Table 7-4 ICWMP ACTION PLAN - TRAINING AND GENERAL PUBLIC AWARENESS.

TABLE 7.1 ICWM ACTION PLAN: TRAINING AND CAPACITY-BUILDING FOR AWARENESS

OBJECTIVE 4 : TO CONDUCT AWARENESS CAMPAIGNS FOR THE COMMUNITIES AND PROVIDE TRAINING FOR ALL ACTORS INVOLVED IN ICWM											
Result 4: All ICWM actors are conscious of risks and demonstrate good ICWM practices											
Strategies	<ul style="list-style-type: none">Inform population of dangers linked with bad HCW management practices							Posters, radio and televised messages, public animations sessions, etc.			
	<ul style="list-style-type: none">Inform population of dangers linked to scavenged HCW materials										
	<ul style="list-style-type: none">Inform home-based care givers / traditional healers of risks linked to improper HCW handling										
	<ul style="list-style-type: none">Conducting awareness campaigns on proper handling of HCW										
	<ul style="list-style-type: none">Elaborate training programs and Train trainers							Programs elaborated and Number of trained trainers			
	<ul style="list-style-type: none">Organising training programmes for all actors involved in ICWM with special emphasis on medical and non medical staff							% of trained staff			
	<ul style="list-style-type: none">Evaluate training program implementation							Appraisal reports			
Activities	Indicators	Responsible Person	Time frame					Cost \$US			
			2014	2015	2016	2017	2018	UNIT	QNTY	UNIT COST USD	TOTAL COST USD
Develop specific ICWM Information Education and Communication (IEC) materials	-Availability of specific IEC materials	Working Group/ Health Promotion Directorate	X	X	X	X	X				135 000.00
Initiate a national awareness campaign through various media e.g. posters, print media, electronic media, and group discussions.	-Number of awareness campaigns held	Working Group/ Health Promotion Directorate	X	X	X	X	X				106 000.00
Conduct a training needs analysis for actors involved in ICWM.	-Number of training needs	Working Group/	X	X	X	X	X				20 000.00



	identified -Training program developed	Health Promotion Directorate									
Lobby to include ICWM in the training curricula for health personnel	-Number of meetings held -Availability of reports	Head of Environmental Health	X	X	X	X	X				18 000.00
Conduct on the job training of trainers (TOT) on ICWM and cascade training to operational levels	-Number of TOT sessions held -Number of trainers trained -Number of trainings cascaded	Working group	X	X	X	X	X				50 000.00
SUB-TOTAL											329 000.00



Table 7-5 ICWMP ACTION PLAN - PRIVATE SECTOR PARTICIPATION

OBJECTIVE 5 : TO SUPPORT PRIVATE INITIATIVES AND PARTNERSHIP IN ICWM											
Result 5. : Private players involved in ICWM											
Strategies	Inform private companies of the business opportunities in solid waste management							Awareness programs			
	Develop sustainable financing mechanism for ICWM activities							Annual financial Flows			
	Set up partnership framework between public sector and private sector in ICWM							Number of Partnership Agreements			
Activities	Indicators	Responsible Person	Time frame					Cost \$US			
			2014	2015	2016	2017	2018	UNIT	QNTY	UNIT COST USD	TOTAL COST USD
Organise a workshop for potential Private players and appraise them on the potential role they can play	-National workshop held - Workshop report produced	Director Environmental Health	X								15 000.00
Establish Private – Public sector partnership forum.	-Number consultations made. -Number of taskforce committees formed	Director Environmental Health	X	X	X	X					10 000.00
Establish financing mechanisms to attract business community to participate in ICWM.	-Banking sector involvement secured -Donor community sensitized. -Waste generators budgeting for its management.	Director Environmental Health	X	X	X	X					5 000.00
SUB-TOTAL											30 000.00



Table 7-6 ICWMP ACTION PLAN - FINANCIAL AND OPERATIONAL ISSUES

OBJECTIVE 6 : TO DEVELOP AND OPERATIONALISE SPECIFIC FINANCIAL RESOURCES TO COVER THE COSTS OF THE MANAGEMENT OF HEALTH-CARE WASTES.											
Result 6: ICWM activities are budgeted for, monitored, evaluated and documented											
Strategies	<ul style="list-style-type: none"> Developing specific budget lines for ICWM at all levels of the accountancy (from national to local). 										
	<ul style="list-style-type: none"> Mobilising financial resources for ICWM capital and running costs. 										
	<ul style="list-style-type: none"> Identifying the appropriate institutions through which the recovery mechanism can be implemented. 										
	<ul style="list-style-type: none"> Monthly operational control reports 										Monthly reports
	<ul style="list-style-type: none"> Mid-term evaluation (end yr 2) 										Evaluation report
	<ul style="list-style-type: none"> Final Evaluation (end yr 5) 										Evaluation report
Activities	Indicators	Responsible Person	Time frame					Cost \$US			
			2014	2015	2016	2017	2018				
Lobby for the establishment of a specific budget line for ICWM	ICWM budget line item established	Steering Committee		X							10 000.00
Mobilize resources utilizing instruments such as the 'Polluter Pays Principle'	Resources mobilised	Steering Committee	X	X	X	X	X				20 000.00
Raising financial resources through User Fees charges for private HCW generators	Funds raised	Working group	X	X	X	X	X				20 000.00
SUB-TOTAL											50 000.00



7.3 SUMMARY OF COSTS

Table 7-7 Summary of costs

OBJECTIVE	TOTAL COST \$US
1. TO REINFORCE THE NATIONAL LEGAL FRAMEWORK FOR ICWM.	250 000
2. TO IMPROVE THE INSTITUTIONAL FRAMEWORK FOR ICWM.	50 000
3. TO ASSESS THE ICWM SITUATION, PROPOSE OPTIONS FOR HEALTH CARE FACILITIES AND IMPROVE THE ICWM IN HEALTH CARE FACILITIES.	500 000
4. TO CONDUCT AWARENESS CAMPAIGNS FOR THE COMMUNITIES AND PROVIDE TRAINING FOR ALL ACTORS INVOLVED IN ICWM.	329 000
5. TO SUPPORT PRIVATE INITIATIVES AND PARTNERSHIP IN ICWM	30 000
6. TO DEVELOP AND OPERATIONALISE SPECIFIC FINANCIAL RESOURCES TO COVER THE COSTS OF THE MANAGEMENT OF HEALTH-CARE WASTES.	50 000
GRAND TOTAL	1 209 000

Due dates and source of financing are indicated in table 7-6.



8. BUDGET FOR THE ICWMP

8.1 INTRODUCTION

The estimated cost of implementing the ICWMP and enhancing this process of proper handling, disposal and management of medical waste is **US \$ 1 209 000.00**. **The estimated costs of implementation for the ICWMP will be covered by the MOH, the IDA project and other development partners as detailed below:**

8.2 ESTIMATED COST OF IMPLEMENTING THE ICWMP

Table 8-1 below provides details of the implementation costs per component of the ICWMP, and Table 8-2 provides estimated yearly costs of the ICWMP implementation.

Table 8-1 Implementation costs of the ICWMP

OBJECTIVES	STRATEGIES	UNIT	QUANTITY	UNIT COST USD	TOTAL USD
Reinforce the National legal framework for ICWM.	Development of HCW Policy, Regulations, technical guidelines and standard operational procedures	Man/day	348	400	138 000
	Printing the documents for circulation	U	7857	14	112 000
	Sub-total				250 000
Improvement of institutional Arrangements	Workshops				10 000
	Taskforce business				7 000
	Awareness and lobbying				10 000
	Operational research				23 000
	Sub-total				50 000
Improvement of ICWM in the health facilities	Piloting some technologies in the various categories.				80 000
	Supply the health services with adequate HCW collection equipment				80 000
	Build low cost, local material incinerators in health centers, clinics and Public Health Units.	U	10	25 000	230 000
	Build stabilized concrete lined pits in rural health centers, Clinics, and for home based care	U	200	550	110 000
	Sub-total				500 000
Training programs and Public awareness	formulation of comprehensive training manuals relevant to the target groups	Man/day	125	400	50 000
	Printing the documents for circulation	U	2572	14	36 000
	Training of trainers	Man/day	233	120	28 000
	Training of medical staff	Man/day	750	120	90 000



OBJECTIVES	STRATEGIES	UNIT	QUANTITY	UNIT COST USD	TOTAL USD
	Training of supplies staff	Man/day	500	100	50 000
	Televised messages	U	19	900	17 000
	Radio messages	U	70	400	28 000
	Posters in Health centers	U	3333	6	20 000
	Public animation sessions	U	25	400	10 000
	Sub-total				329 000
Supporting Private Initiatives	Advocacy and lobbying at different fora	Man/day	200	100	20 000
	Public-Private partnership Forum business				10 000
	Sub-total				30 000
Support for the execution of ICWM Plan (Management Of Health-Care Wastes)	Plan starting activities and institutionalizing ICWM	Man/day	50	100	5 000
	Establishing the User Pays and the Polluter Pays Systems	Man/day	50	100	5 000
	Monitoring at national and local level	Man/day	42.5	200	8 500
	Halfway evaluation	Man/day	30	450	13 500
	Final evaluation	Man/day	40	450	18 000
	Sub-total				50 000
TOTAL					1 209 000

Table 8-2 Annual costs of the ICWMP implementation

ICWM Plan Activities	YR 1	YR 2	YR 3	YR 4	YR 5	TOTAL
Reinforce the National legal framework for ICWM.	250 000	-----	-----	-----	-----	250 000
Improvement of institutional Arrangements	50 000	-----	-----	-----	-----	50 000
Improvement of ICWM in health facilities	200 000	100 000	100 000	50 000	50 000	500 000
Training for health staff and others actors active in ICWM and Public awareness (general public)	369 000	220 000	115 000	15 000	10 000	329 000
Supporting Private Initiatives	20 000	5 000	5 000	-----	-----	30 000
Support for the execution of ICWM Plan (Management Of Health-Care Wastes)	25 000	10 000	5 000	5 000	5 000	50 000
TOTAL	914 000	335 000	225 000	70 000	65 000	1 209 000



8.3 MOH CONTRIBUTION TO THE IMPLEMENTATION OF THE ICWMP

Table 8-3 MHSW Contribution to the Implementation of the ICWMP

Source of contribution	Type of contribution	Committed or projected	Value of contributions US\$
MoH	Cash	Projected	75 000.00
	Labour	Projected	15 000.00
TOTAL Organization contributions			90 000.00

8.4 CONTRIBUTION FROM IDA PROJECT

Table 8-4 Contribution From IDA Project

Source of contribution	Type of contribution	Committed or projected	Value of contributions US\$
IDA	Cash	Projected	300 000.00
TOTAL Organization contributions			300 000.00

8.5 CONTRIBUTIONS FROM OTHER SOURCES/PARTNERS

Table 8-5 Contributions from Other Sources/Partners

Source of contribution	Type of contribution	Committed or projected	Value of contributions US\$
WHO		Projected	15 000.00
US AID		Projected	34 000.00
TOTAL Organization contributions			49 000.00

8.6 PROJECT FUNDING SUMMARY

Table 8-6 Project funding summary

FUNDING SOURCE	DUE DATE	YR 1	YR 2	YR 3	YR 4	YR 5	TOTAL US\$
Contribution from IDA project							300 000.00
MoH contribution							90 000.00
<i>Contributions from WHO, US-AID</i>							49 000.00
<i>Contributions from Other Development Partners</i>							1,169,600.00
TOTAL PROJECT COST							1 209 000.00

The IDA project will cover some of the training and general public awareness costs as outlined in tables 7-4, 8-4 and 8-6. The MoH will thus require a further US \$ 1 218 600.00 external support from other developing partners to be able to implement the ICWMP effectively.



9. ICWMP IMPLEMENTATION MODALITIES

9.1 INSTITUTIONAL FRAMEWORK

The ICWMP falls directly under the responsibility of the Environmental Health Department (EHD) of MoH. The Department will coordinate the implementation and apply a multi-stakeholder approach to embrace all the relevant players to include MTEC, Local Authorities, NGOs, and other private players.

9.2 RESPONSIBILITIES

Part of improving ICWM involves clarifying who is responsible for what functions and identifying the fields of competencies of each institutional actor involved in this process. The following roles and responsibilities are suggested:

At the central level:

The MoH is responsible for the national health policy and ensures the guardianship of the health facilities. The Environmental Health Department (EHD) will take the lead in coordinating the implementation of the ICWMP because:

- i. it is part of its mission,
- ii. it has competent staff in this field,
- iii. it has decentralized services down to District level and
- iv. it has capacity to offer Health Education Service, public information and awareness raising.

The Environmental Health Department will be heavily involved in overseeing the following ICWM activities:

- a) Procurement of consumables (sharp containers, colour coded bin liners)
- b) Procurement of re-usable waste receptacles
- c) Running maintenance of existing incinerators
- d) Ensuring availability of land for new sites for installation of new waste treatment and disposal facilities
- e) Organising /facilitating capacity building on ICWM amongst Health Care Workers
- f) Providing human resources (waste handlers, incinerator attendants etc.)

MoH has no direct budget for Healthcare waste management activities but to implement such a programme MoH has been spending around US\$ 74 750.00 annually (See table 9-1 below).



Table 9-1 MOH Estimated Annual Expenditure on ICWM

No.	EXPENDITURE CATEGORY	TOTAL (US\$)
1.	Personnel/Labour	20 000.00
2.	Equipment/materials	11 000.00
3.	Training/seminar/workshops	9 000.00
4.	Contracts	12 000.00
5.	Other costs (Transport and allowances)	8 000.00
6.	Incidentals	2 000.00
7.	Admin (10%)	6 200.00
8.	Contingency (5%)	3 100.00
	<u>TOTAL</u>	71 300.00

(Source:..... derived estimates from Lesotho Health Profile and interviews with MoH)

The Environmental Health Department (EHD) is the lead agent for this programme and its work plan is as outlined in table 9-2 where it will be guiding the whole process.

The Environment Department of MTEC will be responsible for monitoring of the implementation of the ICWMP. It has the overall responsibility of protecting the environment and thus ultimately the activities of the Environmental Health Department of MoH must conform to the requirements of the Environmental Management Act. It will watch over the whole chain of HCW from generation to final disposal.

The Environment Department is also responsible for developing norms and standards for soil, water and air protection, mainly as they relate to the use of landfill sites for HCW disposal. This function is very important as this assures an independent control and monitoring mechanism for the system to bring about safe handling of HCW throughout the system.

At the District / Local Authority level:

The **Districts and Local Authorities** will need to put in place arrangements to make sure that HCW are not mixed with general wastes in their public landfills. This is becoming a challenge, with the advent of home based care in urban areas and innovative ways of convincing the public to separate at source have to be found.

The **Districts and Local Authorities** must ensure, either by themselves or through partnerships, that facilities capable of handling all the HCW generated in their areas of jurisdiction are in place. They should be responsible for a centralized ICWM regime within their areas of jurisdiction. They should also give their opinion about the ICWMP activities proposed for health facilities in their jurisdiction, in case some may have negative impacts on the local population's health. Coordination of the ICWM activities will be exercised by their respective Environmental Health Departments.



The **Districts and Local Authorities** should design their landfills according to the norms and standards defined by the Environment Department (MTEC), in order to avoid soil, water and air pollution in case of reception of HCW. To accomplish safe disposal of HCW, **especially the ash from incinerators**, specific areas should be reserved for that purpose. In addition, local governments should enact regulations to: (i) refuse to receive mixed HCW with non infectious wastes at local landfills; (ii) forbid uncontrolled HCW disposal; and (iii) set up strong waste management controls in their landfills (materials for covering, restriction for non authorized public access, equipment protection, etc.).

At the health care facility level:

The manager of each health care facility shall be responsible for ICWM in his/her establishment. The manager must ensure that a ICWM plan is prepared and then institute all the requirements of the national policy, regulations and standard operating procedures. S/he must designate the officers/teams charged with HCW segregation, collection, transportation and treatment and be overally responsible.

9.3 INSTITUTIONAL ARRANGEMENTS FOR ICWM IMPLEMENTATION

Effective implementation of the ICWMP components requires that institutional arrangements and responsibilities be clearly defined. The following institutional arrangements are proposed:

i) Improvement of institutional and legal framework

The co-ordination structure should be set up by the Environmental Health Department (EHD). This Unit should take the lead in developing the HCW regulations and technical guidelines.

ii) ICWM improvement at health facilities

The improvement of ICWM at health care facilities should be managed by the Environmental Health Department (EHD) and Health facility managers working together. For example, EHD should regulate the ICWM in health facilities, in line with their own regulations and MTEC requirements. MoH should supply the health facility managers with ICWM equipment and materials, but actual execution of ICWM improvement programs should be conducted by health care facility managers and their staff. Health care facility managers should promote use of recyclable materials and set up control procedures in HCW management, under the supervision of EHD.

iii) Training

Training activities should be led by the EHD of the MoH. This structure has competence in ICWM and could be supported by training and higher learning institutions like the University, the Polytechnic, and other institutions.

At District level, management of training activities should be assigned to the District Health Teams (DHT). The specific training activities will be done in the first two years



of the programme. National Consultants will train key staff as trainers in health facilities and other institutions like the Municipalities. The trained key staff should then train the other employees.

The EHD may not have the human resources to prepare and diffuse the training courses about ICWM. The EHD could prepare the TORs, and do the control and supervision at national level while District Health Teams (DHT) would assume the monitoring at local level. In other words:

- i. The EHD prepares the Terms of Reference for developing the training programs, and does the control and supervision at national level ;
- ii. Health Training Institutes or National Consultants having acquired a large experience in ICWM will prepare the training courses;
- iii. In each District, a training of trainers workshop will be held and will be conducted by Training institutions or national consultants, under the supervision of the DHTs. The latter must prepare periodic reports to be sent to the central level (EHD/MoH);
- iv. In each health care facility, the supervising staff trained in the District workshops will ensure the training of all medical staff, orderlies, cleaners, etc., under their supervision. The heads of the health establishments must supervise this work and prepare periodic evaluation reports.

iv) Public Awareness

The Health Education/Environmental Health Department of the MoH will lead the activities intended to increase the awareness of the general public about the risks associated with HCW. At local level, DHTs will do the supervision. These activities will cover the 5 years of the program, through Public animations, radio and television messages, posters, etc., and will be done as follows:

- The Health Education/Environmental Health Department of the MoH will elaborate the content of these messages, of posters and public animation;
- The televised messages will be diffused by the National Station;
- The radio messages will be diffused by the local radio stations, in English and local languages, under the supervision of District Health Teams
- Private companies (printing enterprises) will make posters to be used in the health centers;
- Public animation sessions will be led by NGOs acting in the health and the environmental field, under the supervision of District Management Teams.

v) Strategy for private sector involvement and partnership

The elaboration of measures to involve private companies more directly in ICWM will be coordinated by the MoH, in collaboration with other stakeholders.



vi) Baseline Survey and Activity Planning

National Consultants, supervised by DHTs and EHD, will carry out a baseline survey at the beginning of the investment phase. During this task, the consultants will indicate the situation prevailing presently in the health facilities, elaborate evaluation criteria, and prepare the execution plan.

vii) Monitoring of the ICWMP

At the local level, it is recommended that the DHTs ensure regular program oversight and provide monthly monitoring reports, while the six-monthly follow up will be realized by EHD.

viii) Evaluation of the ICWM Plan

It is recommended to assign this evaluation to international consultants (under the supervision of EHD), to ensure its neutrality. This evaluation must be done halfway through (at the end of the 2nd year) and at the end of the first phase of the program (year 4).

The following table shows the implementation responsibilities for the ICWMP.

Table 9-2 Implementation Responsibilities by Component

COMPONENTS AND ACTIVITIES		EXECUTION	CONTROL AND SUPERVISION
Improvement of ICWM institutional and legal framework	Set up a structure for coordination and follow up the POA	EHD	MoH/MTEC
	Develop regulations for ICWM	Consultants	EHD/ MoH
	Develop technical guidelines for ICWM	Consultants	EHD/ MoH
Improve ICWM in health facilities	Regulate the HCW management in health facilities.	EHD	EHD/ MoH and MTEC
	Supply HF with ICWM equipments and materials.	Health facilities	EHD/ MoH
	Ensure appropriate protection equipment for health staff.	Health facilities	EHD/ MoH
	Promote use of recyclable materials.	Health facilities	EHD/ MoH
	Set up procedures of control in HCW management.	Health facilities	EHD/ MoH
Training	Elaborate training programs and train trainers.	Consultants/training Institutes.	EHD/ MoH
	Train all health staff active in ICWM	Supervising staff/ Training Institutes.	EHD/ MoH
	Evaluate the training program implementation	Heads of Health centers Health Districts	EHD/ MoH
Public awareness	Televised messages	National Television	Health Education /EHD
	Messages radio	local Radios	Health Education /EHD
	Posters in health facilities	Printers societies	Health Education /EHD
	Public animation sessions	NGO and CBO	Health Education /EHD



COMPONENTS AND ACTIVITIES		EXECUTION	CONTROL AND SUPERVISION
Support the private initiatives and partnership in ICWM	Diffuse information about business opportunities in solid waste management	EHD	MoH
	Develop partnership arrangements between public sector and private sector for ICWM	EHD /Health Facilities Region and Local Authorities	MoH / Ministry of Local Government
Support the execution of ICWM Plan	Plan ICWM activities	National Consultants	EHD/ MoH
	Monitor the execution (national and local level)	Health District	EHD/ MoH
	Evaluation of the ICWM POA (halfway and final)	International Consultants	EHD/ MoH, /MTEC and Local Authorities

9.4 IMPLEMENTATION TIMEFRAME

The following timetable shows the proposed implementation schedule of the ICWM Plan over a five year period.

Table 9-3 Implementation Timetable

ICWM Plan Activities	YR 1	YR 2	YR 3	YR 4
Development of ICWM policy				
Regulation of HCW management				
Development of technical guidelines and standard operation procedures for ICWM				
Institutional arrangements - Set up a structure for coordination and follow up of the POA				
Improvement of ICWM in health facilities				
Elaboration of training programs and training of trainers				
Training for health staff active in ICWM				
Public awareness (general public)				
Supporting private initiatives and partnership in ICWM				
Monitoring and evaluation of the ICWM plan				

Before such an elaborate plan is implemented, certain activities can be started immediately, and others may be realized over the medium/long term.

The following actions could be realized immediately:

- set up a structure for coordination and follow up of the Plan of Action (POA)
- elaboration and dissemination of Policy, regulations, technical basic guidelines and standard operational procedures in ICWM
- elaboration of ICWM training program
- elaboration of public awareness training modules and supports
- set up ICWM procedures in health facilities, including health staff responsibilities

In the short term:



- g) training of trainers
- h) training all the stakeholders involved in the ICWM
- i) dissemination of public awareness programmes
- j) assessment of training program implementation
- k) halfway appraisal

In the medium/longer term:

- l) improvement of the ICWM in the health facilities
- m) Supporting of the private initiatives and partnership in ICWM
- n) Monitoring and evaluation of the ICWM plan

9.5 POTENTIAL PARTNERS AND FIELD OF INTERVENTION

Delivery of essential health services relies on the involvement of a wide range of actors -- public and private sectors, NGOs, and civil society. So it is necessary to establish a partnership framework to identify the roles and responsibilities of each category of actor.

Table 9-4 Potential field of intervention

ACTORS	POTENTIAL FIELD OF INTERVENTION
Technical services of the State (MoH / MTEC)	<ul style="list-style-type: none"> - inform the local and national authorities - facilitate co-ordination of ICWM plan activities - supply technical expertise - execute control and monitoring activities - train the health staff - supervise the training process, monitoring and evaluation
Local Authorities / Districts	<ul style="list-style-type: none"> - participate in the mobilization of populations - ensure HCW are properly disposed in their landfill - participate in training, monitoring and evaluation
Public health facilities / Private health facilities	<ul style="list-style-type: none"> - participate in training activities - supply staff with security equipment - elaborate internal plans and guidelines about ICWM - allocate financial resources for ICWM - ensure HCW management plan is implemented
Private operators	<ul style="list-style-type: none"> - invest in ICWM (e.g., treatment, transport, disposal) - operate as sub-contractors (Local Authorities / Districts / Health Facilities)
NGOs and CBOs	<ul style="list-style-type: none"> - inform, educate and make population aware - participate in / offer training activities
Training Institution	<ul style="list-style-type: none"> - provide health staff training

9.6 INVOLVEMENT OF PRIVATE COMPANIES IN ICWM

HCW collection is a major concern for public and private health facilities. According to environmental regulations, health facilities must ensure sustainable management of their wastes. However, in practice health care facilities have very limited financial resources, and no public health establishment has funds to pay for collection or disposal services for



wastes. For health care facilities having incinerators, waste collection is less of a concern. For private facilities, the major constraints are the absence of alternative solutions to their present practices; HCW co-mingled with general wastes and crude disposal. Most of them can't afford appropriate equipment for treatment.

In terms of HCWM the Ministry of Health is assisted by Lesotho Millennium Development Authority (LMDA) for collection and treatment of HCW in its facilities. LMDA has sub-contracted other companies for this function. The contracted companies are expected to supply the health facility with waste management equipment (container, liners). It collects HCW from the Health facilities for treatment at the incinerator at the hospitals. It is also mandated to maintain day to day running of the incinerator. They are again expected to collect and transport general waste from the hospital for disposal at a designated disposal site.

Both public and private facility managers and staff express a willingness to participate in an institutional arrangement whereby costs of treating their HCW could be shared under a common agreement. Such a public-private partnership arrangement could be put in place on the basis of the following principles:

- selected public health care facilities would be equipped with incinerators to serve a defined geographic radius;
- health centers equipped with incinerators would agree to accept and treat HCW from private facilities and smaller health centers within their service area;
- private health facilities receiving such HCW treatment services would agree to pay a collection / treatment fee as per the terms of the cost sharing agreement.

Long-term private sector involvement in the ICWM business will depend on whether national, local, and municipal authorities are able to put in place self-sustaining sources of financing to cover investment and operating costs for this critical environmental and public health service. If the financial equation is solved, then private sector operators can be expected to identify their individual comparative advantage and explore contractual arrangements to provide a range of services for health care facilities and landfill sites (e.g., transport, treatment, and disposal).



10. HANDLING HEALTH CARE WASTE STREAMS

10.1 RECOMMENDED SYSTEM FOR HANDLING WASTE

The management of waste must be **consistent** from the point of generation (“cradle”) to the point of final disposal (“grave”). The path between these two points can be segmented schematically into eight steps. The following is an outline of the recommended system for handling waste streams in Lesotho:

Step 1: waste minimization

This first step comes prior to the production of waste and aims at reducing as much as possible the amount of HCW that will be produced by setting up an efficient purchasing policy and having a good stock management, for example.

Step 2: HCW generation

This is the point at which waste is produced.

Step 3: segregation and containerization







The correct segregation of waste at the point of generation relies on a clear identification of the different categories of waste and the separate disposal of the waste in accordance with the categorization chosen. Health care waste can generally be classified into four fractions; (i) sharps, (ii) infectious or contaminated non-sharps (healthcare risk waste – (HCRW)), (iii) non-infectious or healthcare general waste (HCGW) and (iv) medical devices and radioactive materials.

Segregation must be done at the point of generation of the waste. To encourage segregation at source, (reusable) containers or baskets with liners of the correct size and thickness are placed as close to the point of generation as possible. They should be properly **colour-coded** (red for infectious waste and Black for general waste) and have the international infectious waste symbol clearly marked.

When they are 3/4 full, the liners are closed and sealed with plastic cable ties or string and placed into larger containers or liners of the same colour coding at the intermediate storage areas. Suitable latex gloves must always be used when handling infectious waste.



Table 10-1 Categories, Labelling And Containers For Health Care Waste

No.,	Waste Category		Labelling	Type of Container	Colour code		
1.	Sharps	Needles, infusion sets, scalpels, knives, blades, lancets and broken glass.	Sharps	Purpose – made puncture proof container	Yellow		
2.	infectious or contaminated non-sharps (healthcare risk waste – (HCRW))	Contaminated non-sharps e.g. Gauze, Cotton wool, dressings, blood, swabs, sample vials.	Infectious	Strong, leak proof plastic bag or container	Red		
		Pathological waste	Pathological	Leak proof plastic bag or container lined with leak proof material			
		Pharmaceutical waste	Pharmaceutical waste	Plastic bag or plastic lined container			
		Genotoxic waste	Genotoxic	Plastic bag or plastic lined container			
		Chemical waste	Chemical	Plastic lined container that is leak proof			
3.	non-infectious or healthcare general waste (HCGW)	Paper, packaging materials, office supplies, drink containers, hand towels, cartons, unbroken glass, plastic bottles and food remains.	General Waste	Black Plastic Bag or black plastic lined container	black		
4.	Radioactive waste		Radioactive	Lead box labelled with radioactive symbol			
5.	Pressurized containers		Pressurized containers	Plastic bag (if small)			
6.	Medical devices		e- waste				

NB: Liquid pharmaceutical waste shall be put in plastic lined containers in their original bottles.



Step 4: intermediate storage (in the HCF)

In order to avoid both the accumulation and decomposition of the waste, it must be collected on a **regular** daily basis.

This area, where the larger containers are kept before removal to the central storage area, should both be close to the wards and not accessible to unauthorized people such as patients and visitors (Figure 10-1).

Step 5: internal transport (in the HCF)

Transport to the central storage area is usually performed using a wheelie bin or trolley. Wheelie bins or trolley should be easy to load and unload, have no sharp edges that could damage waste bags or containers and be easy to clean. Ideally, they should be marked with the corresponding coding colour.



Figure 10-1 Temporary storage for waste

The transport of general waste must be carried out separately from the collection of healthcare risk waste (HCRW) to avoid potential cross contamination or mixing of these two main categories of waste. The collection should follow specific routes through the HCF to reduce the passage of loaded carts through wards and other clean areas.

Step 6: centralized storage (in the HCF)

The central storage area should be sized according to the volume of waste generated as well as the frequency of collection. The facility should not be situated near to food stores or food preparation areas and its access should always be limited to authorized personnel. It should also be easy to clean, have good lighting and ventilation, and be designed to prevent rodents, insects or birds from entering. It should also be clearly separated from the central storage area used for Health Care General Waste (HCGW) in order to avoid cross-contamination. Storage time should not exceed 24-48 hours especially in countries that have a warm and humid climate.





Figure 10-2 Poor example of a centralized storage.

Step 7: external transport

External transport should be done using dedicated vehicles. They shall be free of sharp edges, easy to load and unload by hand, easy to clean/disinfect, and fully enclosed to prevent any spillage in the hospital premises or on the road during transportation.

The transportation should always be properly documented and all vehicles should carry a consignment note from the point of collection to the treatment facility.



Figure 10-3 Example of a hazardous waste transportation vehicle.

Step 8: treatment and final disposal



There are a number of different treatment options to deal with infectious waste. These are listed in table 10-2 below and then detailed under the “Determination of Treatment Systems and Technologies” chapter.

Table 10-2 Treatment And Disposal Methods

Suitable For Different Categories Of Health Care Waste

Waste Category	Treatment	Disposal Method
a) Sharps	- Incineration	- Safe burial - Land filling
b) Infectious waste	- Incineration - Chemical disinfection - Autoclaving - Biological	- Land filling - Safe burial - Sewage - Ottway pit
c) Pathological waste	- Incineration - Biological	- Safe burial - Land filling - Ottway pit *
d) Pharmaceutical waste	- Incineration - Encapsulation - Dilution - Inertization - Dissolution	- Land filling (small quantities) - Safe burial (small quantities) - Discharge to a sewer
e) Genotoxic waste	- Rotary kiln incineration - Inertization - Encapsulation (small quantities) - Neutralization	- Return to supplier
f) Chemical waste	- Rotary kiln incineration - Treatment lagoons - Pyrolytic incineration - Neutralization - Encapsulation - Dilution	- Safe burial (small quantities) - Return to supplier
g) Radioactive waste	- Decay by storage	- Storage
h) Pressurized containers	- Crushing (damaged containers)	- Recycling - Reuse - Return to supplier - Land filling - Controlled explosion (usually done by military specialized units)

- Sewage disposal needs approval from the local authority.

10.2 SUMMARY OF THE WASTE HANDLING SYSTEM

The Lesotho Health Care Waste handling model is based on having centrally located Modern pyrolytic incinerators at Referral, District hospitals, or other Hospitals. All other health centres then transport their waste to these central places. THE Lesotho Millennium Development Authority (LMDA) assists the Ministry of Health to collect, transport and treat HCW at these centrally located incinerators. The system has not been designed to handle situations of systems failure and as is the prevailing situation, all the government incinerators and other equipment and treatment facilities are in dire need for maintenance and most are operating inefficiently and not



treating the waste at all. The Health centres find themselves in difficult situations as they have no alternative waste handling systems in place.

It is imperative that the government seriously considers erecting Local incinerators (built with local material) in Health Centres, Private Health Centres and other Public Health Units because of their very low cost and small quantities of HCW produced in these facilities. Also stabilized concrete lined pits should be erected in Health Centres, Public Health Units and for home based care, because of very low HCW production.

For effective ICWM segregation, handling and disposal/transportation the following practices should be followed:

- The medical waste should continue to be segregated by (i) sharp waste; (ii) infectious or contaminated non sharps; (iii) non infectious or healthcare General waste; and (iv) medical or radioactive devices and hazardous materials.
- Segregation should be done as close to the point of generation as possible. (i.e. in all clinical areas, traditional health practices and home based care environments);
- HCW receptacles shall be readily available at the point of generation, located away from patient areas to avoid cross infections; should be safe; utilization of the receptacles should be well understood by the medical and other health staff dealing with medical waste; and should be monitored regularly to ensure that the procedures are respected;
- Receptacles of appropriate color, size and number should be used, to accommodate and label the different waste types being generated. Labels have to be firmly attached to containers so that they do not become detached during transportation and handling. **If general and hazardous waste are accidentally mixed, the mixture should be treated as hazardous HCW.** The bags or containers should be resistant to their content (puncture-proof for sharps, resistance to chemicals reaction) and to normal conditions of handling and transportation such as vibration and changes in temperature, humidity or pressure;
- Staff involved in HCW management must ensure that the waste bags are properly labeled and sealed to prevent spilling during handling and transportation, and properly removed and should also ensure that for storage purposes, the waste is kept separate, and that the central storage receptacles for each color coded bags be placed in similarly color coded receptacles;
- All loading and unloading of waste shall take place within the designated collection area around the storage point;
- There should be separate schedules and separate collection times for different color coded containers. **Separate vehicles should be used for different types of waste.** This is to avoid increased possibilities of wastes becoming mixed and being transported to the wrong disposal routes and sites;
- Transportation must be done only by **accredited Waste Management Contractors** and certified by the local authority, ENA and other relevant departments;



- HCW must be transported directly to the disposal or treatment site within the shortest possible time; treatment and disposal of HCW should focus in minimizing negative impacts on health and on the environment;
- Capacity building of health facilities workers in all the areas related to health-care waste management should be performed at all levels;
- Segregation system should be uniformly applied throughout the country and should be maintained throughout the entire waste cycle up to disposal.
- Domestic waste should be dealt separately from health care waste.

Table 10-3 Summary on how to improve HCW handling

STEP No.	TITLE	POSSIBLE IMPROVEMENTS
1.0	waste minimization	<ul style="list-style-type: none"> • Take measures that will reduce as much as possible the amount of HCW that will be produced in future. • set up an efficient purchasing policy • set up a good stock management system
2.0	HCW generation	<ul style="list-style-type: none"> • Avoid generating waste as much as is possible
3.0	segregation and containerization	<ul style="list-style-type: none"> • Identify your waste categories • Segregate the waste into these categories at point of generation • Place bins with colour coded liners as close to the point of generation as possible • Observe the procedure of sealing the bags when full and keep them sealed throughout transportation. • Keep the different waste streams separate throughout the process • Have waste segregation policy statements clearly posted in the working areas. • Enforce PPE use at all times when handling waste
4.0	intermediate storage (in the HCF)	<ul style="list-style-type: none"> • Collect waste from working areas regularly and transport it to an intermediate storage area. • Place sealed liners into large containers of similar colour coding • Temporary storage area should both be close to the wards and not accessible to unauthorized people such as patients and visitors. • Infectious waste should be secured away at all times.
5.0	internal transport (in the HCF)	<ul style="list-style-type: none"> • use a wheelie bin or trolley to transport the waste to the central storage area. • Transport the different waste streams separately to avoid cross contamination or mixing. • follow specific routes through the HCF • avoid passing through wards or other clean areas
6.0	centralized storage (in the HCF)	<ul style="list-style-type: none"> • size of central storage area must be according to volume of waste generated. • central storage area must be situated away from food areas. • central storage area must be secure and not accessible to everybody. • It should be easy to clean, have good lighting and ventilation, • It should be designed to prevent rodents, insects or birds from entering. • General waste and Infectious waste should be stored in separate areas. • Storage time should not exceed 24-48 hours
7.0	external transport	<ul style="list-style-type: none"> • Should be done using dedicated vehicles • Vehicles should be free of sharp edges, easy to load and unload, easy to clean/disinfect. • Vehicles should be enclosed. • Transportation should always be properly documented. • Vehicles should carry a consignment note from the point of collection to the treatment facility.



8.0	treatment	<ul style="list-style-type: none"> • Appropriate treatment options should be used (table 10-2 and Chapter 11). • Each HCF must have an alternative treatment option in case of failure.
9.0	final disposal	<ul style="list-style-type: none"> • Appropriate final disposal should be used (table 10-2 and Chapter 12).



11. DETERMINATION OF TREATMENT SYSTEMS AND TECHNOLOGIES

11.1 INTRODUCTION

The relative risk approach will be used in determining the treatment system and technology to be used at each HCF. The criteria for deciding on the system is that it protects in the best way possible, healthcare workers and the community as well as minimize adverse impacts on the environment.

Environmentally-friendly and safe options used in high income countries may not always be affordable or possible to implement e.g. due to lack of electrical supply, etc. Health risks from environmental exposures should be weighed against the risks posed by accidental infection from poorly managed infectious waste (sharps in particular). The use of a burial pit or a small-scale incinerator, although clearly not the best solution, is much better than uncontrolled dumping.

The main criteria for the selection of a technical option should be that their implementation will offer a level of health protection which eliminates as many risks as possible. The ICWM systems can subsequently be upgraded to reach higher safety standards.

11.2 SOLID WASTES TREATMENT

HCW treatment systems should be efficient, environmentally sound, and permit access controls, so as to protect persons from voluntary or accidental exposure to waste during the treatment process. Technology choices should be made according to the following criteria:

- a) Performance and efficiency of treatment
- b) Environmental viability.
- c) Easiness and simplicity in the setting up, the operating and maintenance.
- d) The spare parts should be available, easy to get.
- e) Costs of investments and operating.
- f) Social acceptability

In addition to this, the waste treatment system should be close to the waste generating point. The following is an outline of available technologies for treating HCW:

a. Microwave disinfection

This method is used to disinfect bio-medical waste in stationary or mobile plants. The waste is heated by means of microwave energy. This method needs high investment and operating costs.



b. Autoclave sterilization

This type of treatment is used in health facilities (medical analysis laboratories) for the sterilization of reusable medical equipment. In this process, a dry heat sterilizer is used and heat of 180° C is generated for 30 minutes or longer, for activating vegetative micro-organisms and most bacterial spores. This process is able to handle only limited quantities of waste and therefore is commonly used only for highly infectious waste such as microbial cultures from clinical or research laboratories. Autoclaving is environmentally sound, requires fairly high investment and moderate operating costs, and ensures good disinfection efficiency under appropriate operating conditions. However, it cannot be used for all type of waste and generates contaminated wastewater. In addition, operation requires qualified technicians and its shredders are subject to frequent breakdown.

c. Incineration

Waste incineration is a thermal treatment, which aims at destroying organic waste parts by oxidation. Various types of equipment are in use:

- Pyrolytic incinerator: This has a treatment capacity ranging from 500 to 3,000 kg wastes daily, at a combustion temperature of 1200° or 1600° C; its initial cost is very high. It also needs highly qualified staff. The remnants of wastes are sent to landfill disposal sites or ash-pits.
- Pyrolytic incinerator (modern incinerator): its treatment capacity is from 200 to 10,000 kg/daily, with a combustion temperature ranging from 800 to 900° C; its requirements in terms of investment and care taking are somewhat high; it needs qualified staff; the remnants of wastes are sent to the landfill disposal sites or ash-pits.
- Incinerator with combustion room (artisanal construction, with local materials): Its investment and care taking costs are relatively low; it can work effectively, even with low-qualification staff.

Incineration provides very high disinfection efficiency and drastic reduction of weight and volume of waste. It is relatively low in cost and does not need qualified staff for operating. But it generates significant pollutant emissions.

d. Chemical disinfection

Chemical disinfection, frequently used in health facilities to destroy micro-organisms on medical equipment, floors and walls, is now being extended to the treatment of biomedical wastes. Chemicals are put in the waste to destroy or inactivate the pathogens. This treatment usually is more efficient as in disinfection than in sterilization. Chemical disinfection is most suitable for treating liquid waste such as blood, urine, stools or hospital sewage. Solid (and even highly hazardous) biomedical wastes, including microbiological cultures, sharps, etc., may also be disinfected chemically. Chemical products such as hypo-chlorine and other acids are used to



destroy pathogens, before wastes are burned or transported to disposal sites. The most frequent chemical disinfectants are:

- Chlorine - which is a universal disinfectant, very active against micro-organisms. In case of possible HIV/AIDS infectious materials, concentration of 5 g/litre (5000ppm) of chlorine is recommended.
- Formaldehyde - which is an active gas against all micro-organisms except at low temperature (<20°C); the relative humidity must be near 7 %. It is also sold in the form of gas dissolved in water at concentrations of 370 g/litre. This disinfecting product is recommended for Hepatitis and Ebola virus (but not for HIV/AIDS). The risk associated with formaldehyde is that it can cause cancer.

The drawback of this system is that the disinfected wastes are still there and other methods of final elimination must be devised. This method gives highly efficient disinfection in good operating conditions, and some chemical disinfectants are relatively inexpensive. But it requires highly qualified technicians for operating the process.

e. Burial in municipal landfills

This practice consists of disposing of HCW directly in municipal landfills. In fact, this is not a treatment system: the wastes are stored with household wastes. This system requires very low investments, but it presents huge health and environmental risks, in view of scavenging practices at public landfills. However, land filling is better than leaving hazardous wastes accumulated at hospitals or other publicly accessible places. More suitable treatment methods should immediately be envisaged.

f. Burial inside health facilities

Burial at the origin of HCW production – the health facility - is another form of elimination, mainly used where there is no treatment system or means of waste transportation to public landfills. The risk in this case is that the destruction of infected wastes is not sure, according to the burial place. Also, there is always the risk of digging out wastes, most of all, the sharp objects.

g. Concrete Lined Pits

Disposal at the origin of HCW production in concrete lined pits at the health care facility - is another form of elimination, mainly used where there is no treatment system or means of waste transportation to public landfills. The risk in this case is reduced by the lining and the pit must be above the water table. However the destruction of infected wastes is not sure, according to the burial place. Also, there is always the risk of digging out wastes, most of all, the sharp objects. (See Annex 6 for designs)

h. Open air burning



When done in open air, the burning of HCW constitutes a factor of pollution and harm to the environment. Since HCW is generally burned in a hole, the destruction is never complete: often the quantity of unburned residue constitutes 70 % of the original wastes. This encourages children and scavengers to look for toys and reusable objects.

i. Encapsulation

This method consists of disposing of wastes by filling metal or plastic containers $\frac{3}{4}$ full with waste materials and topping the container up with plastic foam, bituminous sand, cement mortar or clay material. The process is cheap, safe and very appropriate for health centres that cannot envisage other methods to treat sharps, chemical and pharmaceutical waste. Encapsulation is not recommended for non-sharps infectious waste. The main advantage is to prevent the risk of scavengers getting access to these wastes in landfills and to reduce mobilization of toxic substances.

11.2.1 Comparative analysis of solid HCW treatment systems

Table 11-1 demonstrates the advantages and drawbacks of each treatment system, along with its fitness in the economic and socio-cultural context of Lesotho.



Table 11-1 Comparative analysis of solid HCW treatment systems

System	Technical Feasibility	Investment Cost	Operating Cost	Easiness/simplicity	Availability of spare parts in Lesotho	Environmental Viability	General Social acceptance
Autoclave	Very efficient but cannot be used for all types of waste	Fairly high	Average	Very qualified staff	Not available locally	Ecological, but generates contaminated wastewater	Very good
Microwave irradiation	Very efficient	Very high	Very high	Very qualified staff	Not available locally	Very ecological	Very good
Pyrolyses	Very efficient	Very high	Average	Qualified staff	Possible	Very ecological	Very good
Pyrolitic incinerator (modern incinerator)	Very efficient	Fairly high	Average	Limited skills	Possible	Little pollution	Very good
Local material incinerator	Fairly efficient	Low	Low	Limited skills	Available	Polluting	Very good
Chemical disinfection	Fairly efficient	Low	Low	Qualified staff	Available	Polluting	Fairly good
Burial in municipal public landfills	Inefficient	Low	Low	Qualified staff	Available	Very polluting and risky	Bad
Burial inside health facilities	Inefficient	Low	Low	Limited skills	Available	Polluting and risky	Bad
Use of Concrete lined Pits	Efficient	Low	Low	Limited skill	Available	Non polluting	Fairly good
Incineration at open air	Inefficient	Low	Low	Limited skills	Available	Polluting and risky	Very bad
Encapsulation	Very efficient for sharps, drugs but not recommended for non-sharps	Low	Low	Limited skills	available	Non polluting	Good



11.2.2 Recommendations for Solid Wastes Treatment

The comparative analysis, based on the above mentioned economic and technical criteria, leads to the following recommendations:

- Modern pyrolytic incinerators at Referral hospitals, District hospitals, other Hospitals, and the Local Authorities, because of its fairly low cost and operating skills requirements;
- Local incinerators (built with local material) in Health Centres, Private Health Centres and other Public Health Units because of its very low cost and small quantities of HCW produced in these facilities;
- Stabilized concrete lined pits in Health Centres, Public Health Units and for home based care, because of very low HCW production.

Inadequate incineration, or incineration of non-incinerable (halogenated plastic, radioactive waste, reactive chemical waste, silver salts or radiographic waste, mercury or cadmium, heavy metals, etc.) waste can release pollutants into the air. The incineration of materials containing chlorine can generate dioxins and furans, which are classified as possible human carcinogens and can have other adverse effects. Incineration of heavy metals or materials with high metal contents (in particular: lead, mercury and cadmium) can increase the spread of heavy metals in the environment. Dioxins, furans and metals are persistent and remain in the environment. Materials containing chlorine or metal should therefore not be incinerated.

To ensure that inappropriate materials are not incinerated, the waste incineration system must be based on a strategy of segregation at source, to reduce as much as possible the infectious waste stream and to prevent the contamination of other wastes (papers, plastic objects, etc.). All types of wastes must not be incinerated, mainly the non-incinerable ones mentioned above. Waste segregation will allow the non-contaminated, non-infectious and non-incinerable wastes to be disposed at municipal landfills. Only the contaminated wastes (needles, sharp objects, blood stained cottons, etc.) are reserved for incineration. The latter don't produce (or produce very little) toxic elements. In addition, this system of treatment allows a complete melting of needles, which are the main vectors of accidental transmission of HIV/AIDS.

Modern incinerators, with special emission-treating equipment, are able to work at 800-1000° C, and can ensure that no dioxins and furans, or only insignificant quantities are produced. Smaller models, built with local materials and able to operate at these high temperatures are currently being field-tested and implemented in some countries.

In the health centres, the quantities of HCW produced are insignificant. If waste segregation is performed well, the quantities to be incinerated will be reduced and negative impacts on the environment will be insignificant. In addition, promotion of the use of non-chlorine plastic containers can reduce polluting by-products in solid waste incineration.



Although incineration has its critics, it is difficult to choose another system for developing countries such as Lesotho, given the economic and technical conditions. The proposal is not to incinerate all solid urban waste (household wastes, industrial wastes, etc.), but only selected contaminated health care wastes. Appropriate incinerator technology is supported by the WHO elsewhere in Africa. For example, during vaccination campaigns against tuberculosis in Togo and Benin, the WHO has supported, since 2001, a program to produce craft incinerators (made of local materials, cement with clay), in order to destroy the syringe needles used in the vaccination program. WHO organized a workshop in Bamako in 2001 to train some African technicians in the building of these types of incinerators. These models can reach very high temperatures (800° C) able to get the needles and sharp objects melted (the model is shown in annex 4).

Presently, there are no environmentally sound options at low-cost for safe disposal of infectious wastes. Incineration of wastes has been widely practiced, but alternatives, which may be preferable under certain circumstances, are becoming available, such as autoclaving, chemical treatment and microwaving. Land filling, when safely practiced, may also be a viable solution for part of the already segregated wastes.

Autoclave, microwaves systems are surely more efficient and environmentally sound, but more difficult to operate too; they are very expensive and require qualified staff for operating. They cannot be used for all types of waste and generate contaminated wastewater, and in case of malfunction, the spare parts are not available locally. So, these types of technologies should not be recommended in Lesotho, given the present economic situation. Chemical disinfection requires chemical products permanently and qualified staff for operating; the disinfected wastes must also be sent to landfill disposals or other systems of disposal after such treatment.

It is therefore important that where incineration is recommended, it should be accompanied by: (i) appropriate skills training of those who will operate the incinerators; (ii) appropriate and continuous monitoring of level of inflammability and type of waste incinerated.

Whenever incinerators become an increasingly difficult option to use, the following treatment systems should be proposed:

Chemical disinfection:

This method gives highly efficient disinfection, and some chemical disinfectants are not expensive. As for drawbacks, the method requires highly qualified technicians for operating and it is inadequate for pharmaceutical, chemical and some types of infectious waste. In central, general and regional hospitals, which produce rather important quantities of HCW, the latter should be disinfected with chemical products, then evacuated to the public landfills where specific areas have been prepared beforehand.



Disposal at municipal landfills:

In case hazardous health-care waste cannot be treated or disposed elsewhere, direct burying in the municipal landfill should be recommended. To prevent the important disease burden currently created by these wastes, it is necessary : to prepare specific areas for HCW disposal, to limit access to this place (wire fencing and lock) and to bury the waste quickly to avoid contact with people or animals. It is a temporary solution before more suitable treatment methods are found.

Burying inside hospital premises:

In health centres where the HCW production is small, a ditch should be dug. Its bottom and walls must be cemented (or stabilized) to avoid contamination of the water table and prevent the walls from collapsing. The HCW thrown in the ditch must be covered with sand. The same procedure is repeated every time a new quantity of HCW is disposed, until the hole is full; in such a case, another hole is dug nearby. The hole must be protected (fence/lock) to avoid access and accidents. The main drawback is that burial places are not always available inside the health centres.

In all cases, the principle of waste segregation at source of production must be seriously respected, to minimize the contamination of general wastes by the infectious ones.

Sharps and needle treatment

Probably the most frequent risk is created by sharps (needles, scalpel blades, blood vials, glassware, etc.) in contact with infectious germs. In health facilities, needles and sharps should be collected in non-reusable containers, such as puncture-proof “sharps boxes”, specific cardboard, metal or plastic boxes, or in empty rigid plastic bottles (with a tight fitting lid), if financial resources are not available. One must not put sharp objects in any container to be recycled or returned to a store. Table 11-2 demonstrates the advantages and drawbacks of each treatment system for sharps, along with its suitability in the economic and socio-cultural context of Lesotho.



Table 11-2 Comparative analysis of sharps treatment systems

Technology	Technical feasibility	Investment Cost	Operating Cost	Easiness /Simplicity	Availability of spare parts in The Lesotho	Environmental viability	Social acceptance
Autoclave Microwave irradiation	Very efficient	Very high	Average	Needs very qualified staff	Not available	Non polluting, but requires disposal of residue	Very good
Melting in incinerator (or needle incinerator)	Very efficient	Medium for modern incinerator) and low (for craft ones)	Low	Low skills staff	Possible	Non polluting	Good
Chemical disinfecting	Efficient	Low	Low	Qualified staff	-----	Polluting and Requires disposal of residue	Fairly good
Storage in specific containers then landfill burial	Fairly efficient	Very low	Low	Low skills staff	-----	Non polluting but risks digging out sharps	Fairly good
Burial in the site of health centre	Inefficient	Very low	Very low	Low skills staff	-----	risks of digging out sharps	Bad
Mechanical grinding	Very efficient	High	Low	Low skills staff	Not available	Non polluting, but ground sharps must be disposed	Good
Encapsulation	Efficient	Low	Low	Low skills staff	-----	Safe and non polluting	Good



The melting of sharps in incinerators is very efficient. Whenever incinerators become an increasingly difficult option to use, encapsulation (filling metallic or plastic containers up to $\frac{3}{4}$ with wastes then filling up with cement, bituminous sand, etc.), chemical disinfecting, storage in specific containers (then landfill burial), should be recommended because of the very low cost. Autoclaving is a very efficient system, but it is very expensive.

11.3 LIQUID WASTES TREATMENT

For liquid wastes, there are many treatment systems among which: (i) physical and chemical treatment; (ii) intensive biological systems (activated mud system; biological disk; bacterial field, etc.); (iii) septic pits/tanks; (iv) disinfection; and (v) decanting and digesting basin. Table 11-3 demonstrates the advantages and drawbacks of each treatment system for liquid wastes, along with its suitability in the economic and socio-cultural context of Lesotho.

Table 11-3 Comparative analysis of liquid waste treatment systems

System of treatment	Technical Characteristics	Technical Efficiency	Investment and Operating Cost	Recommendation for Lesotho
Decanting and digesting basin	- Mud draining - very weak area (buried)	Medium	Fairly high	Recommended in central and Provincial hospitals
Septic pits	- Mud draining - very weak area (buried)	Medium	Very low	Recommended in health centres
Activated mud system	- sifting - mud draining - ventilation - fairly important area	Very high	Very high	Not recommended (very expensive)
Biological disk, bacterial field	- sifting - mud draining - fairly important area	High	Very high	Not recommended (very expensive)
Physic and chemical treatment	- sifting - chemical products - fairly important area	Very High	Very high	Recommended for central or general hospitals only
Chemical disinfection	- use of chemical products only - little area is necessary - No investments in infrastructure	High	Medium	Recommended

Disinfection is clearly the most efficient way to deal with liquid infectious wastes. That is why this option should be favoured among the other interventions. Consequently, a combined system (disinfection then storage in septic pits) is recommended for the district hospitals, general hospitals, and Health centres, which don't produce much liquid waste. For the referral and general hospitals, a physical and chemical treatment, comprising a disinfection system, is recommended. The implementation of this option requires a feasibility study.



12. DETERMINATION OF DISPOSAL SITES

12.1 CHOICE OF LANDFILL SITES

In big cities such as Maseru, incineration residues, which are considered as household waste, can be disposed in the public municipal landfill, if specific burial areas are prepared, mainly to receive sharp objects not melted during the process. These types of waste hurt scavengers and street children even though they are sterilized during incineration. At District and local level, the remaining wastes after burning can be buried inside health centres, away from patient treatment areas.

12.2 DECISION TREE SCENARIOS

Five scenarios have been developed to describe the context within which health care facilities operate and must find solutions for the safe management of their wastes. The scenarios mainly distinguish between the population density of the area, the proximity to modern waste treatment facilities, and whether facilities are located in **urban, peri-urban** or **rural** environments. Five decision trees corresponding to each scenario are presented to show treatment choices and disposal options:

- **Scenario 1 (Annex 7)** : Urban area with access to a modern waste treatment facility or located within reasonable distance of a larger health-care facility with treatment facility
- **Scenario 2 (Annex 8)** : Urban area without access to modern waste treatment facility
- **Scenario 3 (Annex 9)** : Peri-urban area
- **Scenario 4 (Annex 10)**: Rural area without access to modern waste treatment or disposal facility
- **Scenario 5 (Annex 11)**: Rural area with access to modern waste treatment or located within reasonable distance of a larger health-care facility with treatment facility.



13. THE MONITORING PLAN

13.1 PRINCIPLE AND OBJECTIVE

Waste management is a continual task demanding a permanent effort from each and every person at the health care facility. During the upgrading phase, the process of ICWM must be investigated and recorded. Once the required level is reached, regular monitoring should ensure that the desired standard is maintained. The monitoring of ICWM is part of the overall quality management system. To measure the efficiency of the ICWMP, as far as the reduction of infections is concerned; activities should be monitored and evaluated, in collaboration with concerned institutions: MoH, MTEC, Local Authority, NGOs, etc.

13.2 METHODOLOGY

The ICWMP will be executed over 5 years and implementation monitoring will be carried out as follows:

Table 13-1 Implementation Plan for M&E

OBJECTIVE	TIMING/PERIOD	RESPONSIBLE PARTY
Development of ICWM policy		
Legal framework: <ul style="list-style-type: none"> • Development of ICWM policy • Regulation of HCW management • Development of technical guidelines • Development of standard operational procedures 	At the beginning of the program (first year)	EHD/ MoH
Institutional arrangements <ul style="list-style-type: none"> • Setting up a structure for coordination and follow up of the POA • Supporting private initiatives and partnership in ICWM 	At the beginning of the program (first year)	EHD/ MoH
Planning activities	At the beginning of the program	EHD/ MoH
Implementation of health facility ICWM Plan	Yearly, according to the time-table established	EHD/ MoH
Control and follow up of the execution of ICWM Plan activities	Daily	Health facilities
	Monthly	Health Department in the Districts (MoH)
	Yearly	EHD/ MoH
Training :	- two first years	- EHD/ MoH, National Consultants,



OBJECTIVE	TIMING/PERIOD	RESPONSIBLE PARTY
<ul style="list-style-type: none"> Elaboration of training programs and training of trainers Training for health staff active in ICWM 		Training Institutes
Awareness <ul style="list-style-type: none"> Public awareness (general public) 	- yearly	- EHD/ MoH and NGOs, CBOs
ICWM Plan Evaluation	Half-way (at the end of the 2nd year)	EHD/ MoH, with the support of international consultant
	At the end of the 5th year	EHD/ MoH, with the support of international consultant
Supervision	Six-monthly	EHD/ MoH; MTEC; Local Authority

13.3 MEASURABLE INDICATORS

Program level indicators are presented in Tables 7-1 to 7-6 of the ACTION PLAN for the ICWMP. At the facility level, the following framework and measurable indicators could be developed into a standard format to facilitate comparability and usefulness of the data:

- HCW management structure:**
 Reduction of waste, increase in efficiency; standard of hygiene; awareness of staff and patients; statistical data on waste generation; financial resources; functioning of responsibilities; training and awareness creation activities; monitoring and recording activities;
- HCW collection:**
 Sufficient and appropriate collection containers; efficiency of waste segregation; frequency of waste removal; environmentally friendly handling of waste; responsibilities;
- HCW transportation and storage:**
 cleanliness and functioning of transport equipment; execution of recommended transport procedures; status of storage facilities; cleanliness; separate storage of hazardous items; emergency equipment; lock and safety measures; responsibilities;
- HCW treatment:**
 Incinerator for infectious waste; proper functioning of incinerator; maintenance procedure; safety regulation for operation; safe disposal of ash; responsibilities; sewage system; functioning of septic tanks; maintenance procedure; wastewater treatment;
- HCW disposal:**
 Proper operation of landfill site; proper operation of waste pit for infectious waste; transport of chemical and radioactive waste; responsibilities;
- General cleanliness:**
 containers not overfull; no used sharps outside or protruding from sharps containers; no foul-smelling waste in facility or on premises; no litter in facility or on premises; no faeces on premises; waste pits not overfull.



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ANNEXES

ANNEX 1 NUMBER OF HEALTH FACILITIES BY CATEGORY

NO.	INSTITUTION	SERVICES OFFERED	NUMBER IN THE COUNTRY	SAMPLE SELECTED
INSTITUTIONS	MINISTRY OF HEALTH		1	1
	MINISTRY OF ENVIRONMENT		1	1
	LOCAL AUTHORITIES		6	2
	ANALYTICAL SERVICES PROVIDERS (LABORATORIES)		10	1
DHT	DISTRICT HEALTH TEAM		10	3
TERTIARY	REFERRAL HOSPITALS	In-patients, specialist out-patients, surgery, obstetrics, laboratory, intensive care unit, general practice, gynecology, emergency/casualty	1	1
	HOSPITALS		5	2
SECONDARY	MAJOR HEALTH CENTRES	In-patients, specialist out-patients, surgery, obstetrics, laboratory,	6	4
	PRIVATE FOR PROFIT		23	2
	PRIVATE NON-PROFIT		18	3
	VETERINARY HOSPITALS		1	1
	PHARMACEUTICALS		1	1
	BLOOD TRANSFUSION SERVICES		1	1



ANNEX 2 BASELINE INFORMATION OF THE SELECTED FACILITIES

A.2.1 Referral Hospitals

(i) *Queen Mamohato Memorial Hospital*

Queen Mamohato Memorial Hospital was selected to represent referral hospitals. It is a modern hospital which was recently constructed. It is run by Netcare Pvt Ltd. on behalf of the government of Lesotho and has three filter clinic associated with it; (i) Likotsi filter clinic, (ii) Mabote filter clinic and (iii) Qoaling filter clinic.

Netcare has in turn out-sourced some of its services like cleaning and laboratory services. Cleaning has been outsourced to Mediguardwic Cleaning Services whilst the laboratory has been outsourced to Ampath pvt ltd external.

Mediguardwic Cleaning Services is cleaning the whole complex and is also servicing the three filter clinics. (Waste from the filter clinics is transported to Queen Momahadu Referral Hospital for incineration.) Mediguardwic Cleaning Services is implementing the three bin system of segregating waste at point of generation. From the small bin the waste is placed in big wheely bin of the same colour coding as the plastic liners and when full the wheely bins are transported to the central temporary storage area. From the temporary storage area the infectious waste is taken for incineration which is on-site and the general waste is collected by the City Council every Monday, Wednesday and Friday and taken to the sanitary landfill. The temporary storage area receives 10 to 30 kg of medical waste per day and any anatomical waste is stored in the cold room whilst awaiting incineration. Card board packaging material is being collected for recycling.

The cleaning services are being run professionally with well trained staff. The general staff received in-service training in Health Care waste management, whilst the waste staff further received external formal training in waste management. Three members of staff were also trained to transport the waste from the point of contact to the temporary storage area. The incinerator operators received special training to be able to run the incinerator. Regulations, protocols, and guidelines for HCWM are available and are kept in files which are accessible to all staff.

Ampath Pvt Ltd is running the Laboratory services. It follows the three bin system being instituted by Mediguardwic Cleaning Services, who are doing the cleaning even in the Laboratory too. They also generate liquid bio-hazardous waste like urine which they discharge down the sewer system and also the chemical waste from their analysis is flushed down the sink.

A.2.2 Large Hospitals

(i) *Motebang Hospital*

Motebang Hospital is a large district hospital servicing Leribe District. The hospital offers all possible health services including Laboratory services, Partners-Bayer (Children with



HIV), ICAP (TB-HIV/AIDS). The Medical staff only received training on HCWM during their professional training and any further exposure has been through in house workshops.

Motabang Hospital is implementing the three bin system of segregating waste at point of generation. From the small bins in the wards, the waste is placed in big wheelie bins of the same colour coding which are located at the entrance of each ward. When the Wheelie bins are full the infectious waste is transported to the temporary storage area located next to the incinerator whilst the general waste is collected by a company which was contracted by LMDA and taken to the municipal landfill. Anatomical waste is temporarily stored in large freezers awaiting incineration. From the temporary storage area the infectious waste is taken for incineration which is on-site.

The wheelie bins located at the entrance of wards are not secure and patients are exposed to infection since they are not aware of the risks associated with this waste. Some wards were using the sluice room as a temporary storage area for infectious waste, but this room is not designed for that purpose and still not suitable.

The main temporary storage area next to the incinerator is not being used properly either. The infectious waste is being stored in a cage away from the incinerator whilst the designated lockable storage areas are full of old mattresses and other broken down equipment. The HCW is not being seriously taken care of as it is being pushed aside while other things are stored in its storage facilities.

(ii) Mafeteng Hospital

Mafeteng Hospital is a large district hospital servicing Mafeteng district. The hospital offers all possible health services including Laboratory services, TB-HIV/AIDS control, mental health, eye care, pharmacy and mortuary. The Medical staff only received training on HCWM during their professional training and any further exposure has been through in house workshops.

In terms of waste management, Mafeteng Hospital is implementing the three bin system of segregating waste at point of generation. From the small bins in the wards, the waste is placed in big wheelie bins of the same colour coding which are located at the entrance of each ward. When the Wheelie bins are full the infectious waste is transported to the temporary storage area located next to the incinerator whilst the general waste is collected by a company which was contracted by LMDA and taken to the municipal landfill. Anatomical waste is temporarily stored in large freezers awaiting incineration. From the temporary storage area the infectious waste is taken for incineration which is on-site. The ash from the incinerator is deposited in an ash pit behind the incinerator. The incinerator is not working efficiently as it is failing to melt needles which can be seen in the ash pit still intact

The wheelie bins located at the entrance of wards are not secure and patients are exposed to infection since they are not aware of the risks associated with this waste.



A.2.3 Health Centres

(i) Peka Health Centre

Peka Health Centre is a small clinic situated in Pheka, Leribe district. The clinic offers medicine, children's services and emergencies services. Although they have five beds, they are only for observations. The Medical staff only received training on HCWM during their professional training and any further exposure has been through in house workshops.

The health centre consists of fairly new buildings which were funded by the American Government. However the layout and size of some rooms makes it difficult to deliver Health care smoothly. Certain structures are misplaced and yet other functions are not catered for; (i) the multipurpose hall obstructs the entrance to both the pharmacy store and main entrance for patients because of where it is situated, (ii) .The emergency room is too far and not accessible for taking the client to the ambulance. You have to pass through the waiting area to do so, (iii) there is no cough site for the TB patients and the pharmacy store is too small. is a presentation of a more conducive plan for delivering health care including handling TB patients.

In terms of waste management, Peka Health Centre is implementing the three bin system of segregating waste at point of generation. From the small bins in the wards, the waste is placed in big wheelie bins of the same colour coding which are located at the temporary storage area. The wheelie bin for infectious waste is kept in the sluice room. When the Wheelie bins are full the infectious waste is collected by the District Health Management using a contracted company and transported to the district Hospital for incineration. The waste is collected every Friday and Monday. Anatomical waste is temporarily stored in large freezers awaiting the transportation to the incinerator. The general waste is burnt in a pit which is on site.

(ii) Motsekuoa Health Centre

Motsekuoa Health Centre is a small clinic situated in Mafeteng district. The clinic offers medicine, children's services, emergencies services, HIV/AIDS, mother and child health services (MCH), prevention of mother to child transmission (PMTCT), TB clinic and male circumcision.

The health centre consists of fairly new buildings which were funded by the American Government. The major complaint is that they rooms are too small and always crowded. Further they are not suitably planned to handle TB patients as there are no well ventilated cough sites for patients.

The Medical staff only received training on HCWM during their professional training and any further exposure has been through in house workshops. The health centre is implementing the three bin system of segregating waste at point of generation. From



the small bins in the wards, the waste is placed in big wheelie bins of the same colour coding which are located at the temporary storage area which is the sluice room. The sharps containers are also kept in the sluice room. When the Wheelie bins are full the infectious waste is collected by the District Health Management Team using a contracted company and transported to Mafeteng Hospital for incineration. The waste is collected every Friday and Monday. Anatomical waste is temporarily stored in large freezers awaiting the transportation to the incinerator. The general waste is burnt in a pit outside the clinic facility.

(iii) Ratjomose Health centre

Ratjomose Health Centre is a small clinic situated in Maseru district. The clinic offers medicine, children's services, emergencies services, and HIV/AIDS (ART),

The health centre consists of fairly new buildings which were funded by the American Government. The major complaint is that the rooms are too small and always crowded. Further they are not suitably planned to handle TB patients as there are no well ventilated cough sites for patients.

The Medical staff only received training on HCWM during their professional training and any further exposure has been through in house workshops. The health centre is implementing the three bin system of segregating waste at point of generation. From the small bins in the wards, the waste is stored at the temporary storage area at the back of the clinic. The bags are carried by hand to the storage area. every Friday and Monday, the infectious waste, it is collected by the District Health Management Team using a company that was contracted by LMDA and transported to Queen II Hospital for incineration. The clinic does not generate any anatomical waste. The general waste is also collected and transported to the municipal landfill.

A.2.4 Private Non Profit (NGO)

(i) Mamohau Hospital - (CHAL)

Mamohau Hospital is a large Primary Health hospital servicing rural Leribe district. It is a semi autonomous institution run by CHAL but also receiving some support from Government. It is basically a primary health hospital reaching out to the rural populations. The hospital offers all possible health services including Laboratory services, TB-HIV/AIDS control, HIV counseling and **mid-wifery**. The Medical staff only received training on HCWM during their professional training and any further exposure has been through in house workshops.

In terms of waste management, Mamohau Hospital is implementing the three bin system of segregating waste at point of generation. From the small bins in the wards, the waste is placed in big wheelie bins of the same colour coding which are located at the entrance of the Hospital. When the Wheelie bins are full the infectious waste is transported to the temporary storage area located next to the incinerator whilst the



general waste is burnt at a pit just outside the Hospital premises. Anatomical waste is temporarily stored in large freezers awaiting incineration. From the temporary storage area the infectious waste is taken for incineration which is on-site. The ash from the incinerator is deposited in the open pit used for burning general waste. The incinerator was broken down at time of visit and the medical waste was piling in the store room.

The wheelie bins located at the entrance of wards are not secure and patients are exposed to infection since they are not aware of the risks associated with this waste.

Generally waste handling at the institution is not very good. Although all staff are aware of the three bin system at times wrongly segregated waste was getting to the incinerator and was raising problems for the operators. There is a general laxity about handling waste in the institution and the waste generators were not taking their responsibility of segregating at source. Transportation and treatment was also not being done with the seriousness it deserved, thus the open pit was full of everything. This may be a result of the fact that the person in charge of HCWM is a carpenter who has taken over the heading of the maintenance unit.

It was also noted that spillages are going un-disinfected and the cleaners are being exposed and also spreading the infectious materials all over as they clean with their mops whilst the spillage hasn't been disinfected. The medical staff are the ones in charge of the spill kits and are supposed to disinfect the spillages before the cleaners come to clean it up. But they were not just doing it and leaving it to the cleaners.

(ii) TEBA Clinic

TEBA has diversified from being primarily a labour recruitment and management service provider to offering a number of additional services including human resources, social and financial services both during and post employment. Thus it assesses people for job readiness, assists in the screening, and recruitment and even in the retrenchment of mine workers. TEBA further serves mines and mineworkers within their rural communities. To this end TEBA has clinics which do the health assessments and treatment.

TEBA clinic is a private entity offering medicine and laboratory services specialising in TB treatment. The Clinic is divided into the following sections:

(i) Banking Hall

The banking hall serves for recruiting new employee, relaying messages to relatives in South Africa and financial services. Care supporters are also located in this hall and help with health talks, filling in of withdrawal slips and some initial screening. They refer any suspects to the clinic.

(ii) Clinic

The nurse in the clinic does the testing for TB and initiates treatment. The suspects are also offered HIV testing.

(iii) Coughing Booth



For sputum collection there is a coughing booth which is located outside where it is well aerated.

(iv) Laboratory

The sputum is taken to the laboratory for analysis. The laboratory is run by a laboratory technician and uses Gene-Xpert equipment.

(v) Counselling room

Once the tests are complete the suspects are taken to the counselling room where they are advised of the outcome of the tests and what steps to take.

The current set up is serving the mine workers to a certain level but has been found to be deficient. The proposal is to upgrade it to a one stop shop that will handle all the trans-boundary TB cases efficiently, including all follow-ups, compensations, and welfare of immediate family members who may end up being infected. This will include even phone reminders for taking medication. **TEBA has got the land required for any expansion at their current site, which include many other buildings which they are currently not using.**

In terms of waste management, the clinic is implementing the three bin system of segregating waste at point of generation. From the small bins in the wards, the waste is placed in big wheelie bins of the same colour coding which are located at the temporary storage area. When the Wheelie bins are full the infectious waste is collected by the District Health Management Team using a contracted company and transported to Queen II Hospital for incineration. The waste is collected regularly. The general waste is transported to the Hatsosane municipal landfill.

A.2.5 Private for-Profit

(i) Dr. C. K. Knight Memorial Hospital

Dr. C. Y. Knight Memorial Hospital is a large private for profit hospital servicing urban Hlotse in Leribe district. The hospital offers all possible health services except Laboratory services and radiology. The owner of the Hospital, Dr. C. Y. Knight who was running the hospital passed away two years ago. His passing away left a big gap and left the Hospital in a difficult position which has taken long to recover from. During this time most of the staff left the institution, patient numbers dwindled to near zero and the hospital was basically closed to normal business. However in the past six months the situation has been turned around and the hospital has been under refurbishment and staff have been reengaged again. The Hospital will be up and running by end of this month.

The Medical staff only received training on HCWM during their professional training and any further exposure has been through in house workshops. The hospital does not have waste treatment facilities on site but has entered into an agreement with the Motebang Government Hospital in Hlotse (Leribe) which collects all the medical waste and treat it at their incinerator. The rest of the general waste is burnt in an open pit.



The Hospital has two big rooms which were set aside as laboratories but are not being utilised. Hospital management are offering the TB Project to take them up and utilise them.

From the experience they are getting from their current refurbishments the staff members also pointed out that the construction/refurbishment work will produce noise which will disturb patients. Dust will also be produced and needs to be suppressed.

(ii) Letseng Mine Hospital

Letseng Mine Hospital is a private hospital servicing Letseng mine staff. The hospital offers all possible health services except children's services. The Medical staff only received training on HCWM during their professional training and any further exposure has been through in house workshops. The Snr Nursing officer is in charge of HCWM in the hospital.

The Hospital is implementing the three bin system of segregating waste at point of generation. From the small bins in the wards, the waste is placed in big wheelie bins of the same colour coding which are located at the back of the Hospital, in a lockable cage for the infectious waste, and close to the main entrance for general waste. The general waste is further segregated on site to cans, glass, paper, and plastic. These different fractions are being bailed for recycling at the waste sorting area which is next to the incinerator.

When the Wheelie bins are full all the waste is transported to the temporary storage area located next to the incinerator where it is stored according to the different categories of waste. From the temporary storage area the infectious waste is taken for incineration which is on-site together with some of the general waste. The rest (glass, cardboard, paper, plastics, etc) are being bailed for recycling. The ash from the incinerator is being placed in 200l metal drums, sealed and transported to South Africa for final disposal at a proper sanitary landfill.

The form of transport being used to transport the waste from the hospital to the incinerator is not suitable for the job. They are using any van that will be available.

In case the incinerator is not working, the hospital has an arrangement with Butha Buthe, where they can take it for incineration.

A.2.6 Pharmaceuticals

(i) National Drug Supply Organisation (NDSO)

The National Drug Supply Organisation (NDSO) is the central medical stores for the Government of Lesotho. It is mandated to procure, store and distribute essential drugs which include ARVs, small scale laboratory items, family planning commodities, nutritional products, vaccines and TB medicine.



NDSO's major waste problems emanate from expired drugs. Drugs expire because of slow uptake by hospitals and at times because of large volumes of donated drugs failing to be used in time. Donated Drugs should normally have shelf life more than three quarters still left but there has been cases of drugs nearing their shelf life being donated and posing waste problems for NDSO. Although in most instances donations are arranged and agreed upon, there are cases where truck loads have pitched up without notice. However NDSO has found it difficult to reject these donations.

Once the drugs have expired NDSO gets approval from MoH to destroy. Sending drugs back to manufacturers has proved to be difficult because of border laws with South Africa which are prohibitive.

Handling of waste drugs follows laid down protocol to the level of obtaining a destruction/disposal certificate before destroying the drugs. The expired drugs are recorded, and quantified before destruction. The NDSO staff only received training on HCWM during their professional training and any further exposure has been through in-house workshops. NDSO has an incinerator on site and all the expired drugs are treated here. The rest of the general waste is either burnt in an open pit which is on site or collected by the local authority to the landfill site.

A.2.7 Blood Transfusion Services

(i) Lesotho Blood Transfusion Service (LBTS)

The Lesotho Blood Transfusion Service (LBTS) was created in June, 1984 as an integral part of the Central Laboratory Services by the Ministry of Health. Its goal is to provide safe and adequate blood and blood products to all the hospitals in the country. This is achieved through the recruitment, selection and retention of voluntary non-remunerated blood donors, collection, processing, screening and storage of blood and blood products, distribution of blood and blood products to all the hospitals.

In the process of collecting blood LBTS generates medical waste. In terms of waste management, LBTS is implementing the three bin system of segregating waste at point of generation. When the bins are full they are carried by hand to the temporary storage area. From the temporary storage area the infectious waste is transported to Queen II Hospital for incineration while the general waste is transported to the Hatsosane municipal landfill.

A.2.8 MDR TB clinic (Multiple Drug resistant TB)

(i) Botsabelo MDR -TB clinic

Botsabelo MDR -TB clinic is a specialised Hospital for Multiple Drug resistant TB (MDR-TB) and extensively drug-resistant tuberculosis (XDR TB) treatment. It is a private – public partnership, with twenty two (22) beds and offers services like medicine, children's services, emergencies, radiology and laboratory. Its main thrust is not to keep patients throughout the treatment of the MDR – TB but to handle those who are reacting badly and once stabilized they continue their MDR-TB treatment from home.



In terms of waste management, the hospital is implementing the three bin system of segregating waste at point of generation. From the small bins in the wards, the waste is placed in big wheelie bins of the same colour coding which are located at the temporary storage area. When the Wheelie bins are full the infectious waste is collected by the District Health Management Team using a contracted company and transported to Queen II Hospital for incineration. The waste is collected every Friday and Monday. The general waste is transported to the Hatsosane municipal landfill.

A.2.9 Major Challenges At The HCF

Some of the major challenges (relevant to the current programme) being faced by the healthcare facilities (HFC) that need serious attention include the following;



ANNEX 3 GENERAL WASTE MANAGEMENT PRACTICES

For analysis purposes the health facilities will be divided into three; Large hospital, Health centres and Laboratories. At the health care facilities the following was observed:

A.3.1 Waste segregation:

Health care waste can generally be classified into four fractions; (i) sharps, (ii) infectious or contaminated non-sharps (healthcare risk waste – (HCRW)), (iii) non-infectious or healthcare general waste (HCGW) and (iv) medical devices and radioactive materials.



Figure A.3-1 the three bin system.

Generally all Health Facilities are practising the three bin system (Figure A.3-1) In all health care facilities that were assessed, the waste that is religiously separated from the rest are needles (sharps) which are placed in designated card board safety boxes or plastic yellow safety containers (Figure A.3-1). The most generally used sharps container is the plastic yellow safety containers, which is supplied by the District Health Teams to all the health facilities.





Figure A.3-2 Sharps Containers in common use

The non-infectious or healthcare general waste (HCGW) is similar to domestic waste and constituted **75-90%** of the waste generated at the facilities. This fraction (HCGW) is made of paper, plastic packaging, food preparation, etc. that have not been in contact with patients.

The infectious or healthcare risk waste (HCRW) constituted **10-25%** of the waste generated at the facilities. This fraction (HCRW) is the infectious/hazardous waste, which is of concern at Health Care Facilities (HCF) due to the risks that it poses both to human health and the environment. It consists of blood, body parts, contaminated swabs/cotton wool/bandages, contaminated non-sharps, chemicals, and pharmaceuticals.

In some instances the infectious and non-infectious waste was not segregated and its handling posed serious challenges as it was not labelled, either on the bin or the plastic lining. The mixed waste was being placed in different kinds of bins ranging from metal, small plastic to large wheeled bins (Figure A.3-2). At times the bins were lined with black polythene bags.





Figure A.3-3 General Waste Containers in common use

Medical devices and radioactive materials are an emerging health care waste stream. Most of the medical devices posing problems emanate from donated obsolete equipment being dumped by the developing nations in the less developed nations. This includes all sorts of used equipment and computers which never get to work when they arrive in the recipient country and just find their way straight to the dumps. A lot of this equipment is piling at the health facilities (Figure A.3-4).





Figure A.3-4 Obsolete equipment piling up at a Health Facility.

A.3.2 Temporary storage

Before treatment, waste is supposed to be stored under secured conditions. In most health centres there are no appropriate temporary storage facilities and where they are available they are not secured or appropriate.

(i) General Waste:

From the small bins in the wards the black liners are sealed and placed in black wheelie bins either inside the facility or just outside Figure A.3-5. When the wheelie bins are full the black liners are either taken to a secure storage awaiting transportation to the landfill or deposited in an open pit for burning.



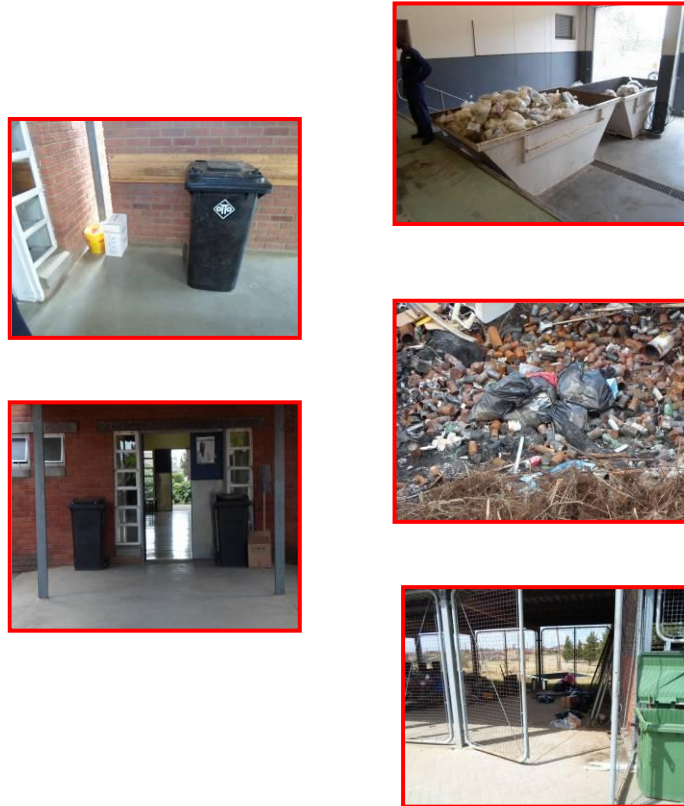


Figure A.3-5 Temporary storage for General Waste.

In some facilities general waste is also being inappropriately stored. At some health facilities, waste is being heaped at the back yard awaiting collection by the local authority. In smaller facilities, it is piled in the pit until there is enough material for burning. In yet other facilities, the waste is piled in a trailer awaiting the Local Authority tractor to come and pull it to the landfill. In all cases, the storage areas are open, not secured and pose high risk to both humans and animals.

(ii) Infectious waste:

From the small bins in the wards the red liners are sealed and placed in red wheelie bins either inside the facility or just outside Figure A.3-6. Some facilities were using the sluice room for temporary storage (Figure A.3-7)

When the wheelie bins are full the Red liners are either taken to a secure storage awaiting treatment at the incinerator .





Figure A.3-6 infectious waste Temporary Storage in large hospital.



Figure A.3-7 infectious waste temporary Storage in Sluce Room



Figure A.3-8 infectious waste Temporary Storage in cage next to incinerator



(iii) Anatomic waste:

Anatomic waste is temporarily stored in large freezers awaiting treatment at the incinerators. Large hospitals have coldrooms for this purpose (Figure A.3-9)



Figure A.3-9 Cold room and freezer for temporary storage of anatomic waste.

(iv) Sharps containers

Sharps containers when full are transported to a locable cage generally close to the incinerator. In some facilities the sharps containers were stored in inappropriate places like under stair cases, next to incinerators, in store rooms or in offices until transport is found (Figure A.3-10).



Figure A.3-10 Temporary storage for sharps containers,



A.3.3 Transportation

When the wheelie bins are full they are generally wheeled to the temporary storage areas. The sharps were found to be transported by hand if the treatment was on site, but if it was off-site either a truck or an ambulance was used. At times the truck would be an open truck.

The infectious and non-infectious waste is transported using various means which include manually by hands, open trucks, wheelie bins and tractor drawn trailers (Figure A.3-11).



Figure A.3-11 Means of transporting infectious and non-infectious waste

A.3.4 Treatment and Disposal of Waste.

(i) Non infectious (general) waste

In the urban areas, general waste is land filled (Figure A.3-12) and in the Districts it is burnt in open pits (Figure A.3-13). The large local Authorities like Maseru and Mafeteng have landfills. The challenge they are facing is the proper running of the landfills as resources are scarce and the proper maintenance procedures are being left undone. There are no official disposal sites in the regions and each centre has to manage its own waste.

Operational challenges of landfills include the following:

- The infectious and non-infectious wastes are mixed and dumped at the landfills, exposing the scavengers and recyclers to contamination.
- The dumps are poorly managed and are a haven for rodents and flies and due to their proximity to residential housing and even medical facilities like the SOS Children's Clinic, they pose serious health risks.
- The waste is ultimately being burnt and a lot of toxic smoke is released into the environment, affecting the nearby residents.





Figure A.3-12 Municipal Landfill

Most of the Health centres in the Districts, where there is no formal collection of general wastes by a Local Authority practice open burning of the non-infectious wastes. This practice is posing some challenges which include the following:

- Air pollution from burning of the wastes
- Potential hazard to humans and animals especially if the pit is not secured, and scavengers have access.
- Some institutions were not even digging a pit. So the waste was just being heaped on the surface and then later burned.
- Littering of the environment with contaminated waste as the institutions tend to pile the waste for some time before burning it. In some cases the institutions were just discarding this waste at any open space, causing pollution.



Figure A.3-13 Open pit burning

(ii) Sharps and infectious waste

Sharps and all infectious waste are incinerated (Figure A.3-14). Most of the Hospitals have incinerators some of which were not working due to lack of maintenance. All government hospitals have the same model of incinerator. They only differed in capacities. Some had a



problem of not operating to the recommended minimum temperature of 1 200°C, thus needles were not being completely burnt.

In Health centres and clinics without incinerators, sharps and infectious waste is collected to the nearest hospital which has an incinerator for treatment.

The ash from the incinerators is generally disposed off in pits at the hospitals or taken to a landfill site.

Some of the government institutions are equipped with incinerators which, need maintenance. The major challenges facing the incinerators include the following:

- The firebricks have been burnt out and the institutions do not have a budget to refurbish the incinerators. With worn out firebricks, the incinerator cannot reach the recommended temperatures.
- The operators are not well trained in operating the incinerators and at times they overload incinerators, causing them to malfunction and generate partially burnt waste.
- The size, capacity and types of incinerators in the institutions is causing the operators to accept sharps only and ignore the rest of the infectious waste since they can't handle large volumes.



Figure A.3-14 Government Hospital incinerators



A.3.5 Accumulation of waste

When treatment facilities (incinerators) are not working, a lot of the health care waste accumulates, with no one knowing what to do with it. Sharp boxes and plastic bags stored next to incinerators start piling up by the day (Figure A.3-15). The most serious condition was witnessed at Motebang hospital where infectious waste had accumulated, filled the temporary storage cage and was now being stored outside. (Figure A.3-15). This is because the incinerator was down.



Figure A.3-15 Sharp boxes, and infectious waste accumulating in temporary storage areas.

A.3.6 Sanitation

Sanitation is either by Pit latrines (Figure A.3-16), septic tank system or water borne sewage reticulation as in large urban areas. All the Health Care Facilities have separate sanitation facilities for males and females. However the facilities are generally not adequate for the patients and visitors that come to the institutions. In several institutions the facilities could not be used due to lack of running water. Fortunately some of them have got pit latrines which can be used as an alternative. The only problem with the pit latrines was lack of cleaning. (Figure A.3-16)





Figure A.3-16 Pit latrines at a Minor Health facility



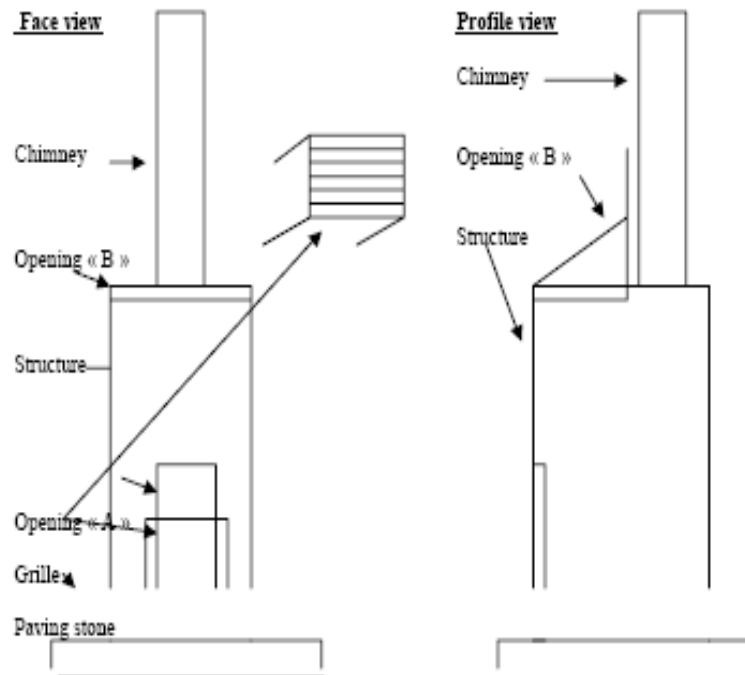
ANNEX 4 MODEL OF “WHO” INCINERATOR MADE WITH LOCAL MATERIALS

Some technical characteristics:

- Materials : red sand (laterite), clay, white cement
- Bricks of cooked sand
- Galvanized metal sheet Chimney

Structure :

- 0.6m x 1m x 1.5m
- Height of chimney : 5 to 6m
- Opening « A » for lighting and ashes recuperation : 40cmx30cm
- metallic gate (Galvanized metal sheet galvanized) for opening « A »
- metallic grate for burning the waste
- opening « B » for the introduction of waste: 40 cm x30cm
- mobile lid for shutting opening « B »
- Concrete paving stone (2m x 2m)

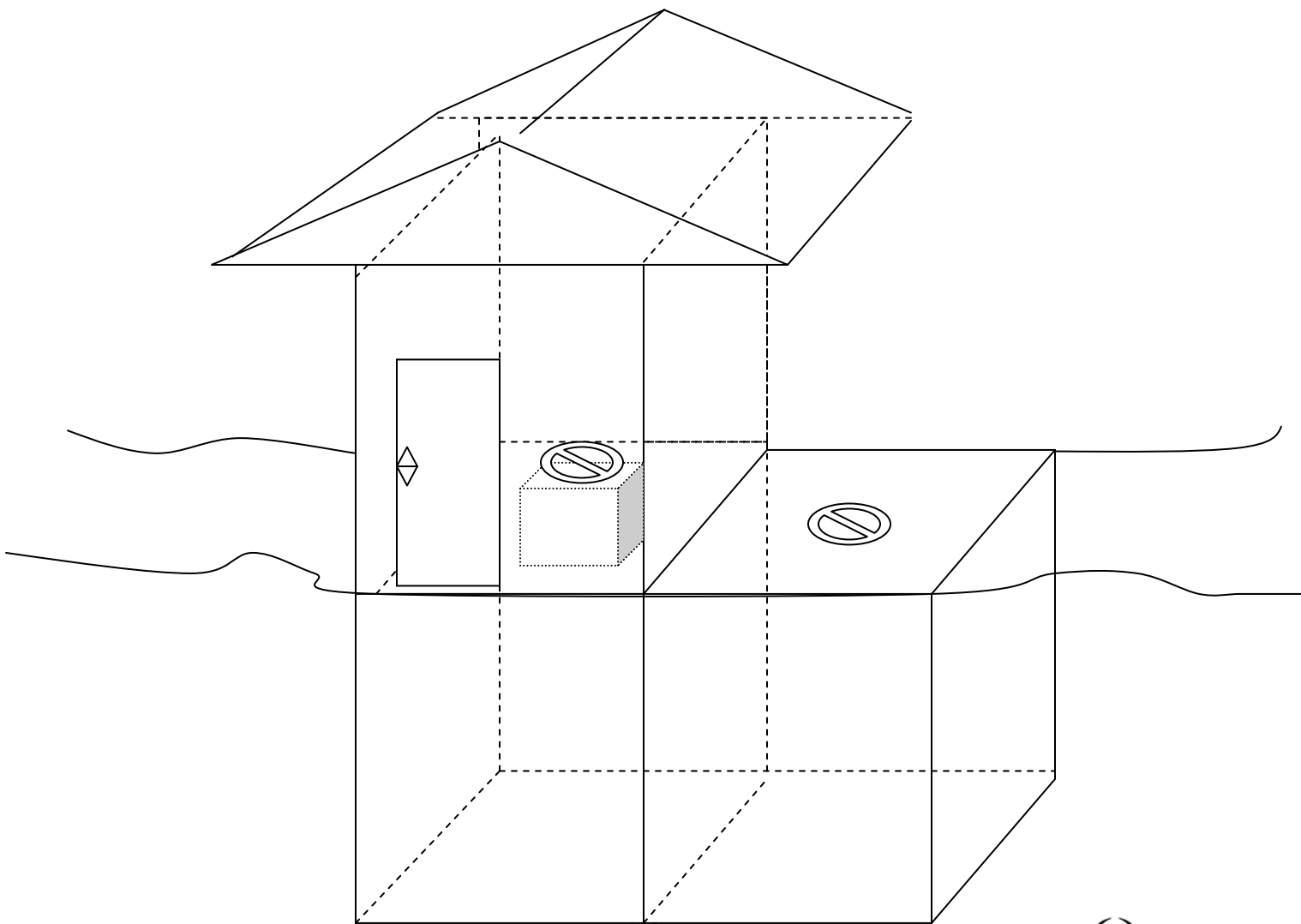


ANNEX 5 CONCRETE LINED PIT - HOME BASED CARE WASTE DISPOSAL

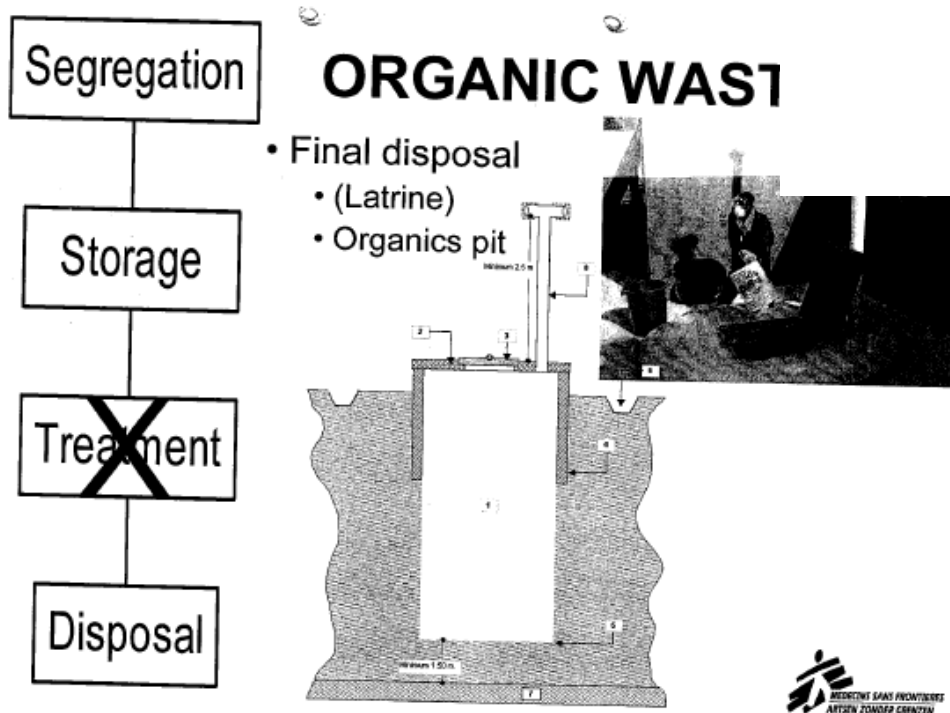
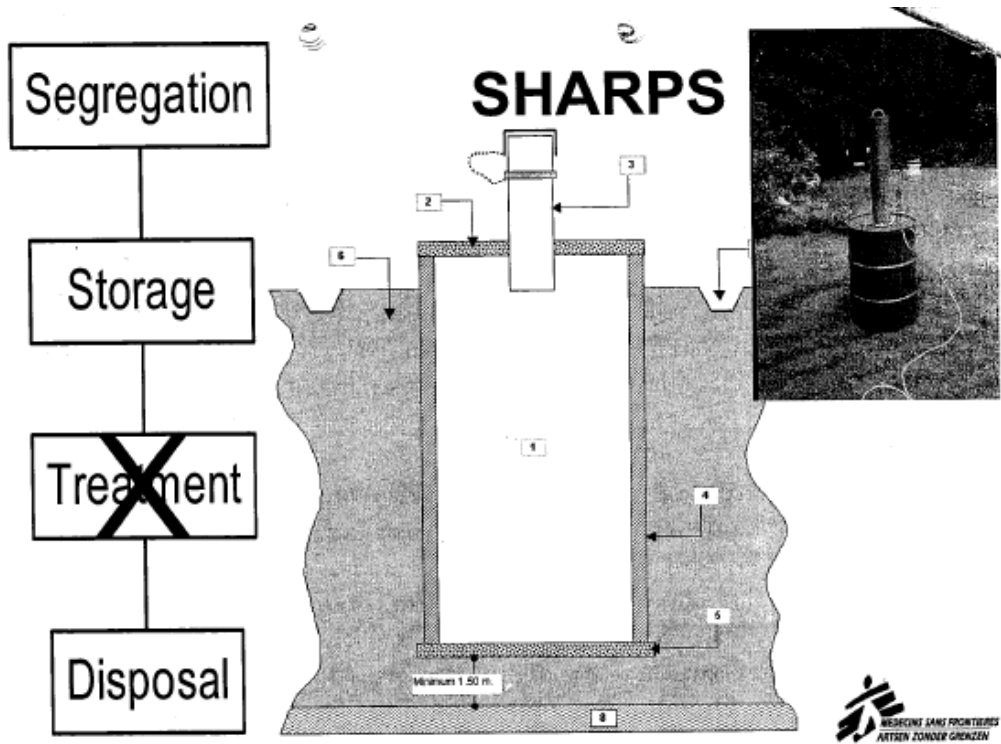


Pit with Pit Latrine for home based care

Design:

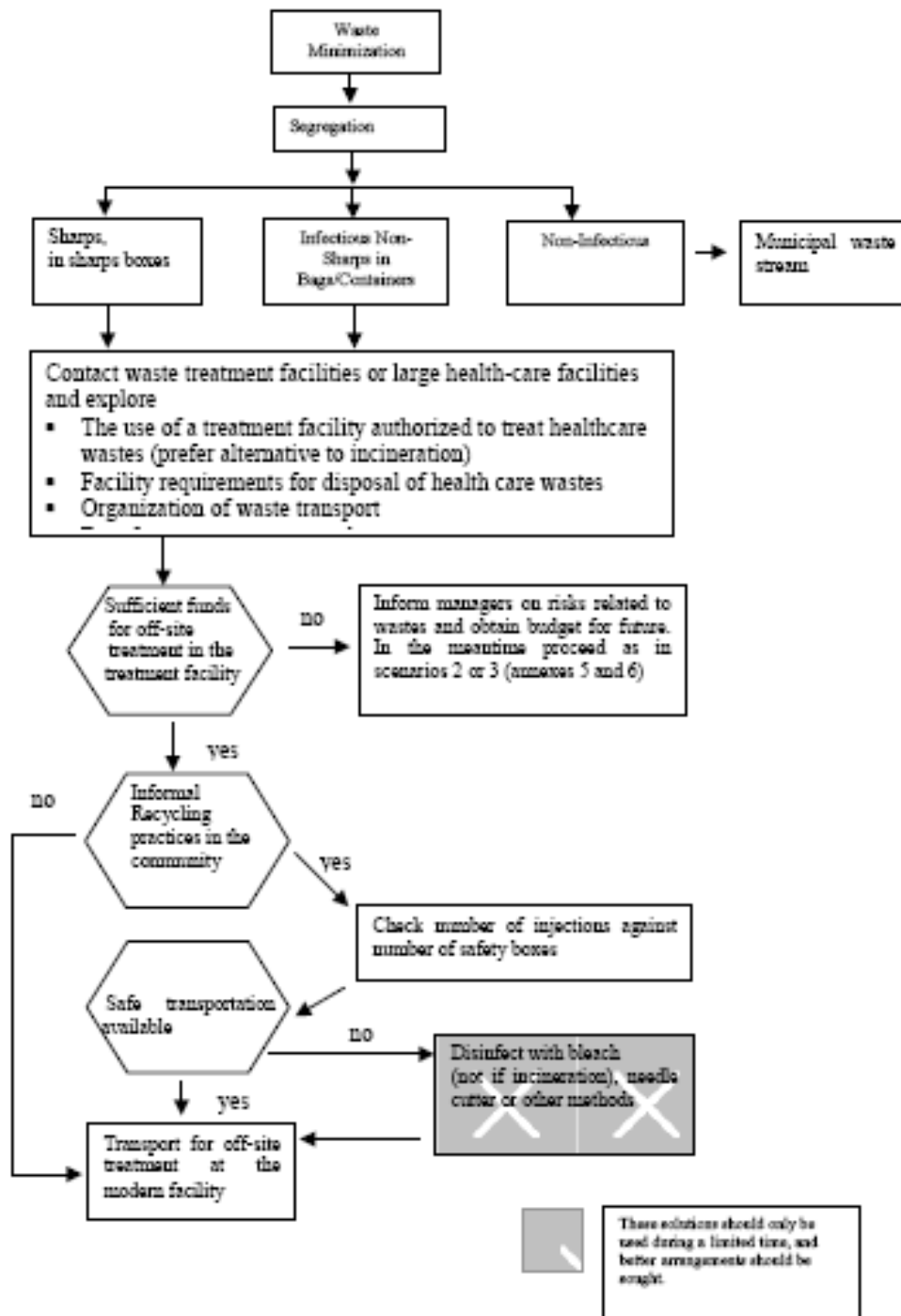


ANNEX 6 CONCRETE LINED PIT - SHARPS AND INFECTIOUS DISPOSAL



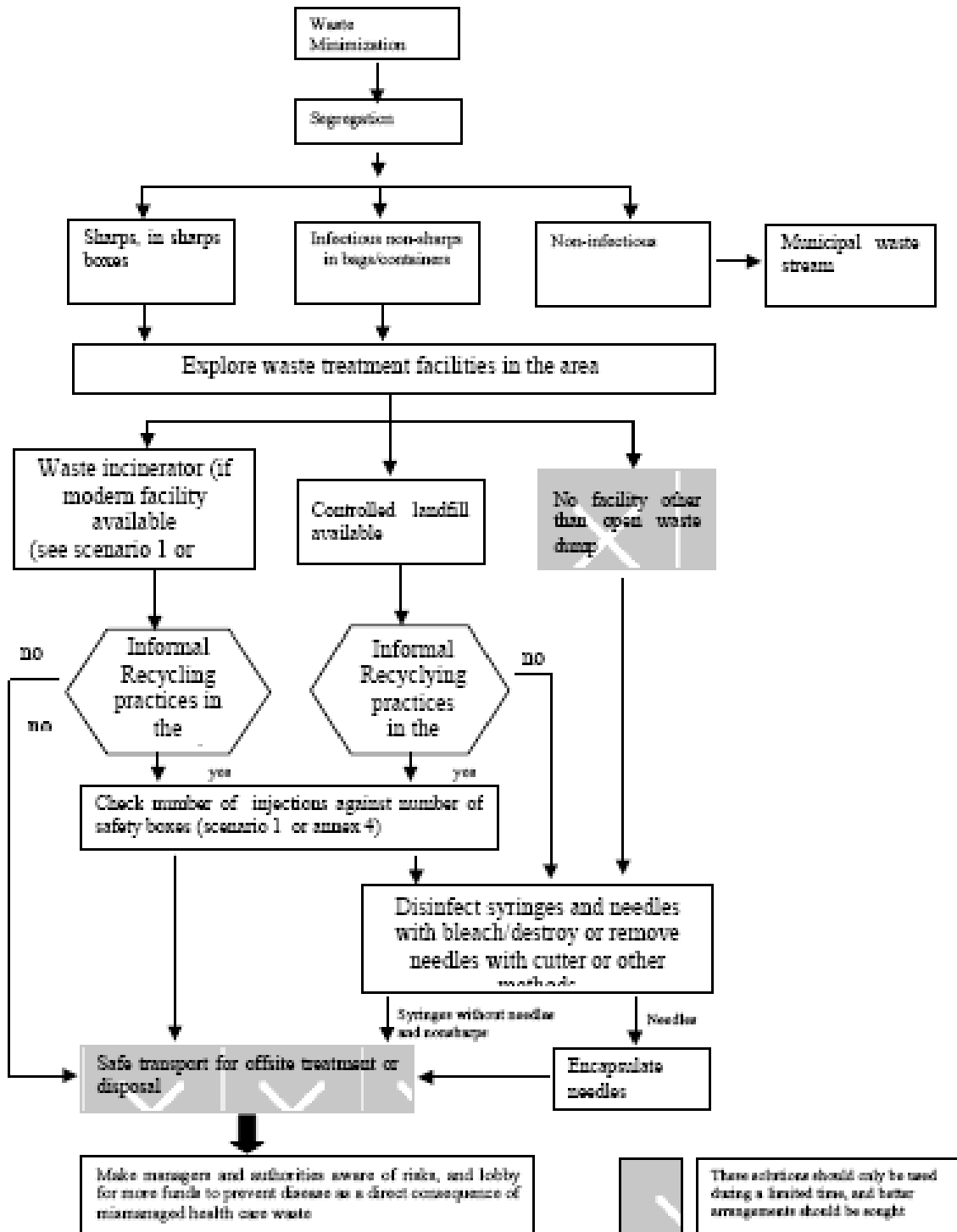
ANNEX 7 HCW FACILITIES OPERATING SCENERIO 1

Scenario 1: Urban area with access to a modern waste treatment facility or located within reasonable distance of a larger health-care facility with treatment facility



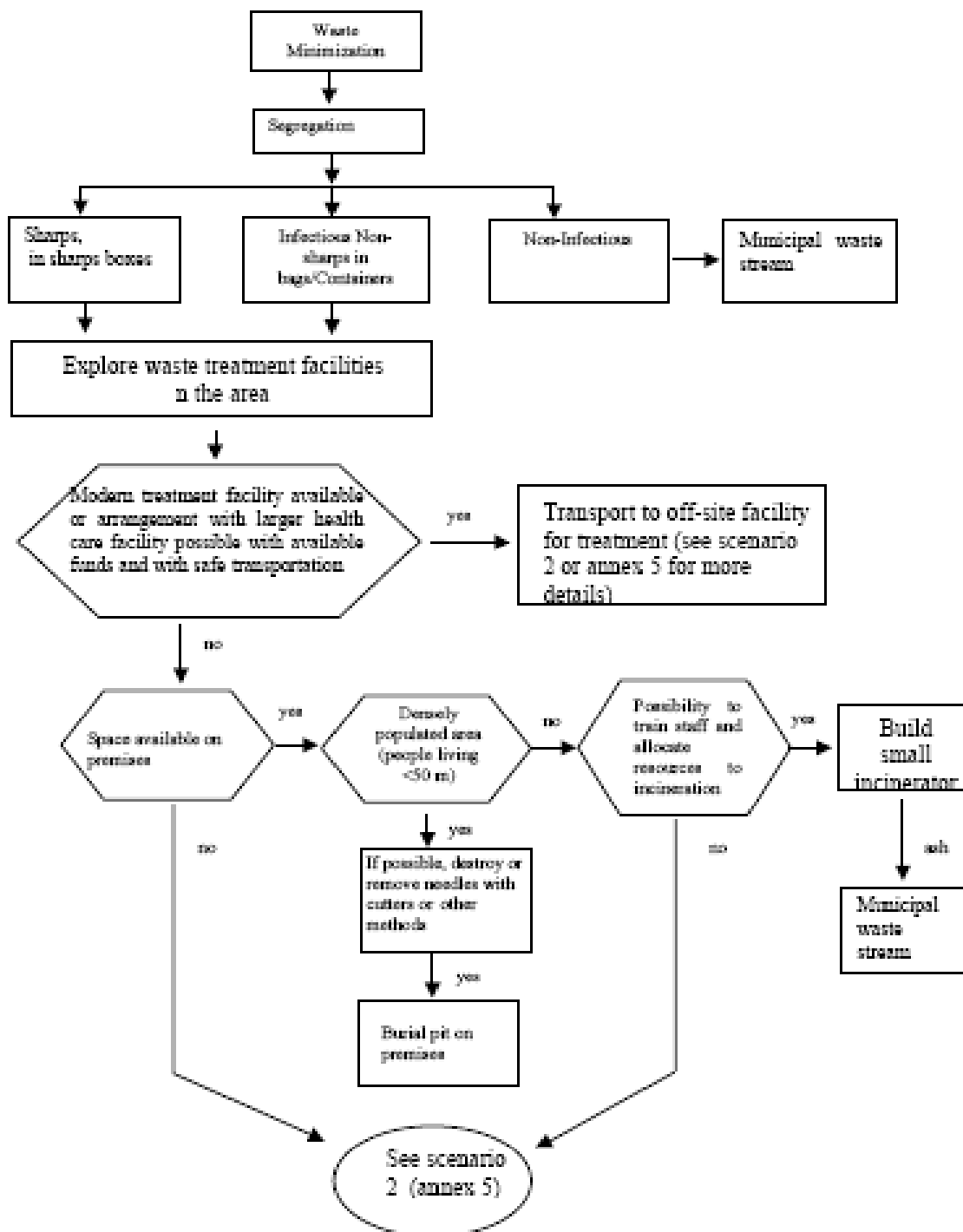
ANNEX 8 HCW FACILITIES OPERATING SCENERIO 2

Scenario 2: Urban area without access to modern waste treatment facility



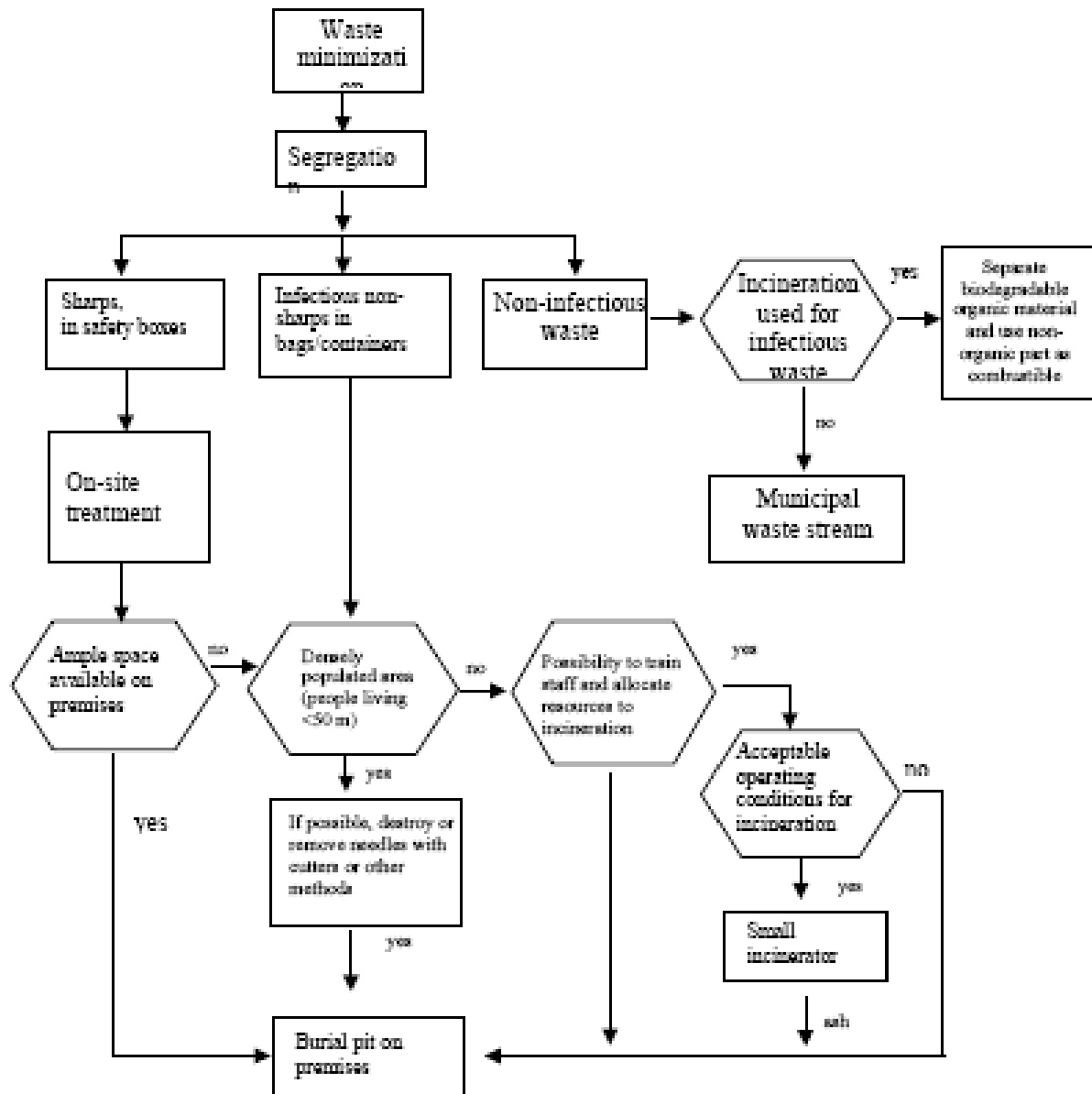
ANNEX 9 HCW FACILITIES OPERATING SCENERIO 3

Scenario 3: Peri-urban area



ANNEX 10 HCW FACILITIES OPERATING SCENERIO 4

Scenario 4: Rural area without access to modern waste treatment or disposal facility



ANNEX 11 HCW FACILITIES OPERATING SCENERIO 5

Scenario 5: Rural area with access to modern waste treatment or located within reasonable distance of a larger health-care facility with treatment facility.

