



**MINISTRY OF HEALTH
GOVERNMENT OF THE KINGDOM OF LESOTHO**

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

August 2012

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FOREWORD

This Health Care Waste Management (HCWM) is a specific update of the National HCWM prepared in 2005. This update takes into consideration the review (see below the paragraph on the situational analysis) carried out between December 2009 and March 2010 by the Ministry of Health (MoH) of the Kingdom of Lesotho (Lesotho) with technical input provided by the Millennium Challenge Account - Lesotho (MCA-L)¹ through the appointed consulting firm, COWI A/S. Together with the HCWM Policy², the HCWM Strategic Plan³, and the HCWM Implementation Plan,⁴ this update will provide the proper reference framework for the implementation of the sustainable management of Health Care Waste (HCW) throughout Lesotho and in particular in the context of the **Lesotho Maternal and Newborn Health (MNH) Performance-Based Financing (PBF) Project**

The MoH as the custodian of this HCWM Strategy and Implementation Plan seeks to address the specific issues with regard to the safe and environmentally friendly treatment and disposal of HCW. Oversight of the HCWM Plan is under the overall responsibility of the Committee on Waste Management (COWMAN) and the National HCWM Committee.

Both the HCWM Strategic Plan and Implementation Plan are informed by a comprehensive Situational Analysis⁵ conducted from December 2009 - March 2010 and are linked closely with the HCWM Policy. It has been qualified in consultation with key stakeholders from a series of inter-ministerial and cross-sectoral bodies, as well as from within the MoH, ranging from Department Heads, representatives from the District Health Management Teams, health facility representatives, as well as representatives of different cadres of health professionals, private enterprise and Non-governmental Organisations (NGOs). Six stakeholder workshops have been held from May 2010 through to September 2010 that together culminated in the development of the HCWM Policy and the HCWM Strategic and Implementation Plans.

This consolidated HCWM Plan is intended as a synthesis of 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 therefore provides a detailed consolidated overview of the management of healthcare waste in Lesotho, in order 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 mandates the need for such a consolidated HCWM plan to accompany the project. In serving as the safeguards document for the MNH PBF Project, this consolidated HCWM Plan thereby ensures that the necessary policies, guidelines and measures for the effective and safe management and disposal of healthcare waste in Lesotho are provided in a single safeguards document.

¹ Millennium Challenge Account Authority, Lesotho HCWM Technical Assistance HS-G-011-09

² MoH Health Care Waste Management Policy, July 2010

³ MoH Health Care Waste Management Strategic Plan, August 2010

⁴ MoH Health Care waste Management Implementation Plan, November 2010

⁵ MoH Health Care Waste Management, Situational Analysis Report, April 2010

Section 1.0 Introduction

1.1 Progress of the existing NHCWM Plan (2005) and the updated HCWM (2010)

In March 2005 a National HCWM Plan⁶ was drawn up outlining a 3 year plan with the following goal:

“National Health service that sufficiently and effectively employs environmentally sound, technically feasible, economically viable and socially acceptable systems for management of health care waste in Lesotho”.

The seven objectives were outlined and activities elaborated. The Table below gives a brief summary of what was achieved since the implementation of this plan. This HCWM Strategic Plan 2010 has been devised to take the initiatives outlined in the NHCWM Plan forward and to build on the gains already made.

Table 1: Summary of activities completed from the previous NHCWM Plan (2005) at the time of the March 2010 Situational Analysis and those planned in the 2010 HCWM)

Obj. No.	Objective	Status of 2005 Plan	2010 - 2014 NHCWM Plan
1	Enhance Legal and Policy Framework for HCWM		These requirements have now been included into the HCWM-TA project for completion in March 2013.
2	Training and awareness for HCFs	A training manual was developed and training was conducted throughout all the districts. Training report available	Further training is planned and is being conducted nationwide
3	Mobilise all the required equipment and protective Clothing and to maintain high standards of treatment	Personal clothing has been provided by the MCA-L. Black Wheelie bins have been provided by the World Bank and red ones have been provided to selected facilities as part of the HCW pilot study. Plastic yellow and black liners have been widely distributed for the proper segregation of HCW. Healthcare facilities are also purchasing red and black liners from their budgets. New or refurbished incinerators have been provided at all the government and CHAL hospitals.	All Healthcare facilities are bound by law to ensure correct equipment for HCW management. Facilities will be guided to plan and budget for equipment purchase and maintenance.
4	Adopt an	The three bin system has been	There are no well-lined pits or

⁶ MoH National Health Care Waste Management Plan, March 2005

	environmentally sound way of HCWM that prevent spread of disease.	adopted and is widely used. The infectious waste and sharps are dealt with locally through incineration.	appropriate disposal sites established. This issue is being addressed in the new HCWM-TA project.
5	Employ a system of medical wastewater management that ensures that no chemicals and pathogens from HCFs are introduced into the sewage system	At the time of the situational analysis in March 2010, there were no specific requirements established for enteric diseases, or cytotoxic drugs. The HCF pharmacies keep records of expired drugs and incineration is uncontrolled. The laboratory samples and chemicals are handled by the on-site incinerators.	This issue is mildly addressed by the new regulations, stating that facilities shall not dispose of treated health care risk waste that is liquid as effluent if it does not comply with the requirements of the Environment Act; The Act still remains to elaborate effluent standards for wastewater. MOH will tackle this as a collaborative issue since it is the mandate of the Department of Environment in the Ministry of Tourism, Environment and Culture)
6	Educate and build awareness to the general public		The education and awareness of the general public has now been included into the HCWM-TA project.
7	Develop specific financial resources to cover the cost of HCWM		At the time of the situational analysis in March 2010, no budget lines for HCWM had been put into place and no billing or fee structures had been established. The Ministry of Health has emphasised the need for all facilities to have a portion of facility budgets available for waste management. A nominal fee structure for incineration of waste at hospital incinerators has been established, although revenue collection has not yet commenced.

1.2 Project Description

The Lesotho Maternal and Newborn Health (MNH) Performance-Based Financing (PBF) Project seeks to improve the utilization and quality of maternal and newborn health services in selected districts in Lesotho.

The project has two components and will be implemented in two phases. During Phase I, the project will be piloted in the Leribe and Quthing districts and a PBF system will be put in place with technical assistance provided by an international consultancy. During Phase II, the project will gradually scale-up to other districts excluding Maseru district. The MoH will identify the criteria to select the districts for Phase II prior to project appraisal in late August 2012. This two-phased approach will allow for adjustments in design based on lessons learned.

Component 1: Maternal and Neonatal Health Service Delivery at Community, Primary and Secondary levels through PBF (US\$9 million).

The objective of this component is to improve MNH service delivery at health facility and community level through two sub-components.

Sub-component 1A: Delivery of Maternal and Neonatal Health Services through PBF. This sub-component will support the provision of quality MNH services as well as selected services in the Essential Services Package at community, health centers and hospitals by providing performance based incentives to VHWs, health centers, hospitals, and the DHMTs (as part of the district councils). In order to strengthen collaboration between the health centers and the VHWs in the respective catchment areas, they will be considered as one unit for payment of incentives. The performance incentives for VHWs will be linked to the overall performance of the respective health centers to which they are mapped.

Incentive payments to DHMTs/district councils based on a quality checklist which will include supervision of health facilities, providing feedback to health facility staff, submission of quarterly overall reports to the district council secretary with lessons learned, identified constraints and suggested solutions, and other information related to service delivery within the district. Performance-based incentives linked to achievement of predefined quantity and quality indicators at the health facilities are expected to stimulate health worker motivation and productivity besides providing additional cash to overcome obstacles affecting the quality or continuity of care of their patients. Performance-based incentives will be adjusted based on comparative isolation of a facility to provide additional incentives to hospitals and health center in remote areas and influence distribution of health personnel.

Sub-component 1B: PBF Implementation and Supervision Support. This sub-component will provide critical support for: (i) PBF implementation and supervision; (ii) capacity building of the MOH and CHAL at central and district levels, district and community councils; and, (iii) best practice documentation and sharing. The MOH and CHAL have limited experiences with PBF and hence the appropriate capacity will have to be built at respective levels, both strategic as well as operational. The project will competitively recruit an international consultancy firm for Phase I to provide technical assistance and to build in-country capacity to implement the PBF in Phase II. The PPTA's key functions are to assist the PBF unit and other implementing entities with managing and monitoring performance-based contracts with health facilities for the delivery of incentivized services. The firm will verify delivery of the services, prepare the invoices for performance payments, assist health facilities and the district and community councils with preparing their PBF business plans, and provide capacity building support to the MOH technical departments and PBF unit on PBF implementation.

Component 2: Training health professionals, and Village Health Workers (IDA US\$2 million)

This component will support the ongoing MOH program for in-service training of doctors and midwives to achieve an acceptable standard of competency in the delivery of MNH services including EmONC⁷ as well as the training of VHWs. Currently, health centers do not provide the full complement of Basic EmONC services since midwives are not allowed to perform three basic EmONC procedures: manual removal of retained placenta; removal of retained products

⁷ A Basic EmONC facility provides 7 critical lifesaving procedures: administration of parenteral antibiotics, oxytocic drugs, and anticonvulsants (magnesium sulphate) for pre-eclampsia/eclampsia; manual removal of retained placenta; removal of retained products of conception (manual vacuum aspiration [MVA] or dilatation and curettage [D&C]); assisted vaginal delivery (vacuum extraction or forceps delivery); and basic neonatal resuscitation (bag and mask). Additionally, a comprehensive EmONC facility offers blood transfusion and Caesarean delivery. In Lesotho, midwives are only allowed to perform 4 of the Basic EmONC procedures (parenteral antibiotics, oxytocic drugs, and anticonvulsants, and basic neonatal resuscitation).

of conception; and assisted vaginal delivery. The Lesotho Nursing Council is reviewing the scope of practice for nurses and midwives and training will be provided accordingly when approved.

1.3 Country Profile

The Kingdom of Lesotho is a small landlocked mountainous country situated within the Republic of South Africa with an area of 30,355 sq km, extending 248 km NNE-SSW and 181 km ESE-WNW.ⁱ It is bordered on the north-east by the SA province of Kwa-Zulu Natal, on its north-western border by the province of the Orange Free State and on the South by the Cape Province and Transkei.

The population of Lesotho in 2003 was estimated by the United Nations at 1,802,000 with approximately 5% of the population being over 65 years of age, and 40% under 15 years of age. There were 87 males for every 100 females in the country in 2003. According to the UN, the annual population growth rate for 2000–2005 is 0.14%. The population density in 2002 was 73 per sq km (188 per sq mi)ⁱⁱ.

According to the United Nations, 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%.ⁱⁱⁱ

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

Table 1.1 Demographic and Socio-economic Statistics:^{iv}

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.^v

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.^{vi}

The recent World Health Organisation Statistics 2006 have recorded the following health status statistics mortality:

Table 1.2: Health Status Statistics Mortality:^{vii}

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

1.4 Health Delivery System

Tuberculosis strains the health-care system to 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.^{viii}

The government of Lesotho is in the process of rehabilitating two hospitals and is making an overall effort to strengthen health care services.^{ix}

The number of health service providers in Lesotho is low as illustrated by the statistics in Table 1.3.

Table 1.3: 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 Care Provider	Number
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 show that the human resources available to provide a health care service to the population is very limited as is shown in Table 1.4.

Table 1.4: 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 has recently (November 2009) been concluded with the Lesotho Red Cross Society (LRCS).

Table 1.5: 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 1.6 shows a summary of the distribution of hospitals, health centres and filter clinics per district.

Table 1.6: 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	

1.5 The Health Sector Reform Process

Since Lesotho gained its independence in 1966 there have been ongoing initiatives aimed at improving the health status of its people, one of them being the adoption of the Primary Health Care strategy for service provision in 1979. The effectiveness of many of these initiatives was limited, according to the Health and Social Welfare Policy (2003) which reported that during the 15 years preceding 2003, the initial improvements seen in health indicators had shown a decline 'due to AIDS, 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, addressing the following:

(A) Technical Aspects

- (i) District health package/essential service package
- (ii) Pharmaceuticals
- (iii) Social Welfare
- (iv) Infrastructure

(B) Administrative/Managerial Aspects-

- (i) Human resources development
- (ii) Partnership and donor co-ordination
- (iii) Finances
- (iv) Decentralization.

Health sector reform was also a response to the rapid increase in demand for health and social welfare 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 is a ten year phased programme, was implemented in 2002 following wide consultations with all stakeholders of the sector:

Phase One focused on institutional capacity building; Phase Two on policy and institutional reform; Phase Three will involve sector-wide implementation of guidelines and protocols developed in the first two phases.

The reform programme entails a rearrangement of structures and definition of policies so that the service delivery system is more responsive to the needs identified at the community level. The key partners supporting this programme are Lesotho Government, Development Corporation of Ireland, European Union, World Health Organisation, African Development Bank and the World Bank

The health sector reform process is monitored on an annual basis, as recorded in Annual Joint Review Reports. 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.

It was reported in the 2008/09 AJR report (the most recent at the time of writing) that progress had been made especially in the areas of pharmaceuticals, laboratory services, and quality management systems. The benefits of these initiatives to HCWM were observed during the field visits for this project and confirmed during the key informant interviews. Donor-driven appointments of staff into positions to implement improvements were made with a view for them to be formally incorporated into the MoH. In some cases where this incorporation has not taken place, the incumbents have resigned, detracting from the original initiative e.g. district information officers.

The most important recommendations in the 2008/09 AJR report relating to HCWM were the need for decentralisation processes and transitional human resource issues to be speedily resolved and more reliable monitoring data to be collected and made available. The role of the HR department was also highlighted in defining new job descriptions and associated competences, with a recommendation that these should be taken into account when curricula are developed by training institutions serving the health sector.

1.6 Waste Management in Lesotho

1.6.1 Categorisation of HCW in Lesotho

Internationally Health Care Waste (HCW) is 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.

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 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;

This summary of the present HCWM System used within the HCFs has been drawn up from information received from interviews, from field visits to all the hospitals in the country, and 20 healthcare facilities as well as from a literature research of existing documents.

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.

1.6.2 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; 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.

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^{xi}.

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:

- 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 transport to a temporary storage area.
- All the HCW should be collected in rigid two-wheeled containers (120 to 240-litre) 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^{xii}

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. These are summarised in the table below:

Table 1.7: Legal requirements for collection, treatment and disposal of HCW

Lesotho has 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, inaccessible. These are summarized as follows:

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.

There are some significant gaps in the existing HCWM System as outlined in the NHCWM Plan as summarised in Table 1.8 below.

Table 1.8: Significant gaps in the existing HCWM System

Significant gaps in the present HCWM System as described in the NHCWM Plan:

- No definitions are given for HCW. The categories of HCW that are catered for are “Infectious Waste”; “Sharps” and HCGW.
- Included under “Infectious Waste” are the following: Pathological/anatomical waste, pharmaceutical waste, chemical waste, liquid waste, highly infectious wastes from the laboratory and isolation waste from infected patients.
- There are no standards given for the size or type of the bin to be used in the 3-bin system
- No specifications are given for the size and thickness of the liners
- There are no specifications for how the liners are to be closed
- Although the “small bins” are no longer recommended, there is no indication of what is meant by “small bin” and it is assumed that the commercial plastic specicans and plastic sharps containers are referred to.
- No specification is given for the type of sharps containers that are to replace the “small bins”.
- The labeling of the liners is a requirement, but no indication is given on how this is to be done.
- Other than stating that “sharps containers should be labeled ‘SHARPS’”, no specifications are given of the hazardous signage or labeling on the HCRW containers.

The updated 2010 HCWM recognises the aforementioned gaps in the existing HCWM system and a mitigation plan addressing these gaps has been developed, as highlighted in Section 6.5 of this document.

Section 2.0 Policy, Legal and Administrative Framework

The overall vision for development is articulated in the Constitution of the Kingdom of Lesotho and in Vision 2020.

The Constitution of Lesotho 1993 in Chapter III: Principles of State Policy articulates the vision and broad policies on socio-economic development. These are principles of Equality and Justice, Protection of Health, Universal Education, Good Conditions of Work, and Protection of Children and Young people. Towards this end, the Constitution's principles for health are 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.^{xiii}

The Vision 2020 statement that originated from a national conference in 2001 and finalized in 2003 emphasises the commitment of government to equitable access to the standard quality of health service in Lesotho:

“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.”

2.1 Policies and Strategies

The policies that are most relevant to HCWM in Lesotho include:

- Healthcare Waste Management Policy (2010)
- Lesotho National Environmental Policy (1998)
- Health and Social Welfare Policy (2003, currently under review)
- Infection Prevention and Control Policies and Guidelines (2006)
- National Tuberculosis Programme: NTP Policy and Manual (2006)
- Lesotho Science and Technology Policy 2006-2011 (2006)

In addition to a short description of these policies, key strategic plans will also be listed in this section.

2.1.1 Healthcare Waste Management Policy (2010)

The Health Care Waste Management Policy (June 2010) was developed as part of the Millennium Challenge Account – Lesotho (MCA-L) Health Care Waste Management Technical Assistance (HCWM-TA) Project. The Policy supports the implementation of the sustainable management of Health Care Waste (HCW) from the health sector throughout Lesotho so 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. Twelve policy statements give effect to the vision, mission and overall objectives of this policy:

- Policy Statement No. 1 - Prevention of Pollution of Natural Resources

HCW will be managed wherever practicable to avoid or reduce at source the toxic and dangerous substances that pollute the natural resources (soil, air and water) and the participation of all stakeholders in HCWM will be promoted to conserve the environment and natural resources for the benefit of present and future generations.

- Policy Statement No. 2 - Waste Minimisation and Recycling

A hierarchical and integrated approach for HCWM will be adopted that makes provision for the introduction of mechanisms to reduce, reuse and recycle HCW to minimise the amount of waste that will require treatment and final disposal and thus reduce the on-site air, water and ground pollution.

- Policy Statement No. 3 – HCWM Planning

Proactive HCWM future planning for infrastructure, equipment and sound financial management will be applied. This will be assisted by the establishment of a HCWM Information System that will be integrated with other information systems.

- Policy Statement No. 4 - Improved Infrastructure and equipment

Improved infrastructure and equipment will be provided for the segregation, containerisation, storage and transport of all categories of HCW thus protecting all people against the hazards to their health and safety for every component of the waste management system.

- Policy Statement No. 5 - Appropriate Treatment technologies

The treatment technologies used for HCW will be compliant with existing legislation, robust, affordable and managed in a cost-effective manner. The technologies must be sustainable and practical whether on or off-site, with consideration given to the environmental, social and public health aspects.

- Policy Statement No. 6 - Disposal technologies

The unacceptable practice of open burning of HCW at the premises of the HC Facilities must be phased out through the development and application of best practicable environmental options for the safe and environmentally friendly disposal of all categories of HCRW both on- and off-site.

- Policy Statement No. 7 - Institutional Arrangements

An institutional framework will be established at all levels within the MoH that includes the coordination of HCWM initiatives, building of capacity and skills and training within the Environmental Health Division for the effective and sustainable management of HCW in Lesotho.

- Policy Statement No. 8 - Collaboration and partnerships

All stakeholders and producers of HCW will be encouraged to take responsibility for their waste and to conserve the environment and natural resources for the benefit of present and future generations. Inter-ministerial and inter-sectoral collaboration and partnerships will be fostered and the involvement and expertise of the private sector will be harnessed to achieve public health care policy objectives for improving access, quality and equity in healthcare.

- Policy Statement No. 9 – Capacity building and Awareness Raising

All cadres of health care staff and health professionals (both public and private) sectors as well as the community throughout Lesotho will on an ongoing basis be made aware of the dangers of mismanaged HCW through communication, training and awareness campaigns to better understand the negative impacts of poor waste management on humans and the natural environment.

- Policy Statement No. 10 - Financial Management

Sufficient, sustainable and well managed financial resources will be made available to give support to the implementation and management of an effective and sustainable HCWM System.

- Policy Statement No. 11 - Development of Enabling Mechanisms

HCWM will be vigorously managed through the application of Regulations, Standards, Guidelines and other management systems and tools to effectively address the proper procurement of equipment, the application of Occupational Health and safety standards and infection control aspects in the cradle to grave process. These mechanisms will be guided by existing legislation, environmental conventions, agreements and treaties, and other relevant international standards.

- Policy Statement No. 12 - Monitoring and Evaluation

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.

2.1.2 Lesotho National Environmental Policy (1998)

The mission statement in the Lesotho National Environmental Policy developed under the auspices of the National Environmental Secretariat (NES) of the Department of Tourism, Environment and Culture is "to promote and ensure that the present and future development of Lesotho is socio-economically and environmentally sustainable". Elements of this policy that are most relevant to HCWM are those relating to toxic and hazardous substances; sanitation and waste management; and air pollution.

2.1.3 Health and Social Welfare Policy (2003)

The Health and social Welfare Policy (2003), which is currently under review, is aligned to the Vision 2020 statement in its commitment to equitable access to a standard quality of health services. This is implemented through the District Health Package which provides Essential Health Service package components free of charge or highly subsidized to all citizens as follows:

- Component 1:Essential Public Health Interventions
 - Sub-component: Health Education & Promotion
 - Sub-component: Environmental Health Services
- Component 2:Communicable Disease Control
- Component 3:Sexual & Reproductive Health
- Component 4:Essential Clinical Services
- Component 5:Social Welfare

The environmental health subcomponent of the Essential Health package states that Government will promote environmental health 'by ensuring safe water and sanitation, vector control, occupational health and safety, waste disposal, food hygiene and port health'^{xiv}

2.1.4 Infection Prevention and Control Policies & Guidelines (2006)

There is a comprehensive infection prevention and control policy and procedures document that includes HCWM^{xv} Section IX deals with basic HCWM policies and procedures and is based upon the generic document developed by World Health Organisation (WHO)^{xvi}

This HCWM section sets out policy statements in this document as follows:

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.

2.1.5 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. Health Care Waste Management aspects are not fully addressed in this document.

2.1.6 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.

2.1.7 MoH Health & Social Welfare Strategic Plan

2004/05 to 2010/11 (March 2004)

This document, the Health and Social Welfare Strategic Action Plan, is the operational manual for the National Health and Social Welfare Policy and provides the situation analysis, defines broad goals and articulates the objectives of the strategic plan as follows:

1. To document the plan for operationalising the necessary reforms needed in the health and social welfare sector
2. To provide general guidance to all stakeholders in designing and implementing their short and long term plans
3. To provide general strategies for achieving the objectives
4. To indicate the level of investment and inputs necessary to implement the policy and plan, and
5. To provide indicators and benchmarks for assessing general and programmatic progress.

2.1.8 National Health Care Waste Management Plan of 2005

The National Health Care Waste Management Plan (NHCWMP) (March 2005) was developed as part of the World Bank Health Sector Reform Project. It is part of the requirements of the HCW-TA project that this plan is reviewed and updated. Significant developments in the implementation of this plan are:

- The establishment of the NHCWM Committee
- The establishment of Healthcare Waste Management Committees in hospitals
- The segregation of HCW at source through the three-bin system within Health Care Facilities
- A raised awareness of the risks and need to manage HCW properly amongst staff at health care facilities. A brochure on the three-bin system was produced.
- A concerted, once-off round of training of all levels of staff at health care facilities at the end of 2009.
- The distribution of coloured plastic liners, sharps safety boxes and personal protective equipment for HCW handling.
- Installation and refurbishment of incinerators.

Other aspects of this NHCWMP are discussed under Sections 1.5.2 and 2.1.7.

2.1.9 National Implementation Plan for the Stockholm Convention

The relevant portions of the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants is discussed here^{xvii}

This 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.

2.1.10 National Health Financing Strategy

A National Health Financing Strategy is presently being drafted and was not available at the time of writing this report.

2.1.11 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.

2.1.12 The Health Services Decentralisation Strategic Plan (2009)

The approach of the current 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 aims 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 adopts 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 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.^{xviii}

2.1.13 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. This plan, amongst other recommendations, set out the approach to strengthening substantive pre-service and post-basic training capacity and developing a National Continuing Education (CE) Program. Very little was articulated on environmental health needs in this plan, however, this is a strong component of the MCA-L Health Systems Strengthening project with which this HCW-TA project integrates strongly.

In this regard a Continuing Education Strategy 2010-2015 and a Continuing Education Implementation Plan 2010/2011 have already been drafted (HSS Project output for MoH, February 2010). The CE Strategy is the guiding document for the drafting of a comprehensive 5-year Training Plan, aimed at directing training activities of all stakeholders and equip them with the knowledge of the roles they can play. The CE Strategy also sets out the funding requirements for implementation of the training initiatives.

2.1.14 The Certification System

In 2005, Medical Care Development International (MCDI)^{xi} was hired by the Government of Lesotho to provide technical assistance in the design of the new certification system. The standards, indicators and methods of scoring were developed using the Joint Commission International Accreditation Standards for Hospitals^{xx} 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 includes 4 Red Cross health centres for which current results will be considered as baseline. 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.^{xxi}

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 2.1: 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%

Table 2.2: 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%

In summary in the concluding remarks of the Hospital and Health Centre Certificate and Accreditation Report it was reported that the MoH will increase its support to improve in the deficiencies areas. The report has concluded that:

“.....the Accreditation Survey reveals that there are qualitative deficiencies that will need to be addressed to improve performance – some of which will require significant supplementary resources to remedy. However, the majority of deficiencies can be corrected with organization development efforts within each institution.”

It is clear that while there is a system for the containment and treatment of health care waste that has been communicated and training has taken place, however, good segregation is not always observed by the staff. Containers and plastic liners are largely the cardboard sharps container, cardboard boxes and plastic liners in red, yellow and black. The colour-coding is not strictly observed. Burning of the HCRW is carried out on site in pits for HCGW or in the brick or batch burning incinerator by the Cleaning/Administration staff as and when sufficient quantities have been accumulated. There is no system in place for the disposal of the ash.

Though these certification standards went a long way to provide a basis for building HCWM standards, they did not include the full HCWM System from generation to final disposal.

2.1.15 The New Lesotho Quality Assurance System

(Draft in preparation)

With the assistance of the Council for Health Service Accreditation of Southern Africa (COHSASA), two new 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^{xii}. These are expected to replace the current standards by the end of 2010.

The new 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 is 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.

2.1.16 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^{xxiii}. No mention was made at all of a Waste Information System, only scant mention of data relating to environmental health. This is therefore an area that would need to be addressed from scratch.

2.2 Present Legislation in Lesotho governing HCWM

2.2.1 International Conventions

The GOL is signatory to a number of conventions. Those most relevant to HCWM are discussed briefly in this section.

The Basel Convention

The GOL is signatory to the Basel Convention (May 1992) which seeks to establish a global regime for the control of international trade in hazardous and other wastes as well as their eventual disposal.

The Basel Convention Technical Guideline (Sept 2003) allows for the different level of waste management infrastructure, capacity and capability of the different parties and gives practical guidelines for a move towards the state-of-the-art management of HCRW. The Basel Convention Technical Guideline on the Environmentally Sound Management of Biomedical and Healthcare Waste (September 2003) is very relevant to the sound management of HCW and can form the foundation of what constitutes best practice for the GOL.

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.^{xxiv} 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 in this document 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)

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 new Environment Act 2008 has been promulgated.

The Rotterdam Convention

The purpose of the Rotterdam Convention on Prior Informed Procedure for certain hazardous Chemicals and Pesticides in International Trade is to reduce hazards posed by chemicals and pesticides. This is achieved by:

- facilitating information exchange about their characteristics
- providing for a national decision making process on their import and export
- disseminating these decisions to parties.

Montreal Protocol

The **Montreal Protocol on Substances That Deplete the Ozone Layer** (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of a number of substances believed to be responsible for ozone depletion. The treaty was opened for signature on September 16, 1987, and entered into force on January 1, 1989.

The treaty is structured around several groups of halogenated hydrocarbons that have been shown to play a role in ozone depletion. All of these ozone depleting substances contain either chlorine or bromine (substances containing only fluorine do not harm the ozone layer).

The two groups are Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs) and for each group, the treaty provides a timetable on which the production of those substances must be phased out and eventually eliminated. This agreement has been well implemented in Lesotho in as far as substitution of CFCs in refrigerants is concerned^{xxv}

Convention on Biological Diversity

The objectives of this Convention 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

The basic principle underpinning this convention is the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to

their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

One of the threats to biological diversity is the unintentional and intentional open burning as these fires do produce considerable amounts of dioxins and furans.

2.2.2 Present Legislation

Lesotho currently has no legislation or policy on pesticides, waste chemicals and radioactive materials. Lesotho has developed the Hazardous (Health Care) Waste Management Regulations (2012) They set requirements for HCWM planning, training, occupational health and safety, waste separation, packaging, treatment and disposal. These regulations however exclude the management of radioactive healthcare waste. There is therefore currently no legislation that deals directly with Healthcare Waste. The enforcement of what legislation does exist is not effective due to:

- Insufficient human and financial resources
- Inadequate skilled personnel
- Lack of infrastructure and equipment
- Inadequate multi-sectoral collaboration and co-ordination^{xxvi}

HCW issues are to one extent or another dealt with under a number of laws, the most relevant of which as described below:

The Constitution of Lesotho

Section 36 of the Constitution of Lesotho lays the foundation for environmental legislation and states that:

"Lesotho shall adopt policies to protect and enhance the natural and cultural environment of Lesotho for the benefit of both present and future generations and shall endeavour to assure all citizens a sound and safe environment adequate for their health and well being"

The Environment Act No 15 of 2001

This Act was repealed on 16th June 2009 and replaced with the Environment Act 2008

The Environment Act No 10 of 2008

The Environment Act 2008 promulgated on 5th December 2008 is set to replace the Environment Act 2001. The Act came into effect on 16 June 2009.

The purpose of this Act is to make provision for the protection and management of the environment and conservation and sustainable utilization of natural resources of Lesotho.

One of the fundamental principles provided by this law is “to assure every person living in Lesotho the fundamental right to a clean and healthy environment” and 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.

In this Act “waste” is defined as:

“any substance that may be prescribed as waste or any matter, whether liquid, solid, gaseous, or radio-active, which is discharged, emitted or deposited in the environment in such volume, composition or manner as to cause an alteration of the environment.”

Although HCW is not specifically cited under this Act it does define “hazardous waste” as:

“waste which is poisonous, corrosive, noxious, explosive, inflammable, radioactive, toxic or harmful to the environment.”

In broad terms, therefore, HCRW is partially covered under the definition of “hazardous waste” because some categories of HCRW are noxious, radioactive and toxic but it is not specifically accommodated under this Act as ‘infectious waste’.

Important aspects of this Act that relate to the good HCWM are listed below:

- It introduces the principles and objectives of environmental management and sustainable development such as the polluter pays principle, precautionary principle, ecosystem integrity and public participation
- It introduces the concepts of environmental impact assessment (EIA), audits and monitoring of projects.
- It also provides for the prescription of environmental quality criteria, standards and guidelines for air, water, effluent, noise vibrations, radiation and solid waste. This is in contrast to the present system where the sectoral agencies are supposed to set standards for their own specific sectors with the risk of non-regulation or under regulation of certain issues.
- It prohibits pollution in contravention of established environmental standards and guidelines and establishes a licensing system for polluting activities. Here the “Polluter Pays” principle is applied where the polluter is required to pay for cleaning up the polluted environment and to compensate third parties for damage arising from pollution.
- Provides for environmental planning. The Department of Environment together with Line Ministries has to prepare the National Action Plan (NEAP)
- Provides for centralized system for the establishment of environmental quality criteria,
- This Act provides for the creation of an inter-ministerial institution called the National Environment Council (NEC) which is chaired by the Minister responsible for the Environment. This body is responsible for formulating environmental policy and to facilitate the co-ordination and harmonization of the policies, plan and activities of government organizations in the environment and natural resources field.

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.

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. Although not specific to HCW, these provisions have direct relevance to HCW as a potential source of pollution if not properly handled.

The Local Government Act 1997

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.

An amendment to this act in 2004 has given 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).

Public Service Act of 2005 and Public Service Regulations 2008:

This Act sets out, amongst other things, how promotions and transfer of staff takes place^{xxvii}

The Labour Code Order 1992 - Ministry of Employment and Labour

There are two sets of regulations written under Section 100 of the Labour Code Order 1992, the one is the Construction Safety Regulations and the second is Chemical Safety Regulations.

The Chemical Safety Regulations are of most relevance to the regulation of HCWM. These regulations provide for the establishment of safety and health committees in all work establishments that have a staff compliment 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.

2.2.3 Proposed Legislation

The Hazardous and Non-Hazardous Waste Management Bill, 2008

This proposed piece of legislation when enacted it will cover aspects of waste management in its totality, i.e. both the general or non-hazardous waste and the hazardous waste. Health Care Waste, both general and risk waste will be addressed. However, it is not certain when this Bill will be passed.

The objective of this Bill is to make provision for the generation, transportation, storage, importation, exportation, recycling and disposal of both hazardous and non-hazardous waste. This draft Bill also makes provision for institutional measures for the control and management of hazardous and non-hazardous waste.^{xxviii}

A definition of “Clinical waste” is given in this draft bill. As this is only a bill and not yet promulgated, the term “clinical waste” has not yet been formally adopted. All the categories of HCRW must be clearly defined in this bill. It is anticipated that once this bill is enacted, the current Hazardous Healthcare waste management regulations will be housed under this act.

2.2.4 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, but it is still not fully functional. The proposed new Hazardous and Non-Hazardous Waste Management Bill, 2008 will also go some way to addressing the gap in the control of HCW. Although it would seem that regulations for Health Care Waste Management could be promulgated under either of these two pieces of legislation, the National Environmental Secretariat of MoTEC that is the custodian of environmental policy and legislation has indicated that they would be best developed under the Hazardous and non-Hazardous WM Bill.

Section 3.0 Baseline Data/Current Situation (2012)

3.1 Waste Quantities by Health Facility

Hospitals

The summarised results for Scott Hospital and Queen II are given in Annex 1a and 1b.

The national referral hospital, Queen II handles the majority of operations involving major surgical procedures. As such, it is to be expected that the per-occupied-bed-per-day generation rates of both infectious waste and pathological waste would be higher than for other hospitals in Lesotho.

However, as the current study is also required to estimate the current overall amount of HCRW and HCGW generated by hospitals (and by HC's: see below), the figures from Queen II and Scott have been used to determine lower and upper limits (at a 95% confidence level) for the population mean. The calculations are given below.

Table 3.1 Estimated mean HCRW generation rates for all public hospitals (March 2010)

Estimated mean HCRW generation rates for all public hospitals	
	HCRW mass per occ bed/day
Scott	0.25
Queen 2	0.40
Mean	0.33
Std dev	0.106
Count	2
Level	0.05 i.e. 95%
Confidence	0.147
Lower bound for mean	0.18
Upper bound for mean	0.47

Using the average and standard deviation of the sample of two HCRW generation rates, and presuming that the HCRW generation rate of the population from which they are drawn (i.e. all public hospitals in Lesotho) is normally distributed, the calculations allow the inference to be drawn that there is a 95% probability that the mean population HCRW generation rate will lie in the range 0.18 to 0.47 kg/occupied bed/day. These upper and lower limits, and also the mean value, are used in the mass calculations in section 3.2 below.

In respect of HCGW, a similar computation may be performed to establish a range for the mean population generation rate, as shown in the table below.

Table 3.2: Estimated mean HCGW Generation Rates for all public hospitals (2010)

Estimated mean HCGW generation rates for all public hospitals	
	HCRW mass per occ bed/day
Scott	0.34
Queen 2	0.35
Mean	0.35
Std dev	0.007
Count	2
Level	0.05
Confidence	0.010
	i.e. 95%
Lower bound for mean	0.34
Upper bound for mean	0.36

It may be noted here that in the 2005 Lesotho study, which also involved the development of a Health Care Waste Management Plan for Lesotho, waste generation at Queen II hospital was measured over a period of 30 days. Over this period, average daily generation of HCRW and HCGW was 148.5kg and 142.6kg, respectively. Unfortunately, bed-occupancy was not recorded during the study; however, if an occupancy figure of 100% (viz. 450 beds occupied) is applied, the resulting daily generation rates per occupied bed would be 0.33kg and 0.32kg for HCRW and HCGW respectively. These figures are very similar to the figures of 0.40kg/occupied bed/day for HCRW and 0.35kg/occupied bed/day for HCGW measured at Queen II in the present study.

Health Centres

The summarised results for Health Centres located around Scott Hospital are given in Annex 1c (March 2010).

The summarized results for Health Centres located around Queen II are given in Annex 1d (March 2010).

(Note that the sharps mass recorded for Thaba Bosiu HC is regarded as suspect, as it is highly improbable that a sharps mass of over 5kg reflects use of sharps for only 62 patients. The HCRW figure for this HC has therefore been excluded from the computations that follow.)

The following may be inferred from the results for the health centres:

HCRW and HCGW generation rates for Maseru Private Hospital (0.794 and 1.109 kg/occupied bed/day respectively) are considerably higher than those for public hospitals in Lesotho. This is a similar pattern to that observed in the DACEL 2000 in the RSA (Gauteng) (see Table 6.2 above).

The HCRW generation rate for Lehlakeng (0.373 kg/occupied bed/day) is similar to that recorded for Queen II Hospital.

The HCRW generation rate for Willies (0.216 kg/occupied bed/day) is lower than that for the previous two facilities, but considerably higher than the figures for public HC's, including filter clinics. This is presumed to be due to the fact that Willies functions as both a clinic and a hospital.

The respective HCRW and HCGW generation rates for Baylor Private HC (0.038 and 0.175 kg/patient) are approximately 50% and 150% higher than the comparative average figures for public HC's.

A comparative analysis of all the public health centres reflected in the two tables above (viz. the six HC's centred on Scott and the three HC's centred on Queen II, i.e. excl. Thaba Bosiu) is given in the table below.

Table 3.3: HCW recording of Public Health Centres (March 2010)

HCW recording at Public Health Centres

Health Centre	District	Patients per day	Per patient HCW mass				HCRW weighed at:
			Inf. + path.	Sharps	HCRW	HCGW	
Kolo	Mafeteng	34	0.008	0.006	0.014	0.076	Scott Hospital
St Barnabas	Maseru	42	0.005	0.003	0.008	0.046	
St Peter Claver	Maseru	54	0.005	0.003	0.008	0.024	
Mofoka	Maseru	56	0.007	0.003	0.010	0.023	
Motsekuoa	Mafeteng	77	0.002	0.002	0.004	0.034	
Matsieng	Maseru	86	0.004	0.003	0.007	0.015	
Thaba Bosiu	Maseru	6	0.012	0.085	0.097	0.097	Queen II Hospital
Likotsi Filter	Maseru	64	0.013	0.012	0.025	0.100	
Qoaling Filter	Maseru	117	0.016	0.011	0.027	0.066	
Mabote Filter	Berea	199	0.006	0.012	0.018	0.051	
Overall (weighted) averages excl. Thaba Bosiu		81	0.008	0.008	0.016	0.049	
		729					

Min.	0.004	0.015
Max.	0.027	0.100

Suspect values

	Scott Only		Queen 2 only	
	HCRW	HCGW	HCRW	HCGW
	0.014	0.076	0.025	0.097
	0.008	0.046	0.027	0.100
	0.008	0.024	0.018	0.066
	0.010	0.023		0.051
	0.004	0.034		
	0.007	0.015		
Average	0.009	0.036	0.023	0.079
Std Dev.	0.0033	0.0222	0.0047	0.0239
Sample size	6	6	3	4
Level	0.05		0.05	
viz. confidence level	95%		95%	
Confidence interval	0.003	0.018	0.005	0.023
Low mean	0.006	0.018	0.018	0.056
High mean	0.012	0.054	0.028	0.102

As may be inferred from the above, there is a substantial difference between the HCRW generation rates of the six clinics centred on Scott Hospital (all of which are rural clinics) for which the average HCRW generation rate is 0.009 kg/patient, and those centred on Queen II Hospital, all three of which are urban "filter clinics", for which the average

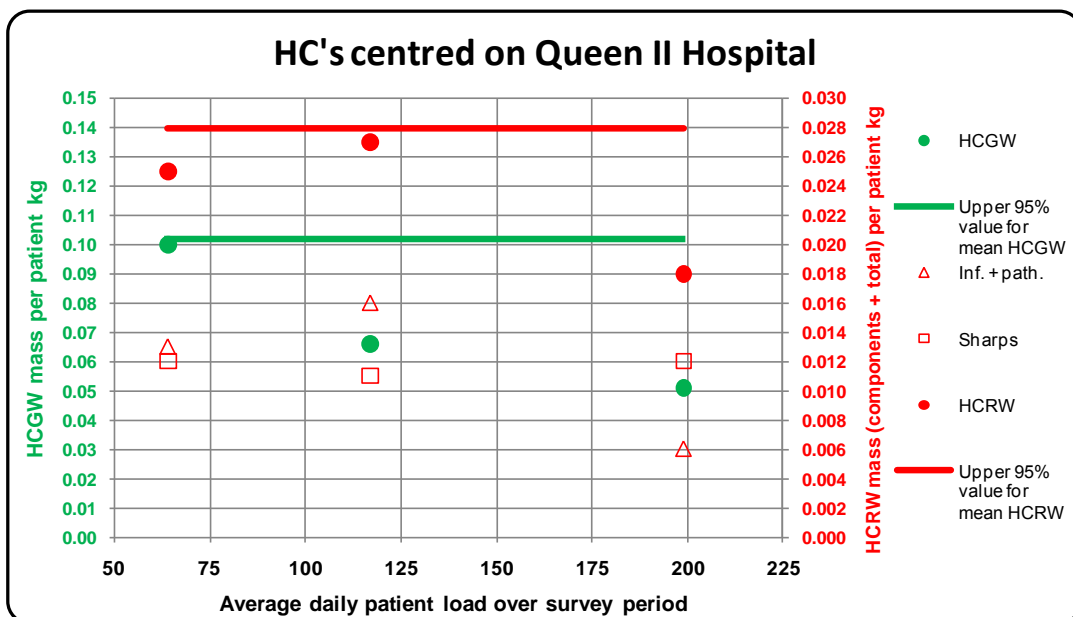
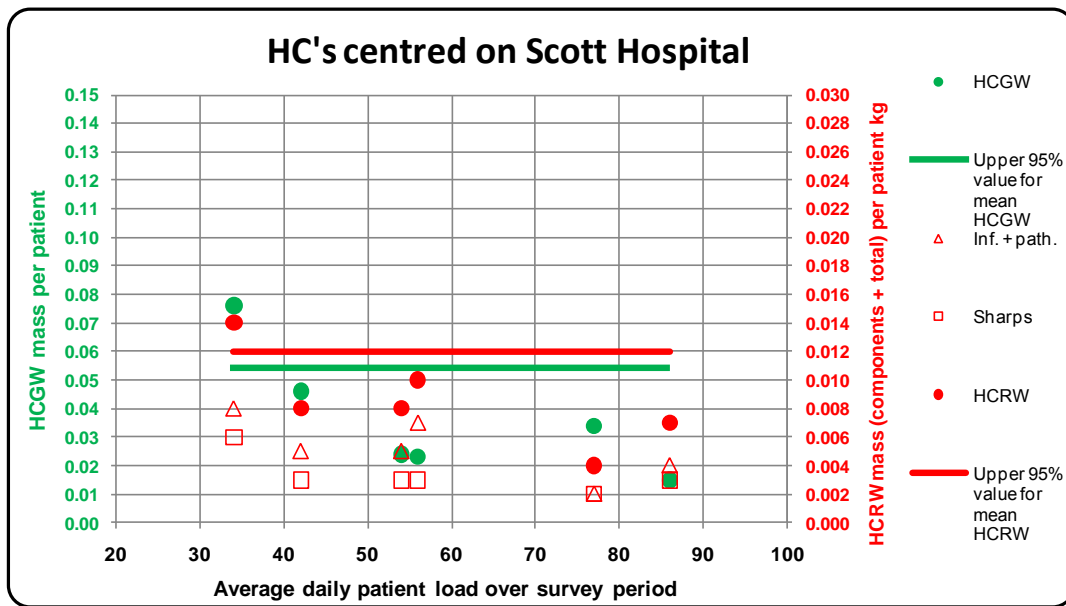
HCRW generation rate is 0.023 kg/patient. There is also a significant difference in the average HCGW generation rates between the two groups (0.036 vs. 0.079 kg/patient).

As performed above for the hospitals, upper and lower limits have been computed for the HCRW and HCGW generation rates for the HCs, at a 95% level.

The results for the various HC's, and also the upper and lower limits for the underlying population, are presented graphically in the charts below.

(Note that HCRW generation rates reflect on the secondary [right-hand] vertical axis in each chart, while those relating to HCGW reflect on the primary [left-hand] vertical axis.)

Figure 3.1: Graphic representation of generation rates



3.2 Determination of current overall HCW generation for Lesotho (March 2010)

Hospitals

Using the estimates for HCRW and HCGW generation determined above, estimates for the mass of HCRW and HCGW generated per hospital per annum can be computed.

As the amount of HCW generated is dependent on the average bed-occupancy, and as current occupancy is not available on a per-institution or overall basis, computations have been performed at the following occupancy levels:

- 38% (GoL Hospitals) and 42% (CHAL hospitals); these are the latest overall occupancies available (as quoted in the 'Annual Joint Review 2008/09').
- 60% (GoL and CHAL hospitals)
- 80% (GoL and CHAL hospitals)

In each case, however, the Queen II occupancy has been set at 100% (which was the level observed during the weighing exercise, and which is reported to obtain generally). In addition, the Scott occupancy has been set at 63% (the level observed during the weighing exercise) except for the case where all hospitals (other than Queen II) are set at 80%, in which case 80% is applied to Scott as well.

Each of the above computations has been repeated for HCRW and HCGW generation rates as follows:

- "best estimate" rates, equivalent to the mean value of the Queen II and Scott generation rates, as determined during the weighing exercise. (In this scenario, the generation rates applied to Queen II and Scott hospitals are the actual rates as determined during the weighing exercises, as these are the "best estimates" available for these two hospitals.)
- "lower limit" rates, and
- "upper limit" rates, being respectively the lower and upper limits of the mean population generation rates, at a 95% confidence level (all as computed above).

The "lower limit" and "upper limit" rates have been applied to all hospitals, including Queen II and Scott, but excluding the special hospitals where lower HCRW generation rates have been applied, based on rates determined for similar health care facilities in the RSA.

A total of nine computations had to be performed. Only one such computation is shown for illustrative purposes in Table 3.4 below.

Table 3.4: Estimated waste generation by Lesotho Hospitals: "best estimate" (2010)

Estimated current waste generation by Lesotho hospitals: "best estimate"													
Hospital details								Waste generation rates and quantities					
Hospital Name	Type	District	GoL / CHAL	Number of beds	Bed occupancy	Occupied beds	On-site incinerator capacity (kg / hour)	Measured / estimated HCRW generation rate (kg / occupied bed / day)	Measured / estimated HCGW generation rate (kg / occupied bed / day)	HCRW generated by hospital (kg / year)	HCRW to be incinerated by hospital (kg / year)	HCGW generated by hospital (kg / year)	
Berea Govt. Hospital	Hospital	Berea	GoL	128	38%	49	120	0.33	0.35	5,900	5,900	6,300	
Maluti Hospital	Hospital	Berea	CHAL	150	42%	63	refurb.	0.33	0.35	7,600	7,600	8,000	
Seboche Hospital	Hospital	Butha-Buthe	CHAL	92	42%	39	120	0.33	0.35	4,700	4,700	5,000	
Butha-Buthe Govt. Hospital	Hospital	Butha-Buthe	GoL	116	38%	45	refurb.	0.33	0.35	5,400	5,400	5,700	
Mamohau Mission Hospital	Hospital	Leribe	CHAL	47	42%	20	80	0.33	0.35	2,400	2,400	2,600	
Motebang (Leribe) Hospital	Hospital	Leribe	GoL	264	38%	101	refurb.	0.33	0.35	12,200	12,200	12,900	
Mafeteng Govt. Hospital	Hospital	Mafeteng	GoL	126	38%	48	refurb.	0.33	0.35	5,800	5,800	6,100	
Bots'abelo Leprosy Hospital	Special Hospital*	Maseru	GoL	6	38%	3	HCRW to QE 2	0.10	0.35	100		400	
Maseru Private Hospital	Hospital	Maseru	Private	20	42%	9		0.33	0.35	1,100		1,100	
Mohlomi Mental Hospital	Special Hospital*	Maseru	GoL	60	38%	23		0.05	0.35	400		2,900	
QE II Hospital	Referral Hospital	Maseru	GoL	450	100%	450	220	0.40	0.35	66,200	67,800	57,500	
Scott Mission Hospital	Hospital	Maseru	CHAL	102	63%	65	120	0.25	0.34	5,900	5,900	8,100	
St. Joseph's Hospital	Hospital	Maseru	CHAL	120	42%	51	120	0.33	0.35	6,100	6,100	6,500	
Makoanyane Military Hospital	Military Hospital	Maseru	GoL	40	38%	16	cap. not known	0.33	0.35	1,900	1,900	2,000	
Nts'ekhe Hospital	Hospital	Mohale's Hoek	GoL	110	38%	42	refurb.	0.33	0.35	5,100	5,100	5,400	
Mokhotlong Govt. Hospital	Hospital	Mokhotlong	GoL	110	38%	42	120	0.33	0.35	5,100	5,100	5,400	
Machabeng (Qacha's Nek)	Hospital	Qacha's Nek	GoL	104	38%	40	120	0.33	0.35	4,800	4,800	5,100	
Tebellong Hospital	Hospital	Qacha's Nek	CHAL	42	42%	18	120	0.33	0.35	2,200	2,200	2,300	
Quthing Gov. Hospital	Hospital	Quthing	GoL	132	38%	51	refurb.	0.33	0.35	6,100	6,100	6,500	
St James Mission (Mantsonyane)	Hospital	Thaba Tseka	CHAL	55	42%	24	120	0.33	0.35	2,900	2,900	3,100	
Paray Mission Hospital	Hospital	Thaba Tseka	CHAL	90	42%	38	120	0.33	0.35	4,600	4,600	4,900	
Count:	21			2,364						Totals:	156,500	156,500	157,800

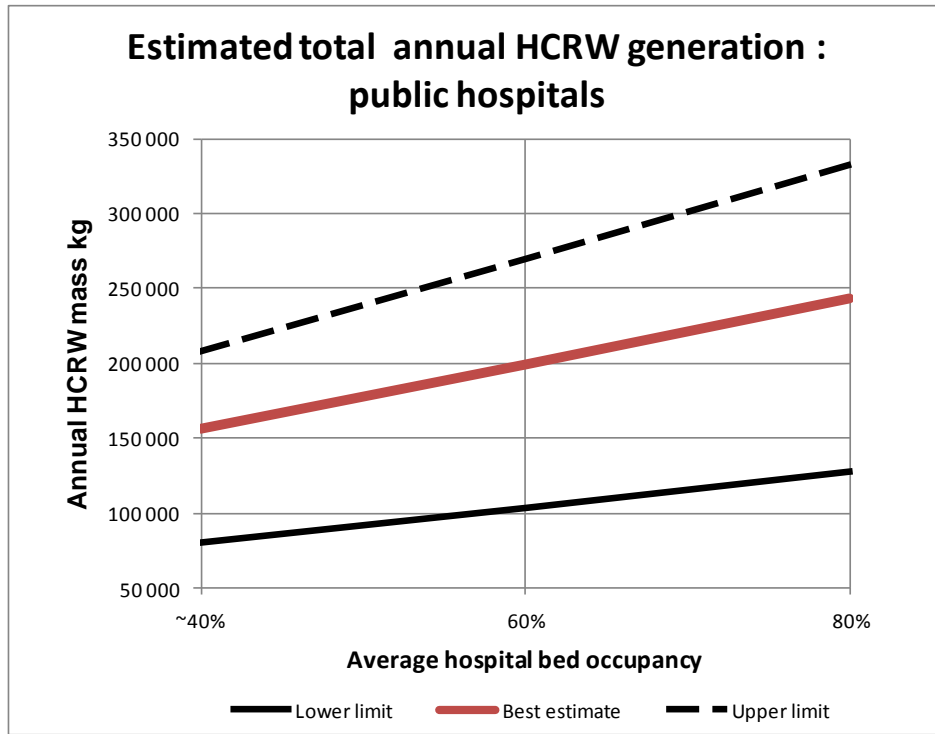
Variable parameters on which above calculations are based:

Bed-occupancy GoL Hospitals:	38%	As per average quoted in AJR 2008/9
Bed-occupancy CHAL Hospitals:	42%	As per average quoted in AJR 2008/9
HCRW generation rate:	0.33	kg/occupied bed/day
HCGW generation rate:	0.35	kg/occupied bed/day

* HCRW generation rates for special hospitals typically very low = established during field visits Jan-Mar 2011

The results of all nine computations for total annual HCRW generation are presented graphically in Figure 3.2 below.

Figure 3.2: Graphic representation of annual HCRW generation: Public Hospitals

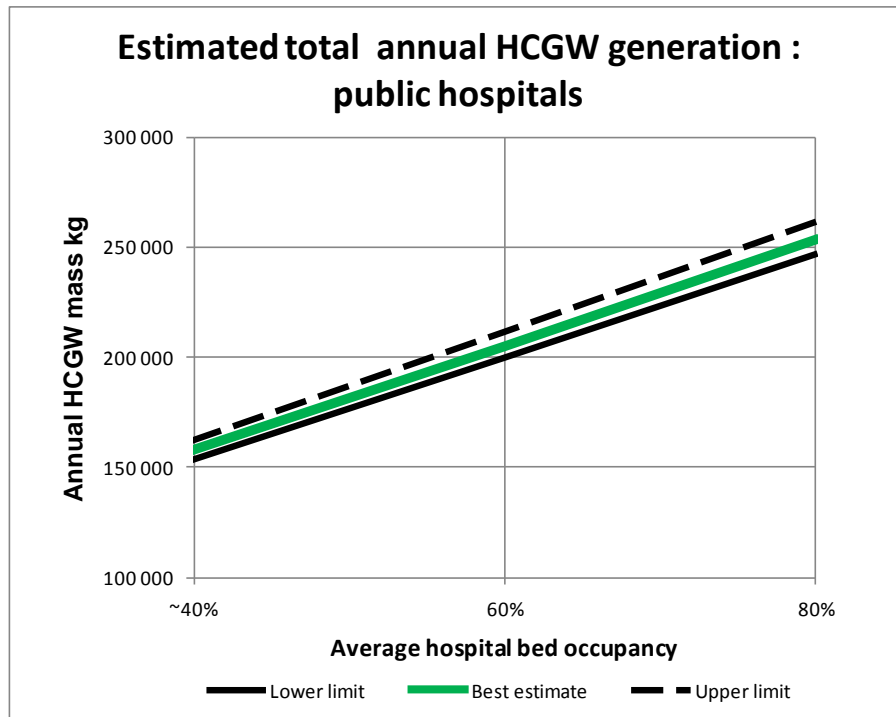


From the above chart it may be seen that at the “best estimate” average HCRW generation rate (0.33 kg/occupied bed/day) the total annual HCRW mass generated is approximately 156,000 kg at an average bed-occupancy of ~40%. This overall total rises to approximately 200,000 at an average bed-occupancy of 60%, and to approximately 244,000 kg at an average bed-occupancy of 80%.

Similarly, at the “upper limit” of the 95% probability range for the average HCRW generation rate (0.47 kg/occupied bed/day) the total annual HCRW mass generated is approximately 208,000 kg at an average bed-occupancy of ~40%. This overall total rises to approximately 270,000 at an average bed-occupancy of 60%, and to approximately 333,000 kg at an average bed-occupancy of 80%.

For HCGW, the results of all nine computations for total annual generation are presented graphically in Figure 3.3 below.

Figure 3.3: Graphic representation of estimated total annual HCGW generation – public hospitals



From the above chart it may be seen that at the “best estimate” average HCGW generation rate (0.35 kg/occupied bed/day) the total annual HCGW mass generated is approximately 158,000 kg at an average bed-occupancy of ~40%. This overall total rises to approximately 205,000 at an average bed-occupancy of 60%, and to approximately 253,000 kg at an average bed-occupancy of 80%.

At the “upper limit” of the 95% probability range for the average HCGW generation rate, totals are only slightly (~ 3%) higher than the “best estimate” figures above. (This is as a consequence of the HCRW generation rates at the two hospitals where weighing was done being very similar.)

Health Centres

In view of the low HCRW generation rates for HC’s, the estimates for overall HCRW generation has been approached on a district rather than on a facility-by-facility basis.

The MoH’s ‘Health Facilities List 2008’ was used a basis to determine the number of GoL and CHAL HC’s in each health district. Based on the MCA’s classification of HC’s for refurbishment or expansion, viz. ‘Type 1’ facilities for patient loads likely to exceed 75 per day (or approximately 18,000 per year) and ‘Type 2’ for patient loads not exceeding 75 per day, the number of Type 1 and Type 2 facilities (GoL, CHAL and LRC) in each district could be determined.

The classification was further refined by identifying the number of HC’s (presumed to be Type 1 facilities) in any district that are filter-clinics. Finally, all HC’s have been

associated with a hospital to which the HC's HCRW is being / can be sent for treatment. The resulting list is reflected in Table ## below. (Note that estimated HCRW generation by the Blood Transfusion Service Laboratory has been included within the totals for GoL (Maseru) HC's.)

The HCRW generation rates used in the table to determine the HCRW mass generated by GoL and/or CHAL HC's in each district are those determined in accordance with paragraph 3.1 above.

The annual patient-loads used in the calculation below are 18,000 for 'Type 1' facilities and 10,500 for 'Type 2' facilities. These figures have been chosen in order arrive at an overall patient-load of approximately 780,000 for CHAL HC's, which is the (tentative) figure provided by them for the 2009/10 year (1st April 2009 to 31st March 2010). (Current GoL figures are not available.)

On this basis, the overall patient load for all GoL+ CHAL + LRC facilities amounts to 1,812,000 which looks high in relation to the total of 1,265,481 reported for facilities (including hospital OPD's and HC's) in the 'Annual Joint Review 2008/09. This suggests that the average patient loads assumed above for Type 1 and Type 2 facilities may be higher than the actual averages for these facilities in the case of GoL (and possibly also LRC) HC's. This is, however, not of concern as (i) the overall quantities of HCRW are small and (ii) the potential over-estimation implies that the calculated HCRW quantities are conservative.

Table 3.5: Health Centres: Estimated annual patient loads and HCRW generation (2010)

Health Centres: estimated annual patient loads and HCRW generation

Hospital to which HCRW is being / may be transported for incineration or other treatment:				GoL and CHAL HC's							
				Number and size				Estimated total annual HCRW generation kg			
Hospital Name	Type	District	GoL / CHAL / LRC	Total number of GoL / CHAL HC's	Filter Clinics (patient load > 18,000)	Other HC's with annual patient load greater than 18,000	Number with annual patient load less than 18,000	Total estimated future annual patient load	Lower 95% limit	Best estimate	Upper 95% limit
Berea Govt. Hospital	Hospital	Berea	GoL	4	1		3	49,500	580	790	1,010
		Berea	LRC	1			1	10,500			
Maluti Hospital	Hospital	Berea	CHAL	11		1	10	123,000	740	1,110	1,480
Seboche Hospital	Hospital	Butha-Buthe	CHAL	2			2	21,000	130	190	250
Butha-Buthe Govt. Hospital	Hospital	Butha-Buthe	GoL	8		1	7	91,500	550	820	1,100
Mamohau Mission Hospital	Hospital	Leribe	CHAL	14		1	13	154,500	930	1,390	1,850
Motebang (Leribe) Hospital	Hospital	Leribe	GoL	11	1	5	5	160,500	1,180	1,700	2,210
Mafeteng Govt. Hospital	Hospital	Mafeteng	GoL	8		1	7	91,500	1,180	1,770	2,360
		Mafeteng	CHAL	9			9	94,500			
		Mafeteng	LRC	1			1	10,500			
QE II Hospital	Referral Hospital	Maseru	GoL	13	2	2	9	166,500	2,940	3,550	4,150
		Maseru	LRC	1			1	10,500			
Scott Mission Hospital	Hospital	Maseru	CHAL	6			6	63,000	380	570	760
St. Joseph's Hospital	Hospital	Maseru	CHAL	11		3	8	138,000	830	1,240	1,660
Nts'ekhe Hospital	Hospital	Mohale's Hoek	GoL	11		1	10	123,000	990	1,490	1,980
		Mohale's Hoek	CHAL	4			4	42,000			
Mokhotlong Govt. Hospital	Hospital	Mokhotlong	GoL	6			6	63,000	630	950	1,260
		Mokhotlong	CHAL	3			3	31,500			
		Mokhotlong	LRC	1			1	10,500			
Machabeng (Qacha's Nek)	Hospital	Qacha's Nek	GoL	6			6	63,000	380	570	760
Tebellong Hospital	Hospital	Qacha's Nek	CHAL	4			4	42,000	250	380	500
Quthing Gov. Hospital	Hospital	Quthing	GoL	5			5	52,500	500	760	1,010
		Quthing	CHAL	3			3	31,500			
St James Mission (Mantsonyane)	Hospital	Thaba Tseka	CHAL	2			2	21,000	320	470	630
		Thaba Tseka	GoL	3			3	31,500			
Paray Mission Hospital	Hospital	Thaba Tseka	CHAL	4			4	42,000	690	1,040	1,390
		Thaba Tseka	GoL	7			7	73,500			
Count:	17			159	4	15	140	1,812,000			

Total annual patient load: GoL	966,000
Total annual patient load: CHAL	804,000
Total annual patient load: LRC	42,000
Total annual HCRW generation:	13,200 18,800 24,400

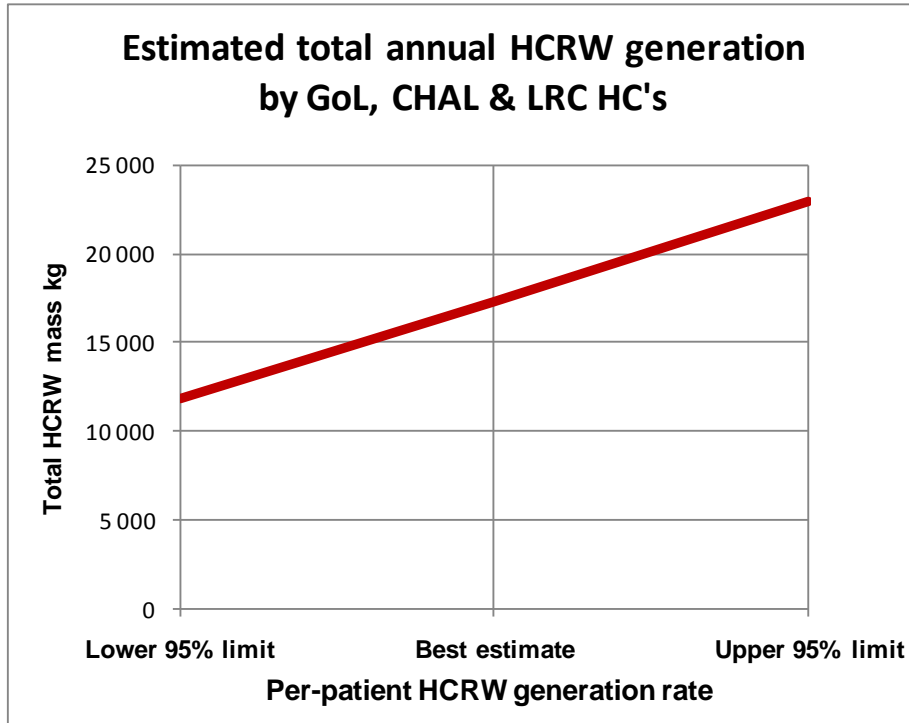
Notes:

	Large HC	Small HC	
1. Assumed annual patient loads:	18,000	10,500	
2. Per-patient HCRW generation rates	Lower bound	Best estimate	upper bound
Filter clinics	0.018	0.023	0.028
Other public HC's	0.006	0.009	0.012
Sharps only	0.003	0.006	0.009

3. Estimated annual mass of HCRW from the BTS (1,450kg) has been included in the Maseru HC totals.

The total HCRW generation by public HC's at various generation rates is represented graphically in Figure 3.4 below.

Figure 3.4: Graphic representation of estimated total annual HCGW generation by GOL, CHAL & LRC HC's



As there is a linear relationship between average patient numbers per facility type and the total HCRW generation figure in the above computation, an increase or decrease in the average patient numbers would cause a proportional increase or decrease in the total HCRW figure at each assumed generation rate. For example, a 10% overall increase in average patient numbers per facility type would cause the total HCRW mass line in the above chart to move upwards by 10%.

It should be noted that the best estimate of total HCRW generation at public HC's (17,300 kg) amounts to approximately 10% of the best estimate of the estimated overall total HCRW generated by public hospitals and HC's in Lesotho (at an average hospital bed occupancy of ~40%) ($156,500 + 17,300 = 173,800$ kg).

3.3 Lessons Learned from the HCRW and HCGW Quantity Recording

Despite doing everything possible to ensure that all stakeholders from the participating hospitals and HCs were well informed and trained prior at commencement of the mass recording exercise, the following problems were experienced.

- Although permission was obtained from the MoH and all the selected HCFs agreed to participate, some of the HCs did not meet their obligations in terms of data recording and HCW storage for the full duration of the project.

- Some identified HCFs did not store their HCRW until the weekly collections and determination of the HCGW volume generated was not effectively done. Data recording from such HCs was therefore excluded from the calculations.
- A few existing sharps containers were found not to have been sealed prior to commencement of the exercise. At the beginning of the exercise, not all the liners had been cleared from the hospitals and clinics. The first day's recordings were therefore used as a trial only.
- Some HCs did not keep up their daily data sheets in terms of bed occupancy, patient loads and number of births (placentas generated).
- Reusable HCGW containers not provided with liners created difficulty when the HCGW was to be transferred from the reusable HCGW container to the standard 110-litre plastic boxes for mass recording.
- Power failures that occurred at the incinerators required the emergency use of electrical extension cords to supply power to the electronic scale.
- At Scott hospital, an electrical fault and also lack of sufficient diesel meant that the conventional open fire "incinerator" had to be used.
- Some poor-quality cardboard box sharps containers and overfilling of sharps containers created a risk of HCRW spillage and subsequent needle prick injuries.
- Information on hospital occupancy rates made available by the MoH varied significantly from the figures actually recorded during the time when the mass recording was undertaken at each of the hospitals.
- Inefficient segregation of the HCRW and the general waste for the first 2-3 days was a problem at Scott hospital. However, this was resolved by again training the cleaners about the requirements of the study.
- Segregation of HCGW and HCRW was poor at Queen II due mainly to the interchangeable use of the black and yellow or red liners.
- The marking of the number of placentas on each large liner proved to be a challenge. On occasions, when the individual plastic bags were used, the weighing personnel were able to count the numbers themselves. Where numbers were not known, these were recorded on the recording sheet. However, sufficient information has been obtained to determine the average weight of a placenta accurately.
- At Queen II some cleaners were not taking their general waste to the incinerator for weighing and on occasion the weighing staff had to intervene to ensure compliance to the agreed procedure. This challenge prevailed until the conclusion of the study despite regular communication with the cleaning staff and the nurses at the hospital

The updated 2010 HCWM recognises the aforementioned lessons learned in the existing HCWM system and a mitigation plan addressing these gaps has been developed, as highlighted in Section 6.5 of this document.

Challenges experienced at individual health centres included:

- Segregation was a challenge at Mofoka clinic for the first week and the staff did not know exactly what was expected of them. The staff at this clinic was again trained to ensure understanding and compliance to the requirements of the study.
- At Mabote and Qoaling health centres some of the sharp boxes that were not to be used until after the 29 March 2010 had in fact been used during the course of the study.
- Insufficient information was obtained from Mokoka, Qoaling.

Section 4.0 Analysis of the Health Care Waste Management System (2010)

4.1 Description and operation of the HCW System in Hospitals

4.1.1 Generation and Segregation of HCGW

Types of containers

Within the hospitals, the collection of HCGW is mostly done with 85-litre black plastic liners placed in a variety of different sized, different coloured unmarked reusable containers. This not only results in limited efficiency in terms of liner capacity, but also makes identification of waste to be disposed in the container solely dependent on the colour of the liner installed.

Outside of the hospital buildings and in the patient waiting areas, HCGW is collected in a variety of ways that include 85-litre bins hanging from hooks, 120-litre and 240-litre black wheelie bins or 210 litres steel drums positioned in public areas. In some hospitals the steel bins or drums are fixed to the walls or positioned between poles like the “pendula bins”. Sometimes the steel bins are found inside the hospitals and these take up a significant amount of space.

Very little opportunity exists for recycling of significant amounts of HCGW packaging materials because of long transport distances and limited markets for recyclable materials in Lesotho. In some cases non-combustible materials like tins and bottles were removed from the HCGW stream for transport to the municipal waste dump to conserve space in the hospital’s on-site waste pit.

Use of containers for HCGW

Cardboard boxes printed with “Hazardous Waste” on the sides, and fitted with plastic liners, are used in many of the hospitals as ‘reusable’ containers for the collection of HCGW. These containers cannot be decontaminated and are therefore disposed of after a number of cycles. When used with a black liner, there is a confused message portrayed with the hazardous waste markings on the cardboard boxes.

Sometimes the “hazardous waste” cardboard boxes are used without any liners for the collection of HCGW

A variety of non-standard unmarked reusable containers are used for the collection of HCGW and the black liners are the only indication of the category of waste to be disposed therein. The confused messages contribute to poor segregation of waste.

An 85-litre black liner that is used in a 20-litre or 30-litre open bin or pedal bin means that the liners are filled only to about 30% of their capacity before being removed for disposal. This is inefficient and costly.

There is no clear pattern in the way in which the 120-litre and the 240-litre black wheelie bins are used. There are no liners sufficiently large to use in any of the wheelie bins, many of which are very dirty and unhygienic. There were some instances where 85-litre liners were

placed in 120-litre wheelie bins, but this was not very effective. The use of wheelie bins inside hospitals takes up valuable space.

Although the steel drums are cheap to provide, such bins are ergonomically very difficult to service, which may be the reason why HCGW waste is sometimes burnt inside the bin. This in turn results in rusting and significantly reduces the bin's serviceable lifespan.

Both the plastic and metal reusable containers are not regularly cleaned or decontaminated. Instances were also found where used ampoules and other clinical glass were placed into ordinary cardboard boxes.

In general, there is a lack of compatibility between some of the bins and the lids, as well as a lack of uniformity in the type of bins being used. For example: a kick-about trolley without a liner was used for the collection of both HCRW and HCGW in the theatre.

The liners are in many instances the only form of identification of the HCW containers, thus resulting in poor segregation as well as excessive contamination of the reusable container when used without a liner. Instances were also encountered where the same colour liner was used for both HCGW and HCRW due to the unavailability of appropriately coloured liners. This created further confusion and added to the already poor standard of segregation.

A water shortage at some hospitals has resulted in potable water being stored in 240-litre wheelie bins. Other instances were also encountered where wheelie bins intended for HCGW were deliberately drilled in various places to prevent such bins from being used for alternative applications.

In accordance with the 3-bin system, the positioning of the containers for HCGW at the generation point should be alongside the infectious waste container and the sharps container. Some containers were difficult to access as they were placed underneath beds, tables or even underneath other HCRW containers.

Food waste.

It was reported that much of the food waste, even leftovers returned from the wards where TB patients are admitted, is used as pigswill. Reusable containers are used for storing and transporting this food waste. It could not be verified how the pigswill was collected, but it is believed that it would have been collected by pig farmers from the surrounding areas.

4.1.2 Generation and Segregation of HCRW at Hospitals

Types of containers for Infectious HCRW at Hospitals

Both red and yellow 85-litre plastic liners are placed in a variety of reusable receptacles of different sizes, colours and shapes.

The two 'standard' sizes of cardboard boxes (50- and 140-litre) are used with a coloured liner for the collection of the infectious waste. Other receptacles included a steel frame or a kick-about trolley.

Use of containers for infectious HCW

HCRW and HCGW containers, placed closely together, may compromise correct segregation as the waste can easily be placed into the wrong container. Greater efficiency in segregation is achieved if there is at least a 1-metre distance between the two containers. In some instances different containers are placed side by side, one with a yellow and one with a red liner, making it difficult to identify which category of HCW each should contain. If both are meant for infectious waste, this takes up limited floor space.

Some of the cardboard boxes are used with lids, whilst others are used without the lids provided. Some cardboard boxes and lids were not correctly assembled, leaving the individual handling the container vulnerable.

Many of the reusable containers have no lids, or lids that are badly damaged and that no longer close properly. The general condition of many of the containers, particularly the plastic pedal bins, is poor with broken lids, pedals that no longer work and cracked side walls. Broken pedal bins have to be operated by hand.

The 85-litre yellow and red liners provided in most of the hospitals are too big for many of the smaller reusable containers used for the collection of the infectious waste. The same liners on the other hand are too small for the larger of the two hazardous cardboard boxes (the 140-litre box). Where the liners are too large, only 30 – 40% of the liner capacity is utilized while if they are too small for the hazardous waste cardboard box, the HCRW can fall past the liner, directly into the cardboard box. Sometimes the cardboard box is bent and deformed to fit the liner, damaging the box.

The use of plastic liners without any receptacle, placed on the floor with blood sometimes visible in the bottom of the liner, was also observed.

There is no standard for closing of the yellow or red liners for infectious HCRW. Some hospitals twist the mouth, but do not use any fastener. Others tie knots, whilst some use surgical gloves as ties to close the liner.

Cardboard boxes used as reusable containers cannot be decontaminated and are disposed of after a number of cycles.

In accordance with the 3-bin system, the positioning of the containers for HCRW at the generation point should be alongside the sharps and the HCGW container. (See section on HCGW above.) The positioning of the containers in many instances is poor, with containers found under trolleys, under beds, under desks or behind doors. Inaccessibility of containers increases the risk of HCRW spillage, as well as incorrect segregation.

Although in some cases the nursing trolley was used with liners fastened to the side, or liners were placed in rings fitted to some of the trolleys, this was not a general practice.

Types of containers for Sharps HCRW at Hospitals

With the exception of a small number of plastic sharps containers, sharps cardboard boxes of different sizes and shapes are used throughout the hospitals. These boxes were supplied by the World Health Organisation.

There are some instances where disposable as well as what is presumed to be reusable plastic sharps containers from different service providers, both in South Africa and internationally, are used. These were frequently found in the laboratories or in pharmacies. In

some hospitals it was reported that these containers are burnt and in others there was evidence that the containers are emptied and reused.

The World Bank donated white laminated cardboard sharps boxes that generally did not create any health or safety risks. There was only one incident recorded where the sharps were reported to have penetrated the cardboard sharps containers.

The hexagonal brown sharps boxes found in some of the hospitals are much thinner and tend to be flimsy when assembled. These sharps boxes are known to fall apart when full and are therefore unsafe.

Use of containers for sharps HCRW

Although there is a very small risk of penetration by needles, the cardboard sharps safety boxes are very practical to use as they are easy to store flat, quick to assemble and easy to burn or incinerate.

As most of the hospitals are using the cardboard sharps containers, theft of these containers was not reported as a problem. When questioned, the staff reported that when they were using the plastic sharps containers, such containers were often utilised for other purposes, mainly as plastic buckets.

The placing of the Sharps Safety Boxes was found to be problematic. Many ingenious places are used to place a sharps container. They are mostly found placed underneath tables, underneath trolleys or on the floor where they are often difficult to access. In some instances they were found on top of trolleys or tables cluttered with other items so that they are not easily distinguishable. Balancing of sharps containers on the edge of tables or on window sills was also encountered. The pictures below give some idea of the need for the proper positioning of sharps containers.

Sharps containers were in most instances placed in wards where they were accessible to patients and visitors. This creates a risk of injuries and infection, in particular in paediatric wards, as well as wards where mentally unstable people are treated.

A sharps box container placed on the floor is ergonomically difficult to use, in addition to the fact that there is a risk of such containers overturning when accidentally kicked. The duplication of sharps boxes was also encountered and this once again takes up unnecessary space wherever the containers are stacked.

Cardboard sharps safety boxes were sometimes found to be overfilled and in many instances, the sharps boxes were not closed properly. Both of these practices create an unacceptable safety hazard.

When there is no stock of the cardboard sharps safety boxes, empty plastic containers (in which liquids of various types are supplied to the hospital) are used for the collection of sharps.

The practice of reusing plastic sharps containers was observed. This is very dangerous due to the double handling of sharps that is required.

Sometimes the sharps boxes or a separate plastic container is used for the collection of ampoules or clinical glass bottles. It was also found that a sharps box container lid was modified with a notice indicating that it was to be used for large bottles.

Use of containers for Pathological / Anatomical HCRW at Hospitals

Placentas are mostly collected in a red or yellow lined kick-about trolley in the delivery room. They are often containerised together with the other general infectious waste. Some hospitals separate out the placentas and place them in lined, 20-litre plastic sharps containers or other types of container with a lid. These containers are reused once the liner with the placentas is removed.

One of the hospitals made use of a plastic liner placed underneath the mother during the birth. The same liner is then used for the containerisation of the placenta, before being disposed together. Other hospitals separate out the placentas in the maternity ward, but they are ultimately disposed of and burnt with other HCRW. Where diesel incinerators are not available for incineration and open fire burning of placentas is done, paraffin, diesel or spirits are often used to promote burning.

Some of the hospitals use old plastic sharps containers with yellow or red liners for the temporary storage of placentas. No form of refrigeration is used for the storage of placentas and where HCRW burning or incineration is not done on a daily basis, placentas are kept in the maternity wards until such time as they can be treated and disposed of.

Amputations appear to be carried out only at Queen II Hospital. None of the other hospitals reported that they have large amputated limbs to dispose of.

Management of Laboratory HCRW at Hospitals

In the laboratory, the blood and stools are collected in yellow or red lined hazardous cardboard boxes and then taken for incineration on site.

The CD4 count machine, the liver function machine and the full blood count machines all have plastic bottles for the collection of the hazardous liquid waste from the machines. It was reported that the bottles had a small volume of hypochlorite solution poured in prior to use, or that this is alternatively added later. This hazardous liquid waste is reported to be poured down the drain outside the laboratory or in some cases there was an inlet to the sewer drain in the floor of the laboratory.

In the larger laboratories where microbial analysis takes place this highly hazardous waste is not pre-treated before being incinerated. This waste is placed into plastic or cardboard sharps containers or into large liners to be taken to the incinerator for treatment.

TB plates are reported to be kept in the small boxes that the plates come in. It was reported that this is done for quality control purposes when audits are conducted from Central level.

The TB plates are not treated in any way before being placed into red or yellow lined containers and taken to the incinerator for on-site treatment.

In the larger laboratories such as Queen II where blood samples are analysed, the blood vials are thrown into red or yellow plastic liners and taken to the incinerator on site.

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Management of Pharmaceutical (and chemical) HCRW in Hospitals

In all the hospitals, pharmaceutical HCRW comprising expired or unused medication is delisted from their pharmacy stocks and collected in ordinary cardboard boxes which are accumulated within the pharmacy store until taken for incineration.

Some of the hospitals reported that they incinerate on-site, but the majority claimed that they take the accumulated pharmaceuticals to a larger incinerator at another hospital or to Queen II. No records of pharmaceutical waste incineration are kept, so it is difficult to verify where it is treated and what the quantities are.

Large quantities of donated pharmaceuticals were found in some of the hospitals and one hospital reported that they do not know what to do with such donated pharmaceuticals as the doctors do not use it. The bulk of these pharmaceuticals that they had in the pharmacy during the visit have expired. One hospital pharmacist reported that a system for the destruction of the donated pharmaceuticals is not in place as it is not recorded as stock.

One district reported that their inspectors had confiscated a large consignment of drugs from the town's supermarket and these were presently kept in the pharmacy awaiting the go-ahead to be destroyed.

Fixer used for the development of X-rays is disposed of to sewer when no longer effective for use.

Management of Isolation HCRW in Hospitals

None of the hospitals reported that they have isolation HCRW. Despite one hospital having equipped a small room in a ward as an isolation ward, the majority of the hospitals do not have isolation wards. Some hospitals had separate TB wards, but this waste was not treated as isolation waste. Some hospitals place TB patients into one section of the normal medical ward. Except for cases of MDR TB, once a TB patient is receiving medication, they are no longer infectious. It is only the waste from MDR TB patients that should be treated as isolation waste.

Management of Extraordinary HCRW in Hospitals

Despite the use of plastic covers in many instances, most hospitals do at some stage generate contaminated mattresses. These were found stored in storerooms or laid outside to dry in the sun. It was reported that unprotected and soiled mattresses are often cleaned and reused.

Fluorescent tubes, batteries and mercury thermometers are disposed of with HCGW.

X-rays are sent for recycling by some hospitals to recover the silver.

4.1.3 Storage for HCW within the hospitals

As a general practice, the sluice rooms within the wards are not used for the intermediate storage of the HCW although in many cases these rooms are large enough.

Most of the red, yellow and black liners are placed unsupervised in public areas outside the wards awaiting collection and transportation to the incinerator, on-site waste pit or municipal waste dump. Sometimes the HCRW collected into separate black, red or yellow liners is mixed in 120-litre, 240-litre or 600-litre wheelie bins that are kept in the passageways.

In some hospitals, the maternity wards use the sluice room as an interim storage facility for the placentas, waiting to be taken directly to the incinerator.

4.1.4 Internal transport of HCW within the Hospitals

HCGW and HCRW liners are carried by hand from the 'reusable' containers (including cardboard boxes) inside the wards to outside of the wards where they are either placed on the floor in the passages, or alternatively into the 120-litre, 240-litre or 600-litre wheelie bins positioned in public areas. The wheelie bins are the means of transport in these cases.

Instances were also observed where liners filled with HCW were transported by wheelbarrow.

In some hospitals the liners are placed on the floor awaiting transport to the treatment site. Such liners are sometimes placed into bins for transport to the treatment area or alternatively carried by hand

It was reported that the placentas are carried by hand by the nursing staff, from the maternity ward directly to the incinerators for treatment.

Sharps containers are carried by hand to the incinerator or placed into the wheelie bins in the corridors.

4.1.5 External Storage at Treatment Facility in Hospitals

Some hospitals have no external storage and both the HCGW and HCRW is left at the incinerator to await treatment. Other hospitals do have a dedicated area for the storage of the HCRW waiting to be treated. There are a variety of different designs, with some being a brick store room next to the incinerator, and others being a separate wire caged area.

In the urban areas, some of the HCGW is stored in these areas awaiting collection by the municipality. Much of the HCGW is, however, burnt on the hospital premises together with the HCRW.

4.1.6 Treatment methods for Hospitals

The treatment of the HCRW at the hospitals is done by some form of open air burning or incineration. All the GOL and CHAL hospitals except Botsabelo, and Mohlomi have new or refurbished incinerators donated by the World Bank. However, only one of these new incinerators (Paray) was in operation during the field visits.

One hospital reported that although their incinerator had been refurbished, it was not functioning and they had reverted to the de Montfort brick burners still on the site. Other hospitals do open burning if there is no incinerator or de Montfort. Diesel or spirits is used to start the burning process and some hospitals are using coal.

The positioning of some of the new incinerators is unfortunate as they are either too close to the staff accommodation or the wards. At Mokhotlong an incinerator was placed on a slab with no housing and it was reported that the work was stopped as the incinerator had been positioned too close to a doctor's house. In other cases they are too far away with no access road or pathway between the hospital and the incinerator.

Access to most of the incinerators is difficult with bumpy, rocky overgrown pathways. The site for the new incinerators has been leveled, causing in some case up to ½- metre drop to the doorway. This will make the transport of the waste by wheelie bin very difficult.

Incineration times and frequencies vary between the different hospitals depending on the volume of HCW generated. Some hospitals like Queen II incinerate daily from about 09h00 – 15h00, 7 days a week. Other peri-urban hospitals will incinerate only once per week for around 2 – 5 hours.

Historically, there have been no formal maintenance contracts for the regular upkeep of the incinerators and repairs and maintenance is done on call. The new incinerators have a 1-year guarantee and follow-up maintenance. Since maintenance is sometimes found to be a problem, some critical spares are kept on site. One hospital incinerator (Quthing) was reported to have been out of commission for over a year, and the incinerator at Mafeteng reportedly breaks down regularly, with long waits until it is eventually repaired.

The stack height of the incinerators is considered to be too low as smoke is sometimes blown into the surrounding buildings.

4.1.7 Disposal of residues from Hospitals

The ash from 'incinerators', which could be anything from an open fire burner, de Montfort burner or a diesel incinerator, together with other inert waste like building rubble, is in most cases randomly disposed of in close proximity to the 'incinerator'. One hospital reported that they put the ash into steel drums and take it to the local municipal dump. Some hospitals burn the HCGW on site and the ash from the incinerator, de Montfort brick burner or open fire burner is placed into the same pit. Since the ash is not covered, there is a risk of the ash being scattered across the area through wind action.

One of the pits where HCGW is burnt is in close proximity to a school, resulting in the school children being exposed to toxic fumes from burning plastic.

Some ash pits are placed on sloping ground. Without any storm water diversion trenches or berms upstream from the pit, it can be expected that the ash pit will collect a significant amount of water, which in turn provides the transporting medium for pollutants. The ash pit is often used for the disposal of incinerator ash as well as the burning of HCGW.

Some ash dumps are immediately adjacent to watercourses on the property boundary.

4.1.8 Cleanliness of reusable containers at Hospitals

Very few of the hospitals wash and decontaminate their reusable HCW containers regularly. Cardboard boxes are in some instances reused and these containers cannot be decontaminated. Sharps containers, including disposable plastic sharps containers, should not be reused, but should be totally destroyed with the sharps.

4.1.9 The Provision and Wearing of PPE in Hospitals

A recent donation of Personal Protective Equipment (PPE) by the MCA-L was made in November 2009 to all the hospital and clinics. This protective clothing included latex gloves, dusk masks, leather gloves and plastic visors for the incinerator operators.

When questioned, the hospital staff said that before the donated consignment, PPE was not always readily available. The hospitals all recorded that this consignment is sufficient for the foreseeable future.

It was reported by the hospital staff that PPE that is available is 'used all the time'. PPE is issued as needed, safety boots being issued annually. Disposable gloves and masks are used. Although it was reported by some hospitals that training in the use of the PPE is carried out, there were no records made available.

Most of the hospitals reported that the PPE marked with an X in the table below is readily available and is used:

Overalls	X	Goggles	
Disposable Aprons	X	Surgical Masks	X
Leather Aprons		Dust Masks	X
Surgical Gloves	X	Visors	
Thick nitrile gloves		Safety Shoes or boots	X
Asbestos gloves		Wellington Boots	

The PPE given to the incinerator operators was unsuitable and varied with the different hospitals. Some did have asbestos gloves and most used dust masks.

4.2 Description and operation of the HCW System in Health Centres

4.2.1 Generation and Segregation of HCGW in HCs

Types of containers for HCGW at HCs

The collection of HCGW within the health centres is carried out mostly using unmarked and different coloured small metal or plastic pedal bins as reusable containers with or without a liner. In addition to that, ordinary packaging boxes as well as hazardous waste marked cardboard boxes are also used with or without plastic liners. Black liners are used extensively in the clinics for HCGW and in many instances also for HCRW.

The 85-litre galvanised metal or black rubber dustbins as well as 120-litre or 240-litre wheelie bins are found outside the clinics for the collection of HCGW disposed by the general public. One HC was visited where a 210-litre steel drum mounted between 2 poles was used as a “pendula bin”.

Use of containers for HCGW

Ordinary packaging boxes as well as hazardous waste marked cardboard boxes with or without plastic liners are used in some clinics as reusable containers for the collection of HCGW. These containers cannot be decontaminated and are therefore disposed of after a number of cycles. When used with a black liner, a confused message is portrayed as to what type of waste is to be disposed.

In some clinics “no liners in the bins” indicate that it is for HCGW and the black-lined cardboard boxes are for HCRW. This practice is confusing and leads to mis-segregation.

There is no real identifiable standard for the disposal of HCGW in many of the HCs.

An 85-litre black liner used in 20 or 30-litre open bins or in pedal bins results in the liners being filled to around 30% of their capacity before being removed and sent for disposal.

Both the 120-litre and the 240-litre wheelie bins are commonly found in and around the HCs, but without any clear pattern in the way the bins are to be used. There are no liners sufficiently large for use in any of the wheelie bins and many are found to be very dirty and unhygienic. The use of either 85-litre bins or different sized wheelie bins inside the HCs takes up already limited floor space.

As water is a problem in some of the clinics, larger plastic containers are in some instances used to store water.

4.2.2 Generation and Segregation of HCRW in HCs

Types of containers for Infectious HCRW at HCs

There is no standard of container used for HCRW within the HC. Unmarked and different coloured steel and plastic pedal bins are the predominant reusable containers used. Hazardous waste marked cardboard boxes are also used as reusable receptacles.

Both red and yellow 85-litre plastic liners are used in many of the HCs for containerisation and these are placed into a variety of unmarked and different coloured receptacles of varying sizes.

50-litre and 140-litre hazardous waste marked cardboard boxes are also available in the clinics.

Use of containers for infectious HCRW

Instances were found where two containers were placed side-by-side, both with the same coloured liner but in fact to be used for HCRW and HCGW respectively. Such practices makes it difficult to distinguish between the two HCW categories and results in poor segregation.

The red and yellow liners provided in most of the HCs are too big for most of the smaller reusable containers used, and are conversely too small for the larger of the two hazardous waste marked cardboard boxes. Where the liners are too large, it results in only 30 to 40% of the liner capacity being utilized. Where the liner is too small for the hazardous waste marked cardboard box, it results in waste falling past the liner directly into the cardboard box. Cardboard boxes are in other instances bent and deformed to fit the liner.

Cardboard boxes used as reusable containers cannot be decontaminated and are disposed of after a number of cycles.

HCRW and HCGW containers placed directly side-by-side compromise the HCW segregation efficiency.

Some of the hazardous waste marked cardboard boxes are used with lids, whilst others are used without the lids that are provided. Some cardboard boxes and lids were not correctly assembled, leaving the individual handling the container vulnerable.

There is no standard for the closing of the liners. The most common method is to tie a knot at the top. However this is difficult to do with the thicker yellow liners. It is generally found that the locally-sourced red liners are transparent and also much thinner than the yellow liners.

The positioning of the containers in many instances is poor, with containers found under trolleys, under beds, under desks or behind doors.

Types of containers for Sharps HCRW at HCs

Sharps cardboard boxes of different sizes are predominately used in the HCs. These boxes are donated by either the World Bank or World Health Organisation. Some plastic sharps containers were also found, but it was not clear whether these are destroyed or emptied and reused.

When used correctly, white laminated cardboard sharps boxes donated by the World Bank were found generally not to create safety risks.

Use of containers for sharps HCRW

Although not the safest option available on the market, the cardboard sharps safety boxes are very practical to use as they are easy to store flat, quick to assemble and easy to burn or incinerate.

As most of the HCs are using the cardboard sharps containers, theft of the containers was not reported as a problem. When questioned, the staff reported that when plastic sharps containers had been used in the past they were often utilised for other purposes at the HCs or stolen to be used somewhere else.

The sharps safety boxes were placed mainly on the floor, on a desk top or a trolley and were generally not stable or well secured. A sharps box container placed on the floor is ergonomically difficult to use, in addition to the fact that there is a risk of such containers overturning when accidentally kicked.

Instances of overfilled sharps safety boxes were recorded at some HCs, with instances also encountered where separated needles were placed on top of the sharps boxes.

Management of Placentas at HCs

The HCs only deal with placentas in an emergency birth. Whenever possible the patients are referred to the nearest hospital before the due date to await the birth.

When HCs do generate a placenta, this is contained in a red, yellow or black liner together with the infectious waste from the birthing process. Other HCs reported that they separate out the placenta to burn it on-site or to dispose into a pit latrine. The only HC equipped with a diesel incinerator reported that the placentas are stored inside the incinerator building until the next weekly incineration is done.

Management of Pharmaceutical (and chemical) HCRW at HCs

Pharmaceutical HCRW (expired medicines) is only occasionally generated. Due to the small stock carried, it is generally easy to use a system of "first in, first out" for all medicines delivered to the HC. Should any medicines expire while still with the HC, such medicines are returned to the local hospital that is responsible for the supply of medicines.

4.2.3 Storage within the HCs

Most of the HCs have limited space for storage. The HCGW and general infectious HCRW contained in liners is mostly removed from the reusable containers by the cleaner and carried by hand to the burning pit, de Montfort brick burner or diesel incinerator where available at the HC.

The sharps safety boxes are mostly accumulated in any available space until there is transport to take them to the nearest hospital for treatment and disposal.

4.2.4 Internal transport

HCGW and HCRW liners are carried by hand from the 'reusable' containers (including cardboard boxes) inside the HC for treatment or to dispose of into the on-site pit.

It was reported that the placentas are also carried by hand by the nursing staff directly after the birth, to be burnt or disposed of.

4.2.5 External Storage at Treatment Facility

As the quantities of the HCW is very small, it is sometimes collected and stored in the open pits, de Montfort brick burners or incinerator (depending on system used) until there are sufficient volumes to justify treatment.

4.2.6 Treatment of HCW at HCs

Except for the sharps, the HCGW, the general infectious HCRW and in some instances placentas are treated on the HC site. The treatment takes place through burning in an open pit, in a de Montfort brick burner or by using the diesel incinerator provided at one of the HCs. Diesel or spirits is used to start the burning and is added where placentas are to be burnt. Some of the old brick burners are at various stages of disrepair.

Access to the burners or pits is in most cases not a problem, although many are sited quite near to the clinic. Most clinic cleaners set the waste alight at night to avoid the smoke affecting the patients. The smoke does however impact on people (including HC staff) residing adjacent to or on the HC premises.

Burning frequencies are anything from daily to once a week.

4.2.7 Disposal of residues at HCs

Residues could vary from the HCRW ash from the incinerator at the one HC, to the HCGW and HCRW ash generated in the de Montfort burners or during open pit burning. Where incineration or de Montford burning is done, the ash is normally removed and disposed of on a pile or a nearby ash pit. Where burning is done in a pit, the ash simple remains within the pit.

Untreated placentas are sometimes disposed of at a pit latrine situated on the HC premises.

4.2.8 Cleanliness of reusable containers at HCs

Very few of the HCs regularly wash and decontaminate their reusable HCW containers. Cardboard boxes used as 'reusable' containers cannot be decontaminated and are eventually burned. Sharps containers, including plastic sharps containers, should not be reused, but should be treated and disposed of.

4.2.9 Wearing of Protective Clothing at HCs

The HCs also benefited by the recent donation of PPE by the MCA-L. It was reported by the HC staff that PPE that is available is 'used all the time'. PPE is issued as needed. Disposable gloves and masks are mostly used. The HCs PPE consisted mainly of disposable aprons, surgical masks and dust masks

Most of the hospitals reported that the PPE marked with an X in the table below is readily available and is used.

4.3 Procurement of equipment for HCWM

All the hospitals displayed large stocks of yellow liners, hazardous waste cardboard boxes and sharps safety boxes that have been donated by the World Bank. Some recorded the provision of black liners as well. However the quantity of black liners donated was considerably less than the yellow liners.

The apparent lack of a regular supply of the appropriately coloured liners for the different categories of waste results in yellow, red and black liners being used for the collection of HCGW and sometimes even for the collection of garden waste. The fact that all liners were donated creates a culture of wasting, with large liners not effectively used when placed in small reusable containers, or liners being removed for disposal on regular collection rounds, before being filled.

Some disposable and even reusable plastic sharps containers were observed in HCFs. It was however reported that the disposable sharps containers are in some instances emptied for reuse as sharps containers, or alternatively as buckets for various alternative applications.

The hazardous waste cardboard boxes are provided in two sizes: 50-litre and 140-litre. They are stored flat, thus saving space, and are easy to assemble. It was, however, found in Queen II during the mass recording exercise that it was necessary to tape up the base of the box to prevent the bottom from falling out. A number of instances were recorded where hazardous waste cardboard boxes supplied were not used at all, resulting in them being stockpiled for extended periods of time in various parts of the HCFs.

The yellow liners provided by World Bank were found to have a wall thickness of 100 microns. The dimensions of the yellow liner are as for the 'standard' 85-litre capacity liner, viz. 75cm wide x 95cm high. This is large enough to fit the 50-litre hazardous waste cardboard boxes, but it is too small to fit the larger 140-litre hazardous waste cardboard boxes supplied.

Additional black and red liners are purchased by the hospital procurement department when required. The HCs are however not in control of their own budgets and are dependent on their nearest hospital for the supply of all equipment.

Although the yellow liner thickness is suitable for containing HCRW, some of the staff at the hospitals complained that it is difficult to close by tying.

4.4 HCRWM in Laboratories

4.4.1 Policy and Strategic Plan 2008/2009 – 2010/2013

The Laboratory Services of the MoH, together with their partners CDC (Centre for Disease Control); APHL (Association of Public Health Laboratories); ASCP (American Society for Clinical Pathology) and PHI (Partners in Health) have developed a Policy and Strategic Plan. (October 2008) The Strategic Plan covers the time span of 2008/2009 to 2010/2013.

The policy framework is extensive and deals with the following aspects: Organisational; Human Resources; Equipment; Reagents and Supplies; Infrastructure/Utilities; Financial and other resources; Test selection and referral Linkage; Quality Assurance; Public Health Laboratory Services; National Blood Transfusion; Research and Development; Bio-Safety; Ethics; Collaboration. It is due for a revision in 2011.

The strategic plan outlines the Lesotho laboratory Services' approach needed to attain their goals with the emphasis on the integration of Laboratory Services' needs with those of the GOL and all its divisions.^{xxix} This strategic plan will commit the Laboratory Services to standards of service equivalent to international standards.

Six Strategic objectives have been identified. The most relevant to HCWM are:

- that the Laboratory services are well managed and coordinated;
- the Quality Assurance System will be strengthened; and
- to design, construct and maintain laboratories according to national standards.

As part of their organizational objectives, some new posts are being created such as the Public Health Laboratory Manager and Procurement and Supply chain Manager. There is an active Quality Assurance Department. Invitations are presently in the process for the appointment of a Safety Officer.

The Tiered laboratory Services Structure consists of:

- Reference Laboratory: National Referral Laboratory (with a Public Health Laboratory)
- Regional Laboratories: Leribe, Central and Mophale's Hoek
- District Laboratories: Buthe Buthe; Mokhotlong; Berea; Thaba Tseka; Mafeteng; Quthing; Quacha's Nek.

Only Leribe and Mophale's Hoek have Medical Scientist with a Senior Laboratory Assistants.

An extensive refurbishment of Laboratories planned to start during 2010. The new private hospital has a big new laboratory planned there and the MoH is planning to establish the new National Referral Laboratory next to Baylor. A new National Blood Bank is also planned.

4.4.2 HCWM in the Laboratory Services

The Field Visits to the laboratories found the following:

- The 3-bin system is used in most of the laboratories. This system also presented the same challenges with regard to the use of the different coloured liners.
- The liquid waste from the diagnostic machines was treated with hypochlorite solution only in some of the laboratories.
- The hazardous liquid waste is reported to be poured down the drain and in some laboratories there was an inlet to the sewer on the floor of the laboratory
- The highly hazardous infectious waste from the microbial analysis is not pre-treated through sterilization or autoclaving before being taken to the on-site incinerator and is contained also in red, yellow or black liners without any identification. It has been reported that the laboratory at Queen II does have an autoclave for the TB slides. This was not verified.
- Red, yellow or black liners are used for the containment of blood vials. Sharps and sometimes the diagnostic plates are placed into a sharps container.
- Access into the Laboratories was controlled with the necessary hazardous signs displayed on the doors

- The conditions within the laboratories varied. Some had good ventilation and were spacious. Others were very small and cramped without air-conditioning or the air-conditioning was out of order.

The challenges for the laboratory services identified by the Acting Director during an interview included:

- The laboratories are congested
- A Safety System has not been fully established yet
- Each lab was previously responsible for the servicing of their equipment and no records of servicing were kept. It was only last year that they started to budget centrally for this and all equipment is now under a service contract dated 1 Sept 2009 – 31 Aug 2014. This contract will be reviewed annually.
- One person from each lab has been trained on laboratory Safety and they are required to monitor the lab. They use the National Medical Laboratory Handbook.
- They emphasize the importance of safety when doing the HIV tests. No vaccinations are done for Hep B on their staff. None of the hospitals staff receive this vaccination.
- There is a gap in the development of SoP's for the separation, treatment and disposal of HCW from the Laboratories.
- There are no facilities within the laboratories to pre-treat the highly hazardous wastes.

A four-Day training for Laboratory Technicians was conducted from 16-19 March 2010 with the American Partners. Module 5 was devoted to HCW and Safety and was conducted by Mme Tsaletseng Siimane on HCWM.^{xxx}

4.4.3 Laboratory Accreditation Checklist

The World Health organization, Regional office Africa has developed a Laboratory Accreditation Checklist for Clinical and Public Health laboratories that the Lesotho Laboratory Services has adopted.

There are several sections in this checklist that refers to HCWM in the laboratories. Of particular note is section 12.9; disposal of infectious and non-infectious waste and the standard given requires that "both infectious waste and sharps containers should be autoclaved before being discarded to decontaminate potentially infectious material."^{xxxi}

Section 5.0 Private Sector Participation

Private Health Practitioners

All doctors and dentists in government and private practice are registered with the Lesotho Medical, Dental and Pharmacy Council as well as the Lesotho Medical Association. The Lesotho Medical Association identified the need for HCRW training amongst HC Professionals and updates on the latest technologies available for use in the medical field.

In order to practice in Lesotho nurses must be registered with the Lesotho Nursing Council. This body has recently initiated a drive to ensure that all nurses running private clinics are registered to practice. They also join the Lesotho Nurses Association.

Private HCWM Service Providers

Two private waste collectors collect waste from private practitioners and some clinics and hospitals, transporting it to the Queen Mamohato hospital incinerator which operates at full capacity. These activities are not regulated as there are no specific tools in place to regulate this industry.

There are no privately owned commercially operated treatment or disposal facilities for HCW in Lesotho. Private sector generators currently use the government or CHAL facilities. In some cases it seems that the waste might be taken into neighbouring South Africa for disposal.

Public Private Partnership

The new referral hospital is being developed as a Public Private Investment Partnership (PPIP) between GOL and a private developer/hospital group consortium.

This PPIP is a 'Design, Build, Operate, and Deliver' (DBOD) Model where the private partners design, co-finance, build, and operate health facilities. In this case it is a tertiary hospital, one gateway clinic and three filter clinics. Unlike other PPPs, PPIPs go beyond private investment in buildings and maintenance. The private partners are also responsible for delivering all clinical and non-clinical services at the facilities, from surgery to immunization to ambulances. The healthcare facility is owned by the government during all phases of the contract. PPIPs are carefully designed to achieve public healthcare policy goals without the government giving up control or ownership to the private sector. The PPIP is a long-term commitment by both the government and the private consortium to provide health services for a defined population. Both partners invest significant resources into the project, ensuring long-term dedication and a common interest in successful outcomes.^{xxxii}

Section 6.0 Summary of HCWM Plan for Lesotho (November 2010)

The over-riding purpose of the HCWM Strategic and Implementation Plans is 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.

6.1 Preferred Scenarios and Recommendations informing the HCWM Strategic Plan 2010

An outline of the preferred scenarios for the technological elements of an improved HCWM system and the recommendations for capacity building and awareness required to support the new improved HCWM system is discussed in this section of the HCWM Implementation Plan.

6.1.1 The preferred feasible scenarios for the technological elements

The two identified preferred feasible scenarios for technological improvement as discussed and agreed at the Stakeholder Workshops are:

- Centralised Incineration facility with a supporting transport system to transfer all HCRW; or
- Three Regional Incineration Facilities with a supporting regional transport system to transfer all HCRW.

It was also agreed that non-burn technology (central or regional) can also be considered in the selection of the preferred technology in the longer term.

6.1.2 Recommendations for the technological elements

The quantities of HCRW generated throughout Lesotho are very small in comparison to other countries and it has been established through a cost analysis that it would not be economically viable to have many higher technology plants, i.e. it would be preferable to consolidate treatment facilities to achieve economies of scale.

It is therefore recommended that central incineration with twin units (to allow for back-up treatment capacity during shut-down for maintenance or repair of one unit) provides the best practicable environmental option for the medium to long term. The technology is readily available and proven. The capital and recurrent costs for establishing and operating a central unit are relatively high and it will be necessary to have the expertise and resources to operate the unit efficiently and effectively. Incineration technology has the added advantage that it is versatile and capable of treating practically all types of HCRW. However, it should be noted that the small quantities of flue gas cleaning residues (fly-ash) would require disposal at a

well-engineered landfill equipped with a liner and a leachate collection, treatment and monitoring system. Alternatively, such residues could be exported to SA for safe disposal.

The technology for the second preferred feasible scenario comprising three regional incinerators is the same as for the central scenario. Facilities having a single incinerator equipped with flue gas cleaning would be established in each of three regions (North, Central and South), thus providing a similar best practicable environmental option for the medium to long term. The capital and recurrent costs would be higher than for the Central Scenario, but these would be off-set to some extent by shorter travel distances and therefore lower transportation costs. This scenario is recommended if it is decided to keep treatment at a regional level.

A non-burn technology option (steam sterilisation) will provide a good alternative for the treatment of HCRW that will not pollute the environment. However, this technology is not as versatile as incineration because there is a need for an additional small incineration facility specifically for pathological and chemical waste. This option is recommended if cleaner technology is preferred and it is decided to avoid the large scale use of incinerators. Steam sterilisation is less costly than incineration on a mass-for-mass basis (not including the additional cost of a small incineration unit for pathological and chemical waste). Residues from steam sterilisation have a greater volume and far greater mass than those from incineration plants, presenting potential problems given the inadequate disposal facilities in Lesotho at present.

The principal features for the segregation, collection and transport of HCRW for each of these scenarios are to be explored further through a pilot test, thus providing the opportunity to develop a suitable solution for Lesotho that is practical and that will minimise adverse impacts on the environment.

Central Incineration (Twin Units)

Principal features for segregation and collection are:

- HCRW from Health Centres (HCs) collected on a periodic basis (probably monthly) by suitably-equipped Light Delivery Vehicles (LDVs), and taken to district hospitals. Existing ash-disposal pits at HCs will be closed and rehabilitated;⁸
- HCRW from GoL and CHAL hospitals (including HCRW from all HCs), in suitable rigid, re-usable containers⁹ (such as 140-litre or 240-litre wheelie-bins, or 100-litre 'tote' boxes) will be collected on a periodic basis (probably weekly or fortnightly; twice-weekly for Queen II

⁸ A small number of very inaccessible HCs will probably not be serviced in this way, and will require new/refurbished de Montfort burners and placenta pits for on-site treatment/disposal of infectious waste and placentas respectively. Allowance has been made for this in the detailed costings.

⁹ A 'pool' of containers / wheelie-bins will be required, to allow for exchange of empty units for full ones. The size of this 'pool' will depend on the collection-frequency and other factors.

or successor) by suitably-equipped trucks¹⁰, and taken to central facility located in or near Maseru for incineration. Ash-disposal pits at hospitals will be closed / rehabilitated;

- Small gas or electric chest-freezers can be provided at most HCs for storage of pathological waste prior to collection. At those HCs which are inaccessible by road and/or do not have electricity, new or refurbished de Montfort burners could, as an interim measure, be used for infectious waste, and new placenta-pits can be provided for pathological waste;
- Appropriately-sized central storage can be provided at all hospitals. Such storage will be in existing or new permanent buildings; infectious waste will be stored in a cold room, and pathological waste in chest-freezers;
- As an alternative to the LDVs, it may be feasible to collect HC waste using vehicles also used for other purposes, for e.g. delivery of supplies / personnel to HCs, provided that the HCRW is well contained and separated from the supplies. The possibility of using 'Riders for Health' to perform this function has also been mooted, although this would require the development of suitable bags / containers;
- The trucks used for transport of HCRW to the central facility will have insulated bodies, and can be equipped with hydraulic tail-lifts for loading and unloading HCRW containers. Trucks will be equipped with devices for securing HCRW containers / wheelie-bins during transport, and with spill-kits.

Principal features for treatment and disposal are:

- Treatment at a new facility in or near Maseru will be by incineration in double-chamber incinerators equipped with flue-gas cleaning / filtering systems;
- 'Twin' incinerators, situated within the same premises, will be installed rather than one (larger) unit, to provide continuity of operation in the event of planned maintenance and/or breakdown;
- A washing-bay with high-pressure washing units will be installed at the central facility; this will be used to clean / disinfect the re-usable containers / wheelie-bins, prior to these being returned to the hospitals.

Lime (2.5% m/m) will be blended with bottom-ash¹¹, which will then be disposed at the (proposed) Maseru landfill. Very small quantities of filter residue¹² may be transported to a hazardous disposal site abroad for safe disposal. Alternatively the filter residue can be encapsulated and disposed of at the (proposed) Maseru landfill site.

¹⁰ Single rear-axle trucks having a GVM of approximately 10,500kg would be suitable. This vehicle could carry 30 x 240-litre wheelie-bins.

¹¹ Mass of bottom-ash is anticipated to be 10-15% of the original waste mass.

¹² Mass of filter residue is anticipated to be ~5% of the original waste mass.

Regional Incineration of all HCRW

Principal features for segregation and collection are:

- Provision for storage of HCRW at, and collection of HCRW from, HCs and hospitals, will be very similar to that envisaged for the central incineration scenario;
- In the regional scenario, HCRW will be collected from hospitals and taken to one of three incineration facilities, probably located in or near Leribe (north), Maseru (central) and Mohale's Hoek (south).

Principal features for treatment and disposal are:

- Treatment at regional facilities will be by incineration in double-chamber incinerators equipped with flue-gas cleaning / filtering systems;
- Lime (2.5% m/m) will be blended with bottom-ash¹³, which will then be transported for disposal at the (proposed) Maseru landfill; Very small quantities of filter residue¹⁴ may be transported to a hazardous disposal site abroad for safe disposal. Alternatively the filter residue can be encapsulated and disposed of in a hazardous waste cell at the (proposed) Maseru landfill site.

Single incinerators will be installed at each of the three locations; in the event of extended breakdowns, HCRW will be transported to one of the other locations for treatment.

6.1.3 The preferred institutional arrangements for effective HCWM

People are the implementers of HCWM activities: technical systems will not function effectively without the support of staff who are competent and motivated to use the equipment and physical infrastructure correctly. They must be supported by institutional arrangements that provide a conducive environment to their implementing good practice sustainably.

The public health sector in Lesotho is in the process of being decentralised. Functions at district and community level, originally falling under the MoH, are being devolved to District Councils. The organogram in Annexure 3 reflects the current organisational structure of the public health sector, particularly the MoH and its linkages to the current transitional district and HCF structures. In the process of shifting functions from central to district level it is important that the HCWM functions are not compromised but effectively carried into the new roles and responsibilities.

The strategic direction for achieving the effective improvement of HCWM points to the following being in place:

¹³ Mass of bottom-ash is anticipated to be 10-15% of the original waste mass.

¹⁴ Mass of filter residue is anticipated to be ~5% of the original waste mass.

Leadership and Coordination at National Level

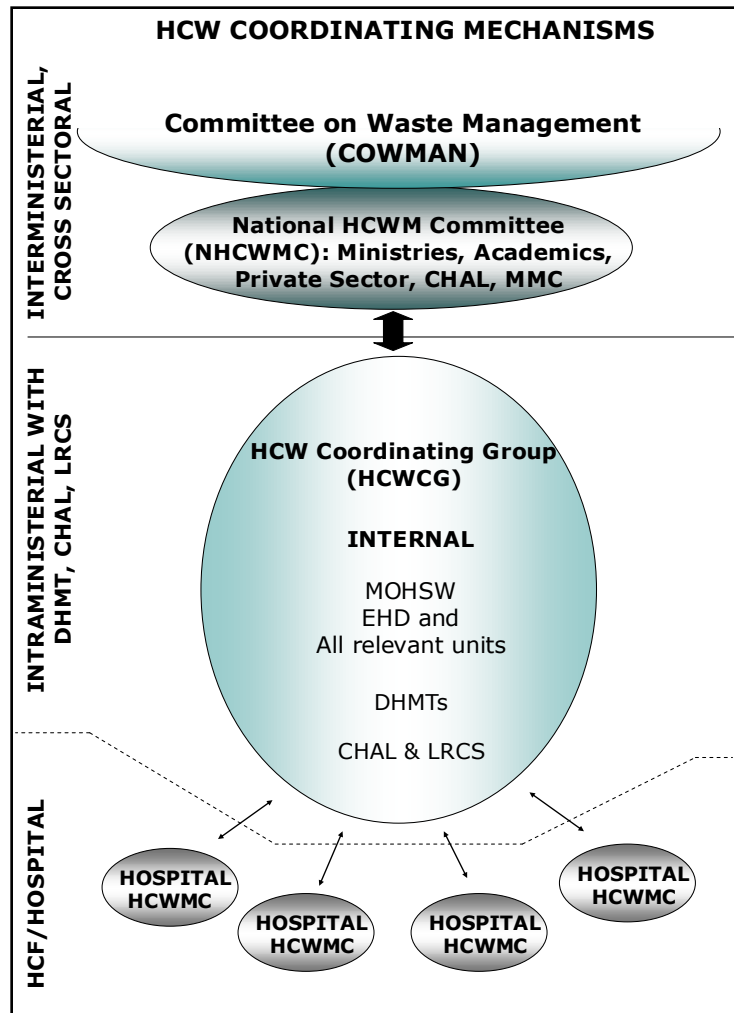
Waste management functions within the Ministry and related bodies must be prioritised in terms of adequate resourcing and leadership support from the highest echelons. Strategic organisational changes and new mechanisms are needed to improve communication, planning and coordination of HCWM initiatives, particularly in the transition towards decentralisation.

The HCWM strategic plan provides for an internal coordinating mechanism, the HCW Coordinating Group, for HCWM initiatives within the ministry and DHMTs, as well as for the strengthening of cross-sectoral collaboration through the existing NHCWM Committee. The HCW Coordinating Group is also a means of reviving and encouraging the Hospital HCWM Committees at facility level, perhaps as combined Infection Control/Health and Safety Committees. The interrelationships amongst these ad hoc committees is illustrated in Figure 6.1 below.

The generation, handling and disposal of HCW takes place at health facility level with the direct involvement of the clinical and administrative staff. The compliance monitoring and enforcement are handled by a separate division, the EHD within the MoH structures. It is important to keep the operational and enforcement functions separate and to make sure that all role players understand and appreciate the distinction.

Outside of the ministry structures, the MTEC DoE environmental inspectorate is the main authority responsible for administering the compliance requirements relating to environmental and waste laws.

Figure 6.1: Diagram of ad hoc coordinating mechanisms for HCWM at different levels in the Health Sector of Lesotho



Review of posts and job descriptions related to HCWM

The status of HCWM staff at all levels must be elevated and the importance of sound HCWM practice recognised. Job descriptions and grades of key designated posts must be reviewed and sufficiently institutionalised. This is particularly important for the key position of the HCW Focal Person, as this post is not yet formalised and is pivotal to all waste management initiatives in the Ministry.

Communication and organisational culture around HCWM

Communication around HCWM initiatives and activities must be promoted both internally, within the MoH (CHAL and LRCS included) and DHMT structures, and externally across other Ministries and sectors.

The awareness of the serious impacts of poorly managed HCW must be raised within those dealing directly with HCRW but also in some cases the general public who are most likely to come into contact with it. Awareness-raising programmes must be designed and implemented on a regular basis to communicate this effectively. Important recipient groups here are the Village Health Workers and Traditional Birth Attendants who attend to Home-based Care at community level as well as the patients who visit HCFs. A variety of communication media should be considered for maximum impact.

It is vital that the people, both in the public and private sector, who are to take improved HCWM systems forward and maintain them, are equipped with the required capacity, skills, knowledge and attitudes to do so. They must be competent to use and maintain the equipment and infrastructure, implement the management systems as part of their daily routine, and be confident in their knowledge of and positive attitude towards applying the policies, regulations, guidelines and procedures that make up the overall HCWM system.

The tools and enabling mechanisms for HCWM must be institutionalised by linking them into existing routines and making them user friendly and accessible. Policies, guidelines and procedures must be incorporated into the document filing / management systems at the different levels, easily accessed by staff who know where to find them.

Strengthening HCWM capacity at district and local facility level structures

The capacity of DHMTs must be developed to meet the requirements of the decentralised system and to give the necessary support and guidance to HCF level staff. It is part of the HCWM Plan to support change and to improve HCWM through training and awareness raising initiatives, coupled with a team building approach and committed supervision, monitoring and evaluation.

Added Benefits of HCWM Plan

Even though HCWM is the focus of the HCWM Plan, because of its cross-cutting nature, the mobilisation of role players around HCWM initiatives will have many more positive spin offs than just the improvement of HCWM: there will be concomitant benefits of enhanced internal communication, inter-sectoral collaboration between different units at ministerial, district and community levels and fewer areas of potential conflict. Occupational health standards will be more easily achieved; general waste management will be improved; and a culture of good housekeeping and cost saving through less wastage will be engendered.

6.2 Phased Implementation

This section describes the phased in approach as initially outlined in Situational Analysis Report, Part II Recommendations¹⁵ for the implementation of an improved HCWM System. The time frames have been adjusted and agreed as follows:

Phase 1: 2010 – 2011 (Short Term)

Phase 2: 2012 – 2014 (Medium Term)

Phase 3: 2015 – 2019 (Long Term)

Phase 4: 2020 onwards

6.2.1 Outline of the phases for implementation

Phase 1: Establishing Status Quo, conducting a Situational Analysis, developing the HCW Management Policy and Strategic Plan, and introducing low-cost or no-cost immediate improvements by strengthening existing standards and operating procedures, sustained capacity building, awareness raising and optimisation of existing resources and capacity. This phase has a duration of two years and incorporates aspects of the HCM-TA Project funded by the MCC that began in 2009.

Phase 2: Testing improved HCW Management options for containerisation, collection and transporting through a Pilot Project requiring modest investment provided through the HCWM-TA Project funded by the MCA-L. This should provide further quick gains and inform the future roll-out of a countrywide improved HCW Management System.

The institutional framework with allocation of responsibilities for HCWM will be established and will begin to function. Aligned with this, a capacity building and awareness programme will be instituted supported by the development of regulations, standards and guidelines and the introduction of a monitoring and evaluation system.

After the testing phase of an improved HCWM system (in the first quarter of 2013, at the completion of the HCWM-TA Project) the roll-out of the lessons learned and the identified preferred HCWM system throughout the country will begin (2013 – 2014). The more detailed programme for this roll-out will be informed by the results of the Pilot Project and will be incorporated into the exit strategy which will provide clear steps to follow as the roleplayers take the process forward independently. Also during this phase a feasibility study for the recommended treatment technologies is recommended and a final decision will have to be taken on the treatment technology to be used for HCRW for Lesotho.

Phase 3: Continuation of the roll-out of the identified preferred HCW management system will take place and it is during this phase that the preferred HCWM treatment technologies and

¹⁵ Situational Analysis Report Final v07.1, April 2010; Government of the Kingdom of Lesotho Millennium Challenge Account- Lesotho, Health Care Waste Management Technical Assistance

procedures will be consolidated and implemented, e.g. central or regional, or a combined solution for the selected level(s) of operation, preferred type of treatment technology/technologies; location of treatment facilities; allocation of roles and responsibilities; regulatory systems and enforcement mechanisms etc. It is envisaged that this phase will run over an estimated period of 5 years to the end of the envisaged planning period for the HCWM Plan (2015 – 2019).

Phase 4: 2020 and beyond the planning period of the HCWM Plan, it is envisaged that implementation of the preferred HCW management system which is financially viable, environmentally sustainable and institutionally well-functioning and which does not endanger the health of staff and patients at, or residents in the vicinity of, health care facilities will continue throughout the country.

6.3 The HCWM-Technical Assistance Project and the Implementation Plan

The Health Sector Project is one of the components of the Compact entered into between the United States of America (USA) and Lesotho through the Millennium Challenge Corporation (MCC) and the Millennium Challenge Account – Lesotho (MCA-L) is the implementing agent. The MCA-L has entered into a contract with the consulting company COWI A/S for the Health Care Waste Management Technical Assistance (HCWM-TA) Project¹⁶ with well-defined terms of reference spanning the period from October 2009 to March 2013).

6.3.1 The relationship between the HCWM-TA Project and the Implementation Plan

The HCWM Strategic and Implementation Plans span a period of 15+ years, and the duration of the HCWM-TA Project is just over 3 years. It is to be noted that Phases 1 and 2 covering the period 2010 – 2014 include the scope of work of the HCWM-TA project funded by the MCA-L. The Activity Plans 1-12 outlined in Section 6 highlight the Initiators and the Responsible partners in separate columns. Activities carried out under the HCWM-TA project have indicated the MCA-L as the Initiator. The funds and resources for these activities are provided for by the MCA-L funding and include the provision of equipment, containers and a transport system for the Pilot Test in two selected districts, as well as the production of awareness-raising and training materials.

Between the years 2013 and 2014 (post the MCA-L project in Phase 2) the results of the Pilot Test will be replicated into the rest of the districts. It will also be during this period that a feasibility study on the types of treatment technology will need to take place and, pending the results of this feasibility study, a final decision will be made on the treatment technology and the location of treatment facilities that will take the implementation plan into Phase 3 (2015-2019). The funding for these activities has yet to be sourced.

The Activity Plans detailed in the matrix provided in the next section presently cover the short and the medium terms (Phases 1 and 2). Component 1 of this project will ensure that the

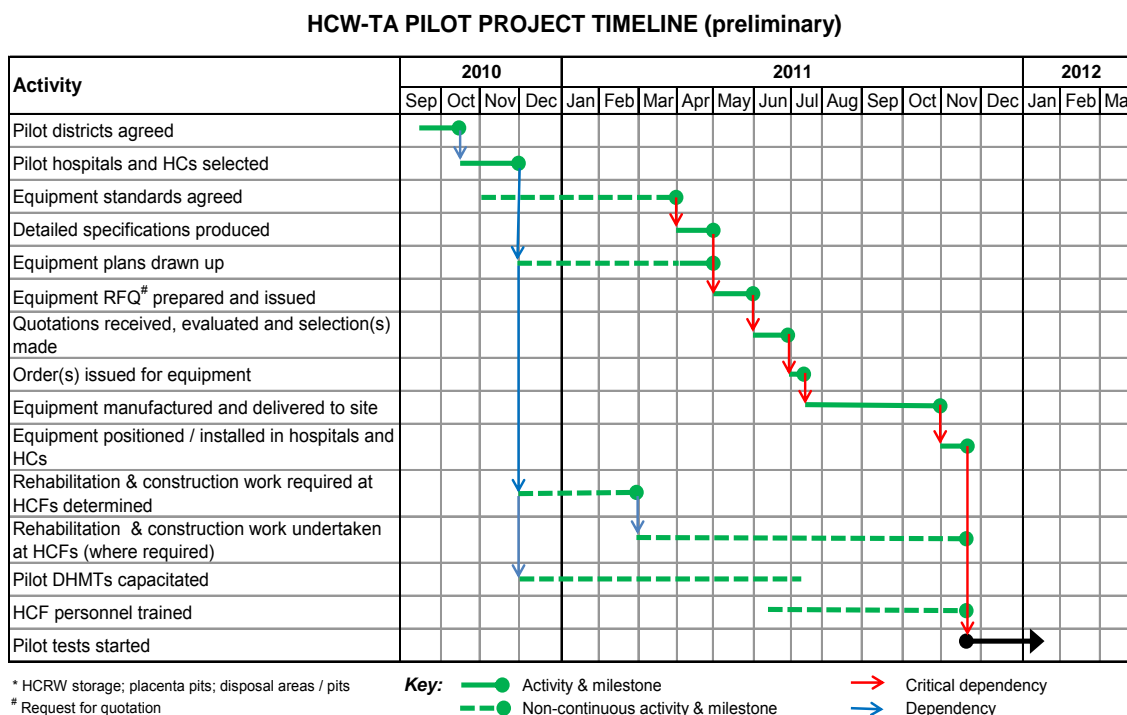
¹⁶ Contract for Consulting Services HS-G-011-09 for Health Care Waste Management Technical Assistance.

regulations, standards, guidelines, licensing and a monitoring and evaluation system are elaborated. Running concurrently with these outputs, capacity building, training and awareness activities will be carried out. A communication and education work plan will ensure that training and promotional material will be developed in an integrated way as part of Components 2 and 3. The focus of the project during 2012 will be on the pilot test. Other activities falling outside of the terms of reference of the HCWM-TA project are summarised in the figure below under the headings 'National' and 'District'. It is these activities that will require some additional resources and funding to ensure that they can be successfully implemented.

6.3.2 The Pilot Test

To ensure completeness and in order to carry out effective planning and co-ordination of the other initiatives running concurrently as part of the Health Sector Project, a preliminary conceptual plan for the Pilot Test has been developed. The critical path in the preparations for the pilot test is summarised in the Figure 6.2 below. The critical timing will be around the ordering (and possible manufacturing) of the equipment to be tested, and if the Pilot Test is to start in November 2011, the Request for Quotes (RFQs) must be prepared by the end of May 2011 so that equipment can be ordered in June 2011. The information that will inform the RFQs relies on the Standards being agreed, and on the completion of the Regulations. A decision is also required by the end of November 2010 on the districts where the Pilot Test will be run so that preparations can begin on the selection of Hospitals and HCs, in order to determine the quantities of the various types of equipment that will be needed. Another aspect to be considered is the impact that the Infrastructure Project (and other projects and initiatives already running in the districts) can have on the timeframes indicated below. Figure 6.2 below outlines the preliminary timeframes envisaged for the Pilot Test.

Figure 6.2: HCWM-TA Pilot Project preliminary timeframes



6.4 Financial Considerations and alternatives for funding

6.4.1 Estimated existing recurrent costs associated with HCWM

The Situational Analysis assessed the existing recurrent costs associated with HCWM. The findings were as follows:

Table 6.1: Estimate of existing recurrent costs associated with HCWM (2010)

Estimated annual cost of consumable items (plastic liners/bags, cardboard box waste containers, safety boxes [sharps], 'specican' containers, PPE for waste-handlers)	M 3,760,000
Estimated annual waste-related labour costs (imputed)	M 470,000
Estimated sundry costs (disposal of HCGW, actual and imputed HCRW collection costs for HCs, etc.)	M 680,000
Estimated annual cost of fuel, power and maintenance for 17 incinerators	M 990,000
Total estimated annual cost	M 5,900,000

All the above categories of recurrent costs will continue to be incurred under each of the preferred scenarios. However, when the existing incinerators are 'retired' from use (proposed to be at the end of 2019 / beginning of 2020) the associated fuel, power and maintenance costs (amounting to approximately M 1 million per annum – see table above) will fall away, being replaced by the costs associated with the new treatment facilities (see below).

6.4.2 Financial implications of new preferred scenarios

Capital and recurrent costs associated with the preferred scenarios are set out below.¹⁷ These costs, expressed in 2010 Maloti and have been determined on the assumption that the MoH will procure and operate all HCRW-related infrastructures in-house.

In both scenarios, capital and recurrent expenditure will come into effect from 2010, but only at modest levels (refer to Supporting Document for details). In 2012, in each scenario, there will be approximately M 5 million capital expenditure on infrastructure, equipment and vehicles, and from this year there will also be a jump in recurrent expenditure by approximately M 0.5 million per annum.

In each scenario, the major capital expenditure will occur in 2019 with the construction and commissioning of the new treatment plant(s). For comparative purposes, capital costs for each scenario have been discounted to 2010 at 6% per annum. The associated net present values

¹⁷ For further details on how the costs were calculated, refer to the HCWM Strategic Plan Support Document.

(NPVs) and also the recurrent costs from 2020 onwards (i.e. once the new treatment facilities and associated transport infrastructure come into operation) are shown in the table below.

Table 6.2: Comparison of the capital and recurrent costs of the two preferred scenarios

Scenario	NPV of capital costs up to 2025	Recurrent costs from 2020 onwards
Centralised incineration	M 21.9 million	M 4.76 million
Incineration at 3 regional facilities	M 27.3 million	M 6.12 million

6.4.3 Alternatives for funding/operating the HCRW collection and treatment facilities

Alternatives for funding the capital costs of the proposed new collection and treatment services, and for operation of these services, are considered in the next section. The alternatives include (i) funding and operation by the MoH (with or without the support of development partners), (ii) 'outsourcing' of all or part of the HCRW collection and treatment service, (iii) forming a public-private partnership for provision of some or all of the HCRW management services, and (iv) a combination of some or all of the above.

6.4.4 Decision regarding the approach to be adopted for funding / operating the HCRW service

Full implementation of the HCWM plan will only be completed when new, environmentally-sound treatment and disposal facilities are brought into service. Our view is that this should be in or about 2019, in order to:

- i. make best use of the probable 'useful life' of the existing new and refurbished incinerators in place at 17 public hospitals, and
- ii. allow sufficient time for thorough investigation of alternatives and for putting in place the necessary corporate / legal entity before environmental impact assessments are undertaken and any necessary regulatory approvals are obtained.

In view of this, it is recommended that a decision regarding the corporate structure, the identification of suitable partner(s) etc. be taken in 2011, with finalisation of arrangements taking place in or around 2012.

Notwithstanding the above, all work required for implementation of the HCWM plan other than that relating to treatment and disposal can go ahead, as it is envisaged that such work will be undertaken and funded internally by the Ministry.

6.4.5 Alternatives for Funding/operating the HCRW Collection and Treatment Services

This section gives some guidance for the possible alternatives for funding the capital costs of the proposed new collection and treatment services, and for operation of these services. (In respect of recurrent costs, it is assumed that these costs will be provided for in, the MoH's overall operating budgets.)

It should be borne in mind that the alternatives outlined below are not mutually exclusive, and it may, for example, be possible to combine elements from the various alternatives in order to arrive at a very satisfactory solution that takes account of initiatives already underway or planned in Lesotho.

Funding and Operation by MoH

In this alternative, funding of all capital costs would be undertaken by the Ministry, with or without the assistance of development partners.

Of relevance in this regard is the fact that the overall capital requirements are modest (in comparison with other projects already underway, for example the upgrading of public HCs across Lesotho), and the fact that the envisaged timeframe is long (15 years), with much of the funding only being required from year 9 onwards.

As regards operation of the HCRW collection and treatment service, it is probably not possible to make a strong case for this to be undertaken in-house by the Ministry, in view of the Ministry's stated intention to focus on 'core' healthcare activities, and the Government's objective to develop and strengthen the private sector in Lesotho.

"Outsourcing" all or part of the HCRW collection and treatment service

In the present context, and to distinguish from alternatives involving public-private partnerships (see next section), outsourcing is here taken to mean the engagement of an external party (typically a private individual, company or other legal entity) to provide specified services on an agreed basis, against payment of agreed fees/charges, during a set period / term. The external party (or 'service-provider') would be required to provide all necessary equipment, plant and personnel required, and would recoup his investment costs, operating costs and profit over the duration of the contract period, through fees received against delivery of the services.

Service-providers would typically be appointed via an open tender process, in which due consideration would be given to a number of factors including price(s) offered, track-record, previous experience, local content, capacity (management, personnel, financial), etc.

The principal advantages of outsourcing include the fact that the Ministry would be relieved of the organisational, operational and investment (capital) burdens associated with providing the service, and would enjoy 'cost-certainty' for the services (i.e. would only pay for services actually received, and only at the agreed rate).

Disadvantages of outsourcing include the fact that over the long run the services may cost the Ministry more than would have been the case had they been rendered in-house. Problems can arise if the Ministry is not able to supervise / control the service-provider adequately, leading to over-supply and /or over-invoicing, or is not able to process the service-provider's (legitimate) invoices timeously, leading to the withholding of services, etc.

In the present context, a number of opportunities for outsourcing can be considered, including:

- outsourcing of the collection of HCRW from public health centres (and transportation of this waste to the nearest hospital);
- outsourcing of all collection and transport of HCRW from public HCFs (which would also need to include the return of re-usable containers);
- as above, but including the cleaning / disinfecting of the re-usable containers;
- any of the above could also include the distribution of disposable HCRW containers (plastic liners, safety boxes, etc.) to HCFs, from a central MoH store;
- as above, but including the actual supply of disposable containers from the service-provider's own store;
- outsourcing the operation of the incineration facility / facilities themselves (i.e. facilities would be owned by the Ministry, and operated on the Ministry's behalf by the service-provider);
- outsourcing the full HCRW collection / transport / disposal service.

All the collection / transport options above lend themselves to outsourcing. However, it needs to be borne in mind that service-providers will need to purchase LDVs and/or trucks, for which bank funding will almost certainly be required. In view of this and as banks will generally require the security afforded by reasonably long contracts, a five-year term will probably be required.

In view of the capital required to construct the incineration facility / facilities themselves, and the low quantities of HCRW generated, it is unlikely that a local service-providers can be secured to undertake provision of the 'full' HCRW service, except on terms which are likely to be disadvantageous to the Ministry, e.g. long contract period and/or high prices and/or stipulation of minimum quantities.

Having said this, the possibility of utilising a local service-provider for collection / transport, in partnership with a South African service-provider for treatment / disposal, is worthy of consideration. Provided agreement can be reached regarding the trans-boundary movement of the waste, treatment at a facility in (say) Bloemfontein may be cost-effective.

As regards 'operation only' of the incineration facility / facilities, although attractive in principle, this is likely to be an extremely difficult option for the Ministry to manage, for a number of reasons including:

- difficulty in establishing whether damage to or failure of equipment / plant is as a result of 'fair wear and tear' or is due to misuse / abuse;
- the need to monitor the treatment process closely and continuously, in order to counter any attempt by the service-provider to 'save' on operating costs (at the expense of safety, emissions, etc.), skimp on maintenance, etc.

Forming a Public-Private Partnership (PPP) for provision of all or part of the HCRW collection and treatment service

The opportunities for PPPs include:

- provision and operation of treatment facilities
- provision and operation of the full HCRW collection / transport / disposal service

Some of the advantages of forming a PPP are that:

- the Ministry will secure a long-term arrangement with a party that has expertise in HCRW management
- the Ministry will be relieved of organisational, operational, and investment (capital) burdens, and will enjoy cost-certainty for provision of the services
- the private sector can be involved, either as partners or as service-providers to the PPP

It may be desirable to have a 'hybrid' structure; one possibility would be to set up a PPP to undertake treatment and disposal of HCRW only. This PPP could in turn engage a service provider(s) to undertake collection of the waste from HCFs.

From discussions held recently between the Consultants and representatives of Tšepong / Netcare it is understood that:

- an incinerator will be installed at the new referral hospital (in Maseru) during 2011;
- this incinerator will have a flue-gas cleaning system (specifications are awaited);
- this incinerator will have 'spare capacity', i.e. it's capacity is in excess of requirements for the referral hospital plus the associated filter-clinics (actual capacity still to be advised); and
- such spare capacity may be made available to the Ministry and/or the private sector, on a cost-recovery basis.

Should it be confirmed that adequate additional capacity is available at this incinerator, it could then potentially serve as one of the three proposed 'regional' facilities in the regional scenario (see Section

A new PPP (or PPP's) could be formed to provide and operate facilities in the northern and southern regions.

Alternatively, the existing Tšepong / MoH PPP could possibly be expanded to allow for the provision of additional incineration capacity at the new Queen 'Mamohato Memorial Hospital, allowing it to serve as the (sole) central HCRW treatment facility (see Section 2.2.1).

A further alternative may be to set up a new PPP specifically to undertake provision and operation of the HCRW treatment facility / facilities. This new PPP would then take over the Tšepong incinerator on an agreed basis. The private partner for this venture would ideally be one with experience in the field who has substantial incineration operations in South Africa.

A local partner that would undertake the collection and transport of HCRW could be included within the PPP; alternatively, this aspect of the service could be outsourced by the PPP, or by the Ministry.

6.4.6 Assumptions

Although the HCWM-TA project has ensured that there is sufficient capacity and funding available to carry out most of Phases 1 and 2, certain assumptions have been made in the development of the HCWM Plan.

The successful implementation of the HCWM Plan will depend on the following assumptions being met:

- That the MoH will provide the necessary capacity and leadership to implement the strategy
- That there will be effective inter-ministerial cooperation.
- The post of the HCW Focal Person, pivotal to the coordination of the roll out of the activity plans, will be formalised at the same grade as Health Inspector, requiring a qualification in a range of relevant disciplines with two years' experience in waste management.
- That funding mechanisms will be available for the establishment of more efficient and less polluting central / regional treatment facilities
- That the decision will be taken by the involved Ministries to close the poorer performing on-site treatment and disposal facilities in all but the most inaccessible and remote areas.
- That there will be a landfill site capable of safely disposing of the residues from the treatment facilities.
- That there will be funding available for intensive HCWM training and awareness-raising programmes to accompany initial implementation, but that these will become entrenched in curricula, health care accreditation systems, training plans and awareness programmes.

6.5 The Activity Plans

This section contains the detailed activities that will translate the Strategic Actions of the HCWM Strategic Plan into a detailed implementation plan. There are twelve Activity Plans (one for each Strategic Action) with an Initiator and Responsible Partners given. The cradle-to-grave process of HCWM extends beyond the boundaries of the MoH and the individual HCFs; inter-ministerial involvement in the execution of these activities is therefore essential for the implementation of this strategy.

The Activity Plans span the years 2010 – 2014 (Phases 1 and 2). Each year has been divided into quarters and time frames for each activity have been allocated with each block representing 3 months. Key Performance Indicators are given to assist with the monitoring of the Implementation Plan.

The 12 Activity Plans are detailed in the matrices that follow. Below is a list of the twelve Activity Plans:

1. Activity Plan 1 Prevention of Pollution of Natural Resources
2. Activity Plan 2 Waste Minimisation and Recycling
3. Activity Plan 3 HCWM Planning
4. Activity Plan 4 Improved infrastructure and equipment for handling
5. Activity Plan 5 Appropriate Treatment Technologies
6. Activity Plan 6 Disposal Technologies
7. Activity Plan 7 Institutional Arrangements within MoH and DHMTs
8. Activity Plan 8 Collaboration and Partnerships
9. Activity Plan 9 Capacity Building and Training
10. Activity Plan 10 Financial Management
11. Activity Plan 11 Develop Enabling Mechanisms
12. Activity Plan 12 Information System, Monitoring and Evaluation

6.5.1 The Activity Plan Matrices – Short and Medium Term Implementation Plan

Activity Plan No. 1: Prevention of Pollution of Natural Resources		Issues Addressed:	To minimise at source the impact of toxic and dangerous substances that pollute the natural environment through the introduction of systems and procedures to avoid or reduce at source the generation of HCW.																				
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	SHORT TERM PLAN (0 - 2 years) Prevention of Pollution of Natural Resources																						
1.1	Adopt policies and procedures to minimise the impact of HCW on the natural environment																						
1.1.1	Assess at national level systems and technologies where hazardous materials can be avoided at source		NUL																				
1.1.2	Develop procurement practices																						
1.1.2.1	Research procurement procedures that will reduce the quantities of hazardous and non-hazardous waste generated (green procurement)	MoHSW EHD	MoHSW Procurement Dept																				
1.1.2.2	Prioritise and agree on the practical and available green procurement items and assess the reduced impact on the environment																						
1.1.2.3	Draw up procurement procedures for the agreed green procurement items and implement																						
1.1.3	Include green procurement procedures into guidelines developed in 11.1.4		MCA-L																				
1	MEDIUM TERM PLAN (3 - 5 years) Prevention of Pollution of Natural Resources																						
1.1																							
1.1.2.4	Implement the green procurement procedures into the purchasing procedures.		MoHSW Purchasing Dept.																				
Key Performance Indicator	Green procurement procedures incorporated into the standard operating practices for the purchase of identified supplies There is a reduction in the quantities of HCW generated																						

Activity Plan No. 2: Waste Minimisation and Recycling		Issues Addressed:	Provision is made for the introduction of mechanisms to reduce, reuse and / or recycle HCGW to minimise the amount of waste that will require treatment and final disposal.																								
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
2	SHORT TERM PLAN (0-2 years) Waste Minimisation and Recycling																										
2.1	Reduce amount of HCGW that requires disposal through reuse, recycling of recoverable materials	MoHSW EHD	DHTMTs, HCFs																								
2.1.1	Measure HCGW Streams																										
2.1.1.1	Determine the composition of the HCGW Streams and where possible estimate the quantities																										
2.1.1.2	Determine and agree on the possible and practical reuse and recycling opportunities that exist to minimise the quantity of waste being disposed																										
2.1.2	Include the Reuse or Recycling opportunities into the NHWM Plans developed in 3.1		MCA-L																								
2	MEDIUM TERM PLAN (3 - 5 years) Waste Minimisation and Recycling																										
2.1	Reduce amount of HCGW that requires disposal through reuse, recycling of recoverable materials	MoHSW EHD	DHTMTs, HCFs																								
2.1.3	Introduce the viable systems for reusing and recycling identified items of HCGW into all HCFs																										
Key Performance Indicator	Minimisation measures determined for HCG Waste Streams Effective re-use and recycling measures incorporated into the annual HCWM Plans and implemented at the HCFs																										

Activity Plan No. 3: HCWM Planning		Issues Addressed:	Relevant data obtained from audits, inspections and the integrated HMIS are regularly analysed and incorporated into a proactive approach to HCWM planning for infrastructure, equipment and sound financial management																									
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014								
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4					
3	SHORT TERM PLAN (0-2 years) - HCWM Planning																											
3.1	Draw up annual integrated HCWM Plans	MCA-L	MoHSW EHD																									
3.1.1	Draw up a NCHWM Plan that distinguishes systems suitable for hospitals and all categories of HCs and disseminate to all HCFs		MoHSW EHD	DHTMTs, HCFs																								
3.1.2	Revise the HCWM Plan	MoHSW EHD																										
3.1.2.1	Obtain data from audits, inspections and the newly established HMIS and collate and analyse (See Activity Plan 12)																											
3	MEDIUM TERM PLAN (3 - 5 years) HCWM Planning																											
3.1	Draw up annual integrated HCWM Plans	MoHSW EHD																										
3.1.3	Revise the HCWM Plan Annually																											
3.1.3.1	Obtain data from audits, inspections and the HMIS and on a regular basis and collate and analyse (See Activity Plan 12)																											
3.1.3.2	Using the information obtained above, review the NHCWM Plan annually																											
Key Performance Indicator	A National HCWM Plan is available and communicated to all HCFs The National HCWM Plan is revised on an annual basis using information obtained from the audits and inspections																											

Activity Plan No. 4: Improved Infrastructure and Equipment for handling		Issues Addressed:	Improved infrastructure and equipment will be provided for the segregation, containerisation, storage and transport of all categories of HCW thus protecting all people against the hazards to their health and safety throughout the cradle to grave process																				
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
4	SHORT TERM PLAN (0-2 years) Improved Infrastructure and Equipment for handling																						
4.1	Improve segregation at source, standardise containerisation and establish a safe and efficient transport system																						
4.1.1	Identify suitable equipment for proper separation, transportation and treatment of HCW		MCA-L/HPIU / DHMTs / HCF																				
4.1.1.1	Agree on the type of equipment required for improved segregation and transport HCW (containers, brackets, stands, liners etc.)																						
4.1.1.2	Set standards and specifications for all equipment used for the separation & transport of HCW (containers, brackets, stands, liners																						
4.1.1.3	Provide suitable equipment at all hospitals for internal transport of HCRW (e.g. wheelie-bins 240 lit. where required)																						
4.1.1.4	Procure suitable containers for ash storage / removal at all hospital incinerators (steel bins (85 lit) where required)																						
4.1.2	Assess storage requirements for improving the storage areas for HCRW at HCF level and include in infrastructure project		MCA-L/HPIU / DHMTs / HCF																				
4.1.2.1	Identify and demarcate secure internal storage areas for HCRW (all hospitals excl. Lepereng & Mohlomi)																						
4.1.2.2	Where necessary and possible plan for storage areas/other infrastructure required for HCWM as part of the infrastructure project																						
4.1.3	Conduct a pilot test in identified districts on an improved HCWM system and monitor and evaluate system to establish preferred options for improvement			MoHSW EHD																			
4.1.3.1	Agree on and select districts to be the pilot for an improved HCWM separation, collection and transfer system.																						
4.1.3.2	Allocate and agree on responsibilities to run the pilot test																						
4.1.3.3	Draw up a detailed pilot project plan that includes an equipment plan, a training plan and an implementation plan																						
4.1.3.4	Purchase the required equipment for the pilot test																						
4.1.3.5	Start and run the pilot test in the selected districts for one year.																						
4.1.3.6	Set up a monitoring system to evaluate the improved system for the segregation and collection of HCW within the pilot HCFs																						
4.1.4	Investigate and test an external transfer and collection system within the identified pilot project districts		MCA-L/HPIU / DHMTs / HCFs in selected Pilot Site areas																				
4.1.4.1	Investigate the options for the external transfer and system for the pilot districts (e.g. MoHSW / SP Contract / PPP)																						
4.1.4.2	Order and provide the necessary vehicles for transporting the HCW in the pilot districts																						
4.1.4.3	Determine transportation routes and routines for the pilot districts and implement																						
4.1.4.5	Set up a monitoring system to evaluate the external collection and transfer system of HCW from HCFs																						

Activity Plan No. 6: Disposal Technologies		Issues Addressed:	The unacceptable practice of open burning of HCW and the uncontrolled ash disposal on-site is phased out through the development and application of best practicable environmental options for the safe and environmentally friendly disposal of HCRW.																								
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
6	SHORT TERM PLAN (0-2 years) Disposal Technologies																										
6.1	Develop and adopt environmentally sound disposal technologies to dispose of HCW																										
6.1.1	Assess the present disposal areas of all HCFs and identify suitable alternative methods. Apply recommendations	MCA-L / MoHSW EHD	MoTEC DOE / MNR DWA / MMS / MoLGC																								
6.1.1.1	Conduct an assessment of all disposal areas of hospitals and HCFs and give recommendations for improvements. (e.g. fencing, rehabilitation, new pits, diversion channels for stormwater, etc.)																										
6.1.1.2	Set standards for on-site disposal of HCRW (Placenta pits, disposal of HCGW etc)																										
6.1.2	Identify inaccessible and remote areas that may have to continue to dispose of residues of treatment, HCRW and/or HGW on-	MoHSW EHD	MoTEC DOE / MNR DWA / MMS / MoLGC																								
6.1.2.1	Identify and apply the BPEO for the short-term disposal of HCW at peri-urban and urban HCs not included in the pilot test																										
6.1.2.2	Identify remote rural and accessible rural areas for continuing on-site disposal																										
6.1.3	Apply and test alternative methods for the disposal of residues and/or HCW in pilot areas	MoHSW	MoHSW EHD /MCA-L/ MoTEC DOE / MoLGC / DHMTs and HCFs of Pilot areas																								
6.1.3.1	Identify the BPEO for the disposal of HCW and residues from the treatment of HCRW at all HCFs included in the pilot test																										
6.1.3.2	Apply and test alternative methods for the disposal of residues and HCW in remote rural and accessible rural HCs																										
6.1.3.4	Set up a monitoring system to evaluate the improved system for the disposal of HCW and residues of treatment for the pilot areas.																										
6	MEDIUM TERM PLAN (3 - 5 years) - Disposal Technologies																										
6.1	Develop and adopt environmentally sound disposal technologies to dispose of HCW																										
6.1.3	Apply and test alternative methods for the disposal of residues and/or HCW in pilot areas	MoHSW	MoHSW EHD / MCA-L/MoTEC DOE / MoLGC / DHMTs and HCFs of Pilot areas																								
6.1.3.2	Continue to test of alternative methods for the disposal of residues and HCW in remote rural and accessible rural HCs																										
6.1.3.4	Carry out monitoring and and evaluate the improved system for the disposal of HCW and residues of treatment for the pilot areas for identification of the BPEO in the rest of the districts																										
6.1.4	Roll out the preferred methods for on- and off-site disposal of HCW into other districts			MoHSW EHD																							
6.1.4.1	Develop a plan for the roll out of the preferred methods for on- and off-site disposal of HCW into the other districts																										
6.1.4.2	Apply the preferred methods for on-site of HCW for all HCs and hospitals																										
Key Performance Indicator	Alternative methods for on- and off-site disposal investigated and tested On-site disposal at all HCFs improved																										

Activity Plan No. 7: Institutional Arrangements within MoHSW and DHMTs		Issues Addressed:	To establish an internal coordination mechanism that functions effectively across all entities relevant to HCWM within the MoHSW, DHMTs and HCFs to clarify HCWM roles and responsibilities for all HCWM management functions and to interact coherently with e																								
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
7	SHORT TERM PLAN (0-2 years) Institutional arrangements within MoHSW and DHMTs																										
7.1	Establish coordination mechanism that functions effectively across the entities with the MoHSW to clarify HCWM roles and responsibilities, to review, advise, integrate initiatives																										
7.1.1	Establish an intra-ministerial working group for the cohesive planning and management of HCWM at central, district and HCF levels -Convene inaugural meeting, agree TORs -Capacity development on aspects relating to review activities -Mentoring and capac																										
7.1.2	Strengthen leadership, knowledge and skills of EH personnel in HCWM -Mentoring and capacity development of counterparts, esp EHD																										
7.1.3	Critical roles and responsibilities in HCWM in MoHSW are reviewed and revised - HCWM roles and responsibilities clarified and documented - Job descriptions of EHDs and DHMTs reflect clear roles - Review certain key HCWM job descriptions and grading, in p	DGHS, MoHSW EHD / MCA-L	MoHSW Relevant Depts																								
7.1.4	Train and involve key personnel at district level in HCWM initiatives - Prepare role player-roles matrix and identify training needs - Training of trainers for Nurse Tutors, Health Inspectors/Senior Health Assts, Public Health Nurses - Course feedback and																										
7	MEDIUM TERM PLAN (3 - 5 years) - Institutional Arrangements within MoHSW and DHMTs																										
7.1	HCW Coordinating Group continues to function effectively across the entities in the MoHSW as review and advisory body, integrating HCW initiatives																										
7.1.1	Support intra-ministerial working group for the cohesive planning and management of HCWM at central, district and HCF levels - Ongoing meetings take place - Feed HCWM information to Committee regularly																										
7.1.2	Strengthen leadership, knowledge and skills of EH personnel in HCWM - Status of HCW-related jobs is formalised and raised - Level of authority support matches mandate for HCWM Focal Person	DGHS, MoHSW EHD / MCA-L	MoHSW Relevant Depts																								
7.1.4	Train and involve key personnel at district level in HCWM initiatives - Ongoing training included in MoHSW Training Master Plan - Ongoing personal development plans are followed up - DHMTs strengthened on ongoing basis																										
Key Performance Indicator	HCWCG Meetings held on regular basis HCWM role of EHD and HCW Focal Person strengthened and institutionalised Formal training on HCWM and TOT institutionalised and implemented at MoHSW and DHMT levels																										

Activity Plan No. 8: Collaboration and Partnerships		Issues Addressed:	To establish and strengthen communication and coordination mechanisms that function effectively across other line ministries, district and community councils, community structures, and any other external bodies both public and private sector, to promote a																								
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
8	SHORT TERM PLAN (0-2 years) Collaboration and Partnerships																										
8.1	Strengthen functions and coordination role of NHCWM Committee.	MTEC-DoE	MoHSW - EHD and other members of NHCWMC																								
8.1.1	Strengthen functions and coordination role of NHCWM Committee - Ensure meet regularly according to agreed ToRs - Encourage & follow up participation in NHCWM Committee																										
8.2	Promote the development and appointment of competent private HCWM service contractors	MoHSW - EHD / MCA-L	MoHSW DPS, PPP																								
8.2.1	Plan and support the development of business opportunities in HCW Management which could include PPPs for HCRW treatment or transport systems that will be fully compliant with HCRW regulations by the year 2020. - Meet and discuss needs - Develop required																										
8.2.2	Build knowledge of Private Sector about best practice in HCWM through the development of information materials		MoHSW H Ed																								
8	MEDIUM TERM PLAN (3 - 5 years) - Collaboration and Partnerships																										
8.1	Strengthen communication and coordination mechanism to continue functioning effectively across other line ministries and other stakeholders to promote awareness and capacity building	MTEC-DoE	MoHSW - EHD and other members of NHCWMC																								
8.1.1	Continue to strengthen functions and coordination role of NHCWM Committee -Ongoing MoHSW support and participation in the NHCWM Committee																										
8.2	Promote the development and appointment of competent private HCWM service contractors	MoHSW - EHD	MoHSW PPP unit, Private Sector, MTEC-DoE																								
8.2.2	Finalise information pack and continue to build knowledge of Private Sector about best practice in HCWM - Develop register of approved, legally compliant, private sector service providers																										
Key Performance Indicator	Meetings of NHCWMC continue to take place and continuing functioning of committee Increase in Private Sector capacity and service provision																										

Activity Plan No. 9: Capacity Building and Training		Issues Addressed:	To build sound knowledge, skills, attitudes and awareness around HCWM within the health care structures in MoHSW, DHMTs and the general public that come into contact with HCRW and to institutionalise HCWM systems and implementation tools																				
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
9	SHORT TERM PLAN (0-2 years) Capacity Building and Training																						
9.1	Build sound knowledge, skills attitudes and awareness around HCWM																						
9.1.1	Incorporate HCWM policies and procedures into curricula, continuing education programmes, induction programmes and MoHSW annual training master plans. - Identify key curricula and training plans	MoHSW-EHD / MCA-L	MoHSW H Ed, MoHSW HR, LNC, Med Council, Ed Institutions																				
9.1.2	Design and institutionalise a HCWM course for all key HCWM stakeholders - Identify target groups, learning needs and training methodologies - Incorporate into master plan, CE training, induction		MoHSW EHD /NHTC /MCA-L /LNC, Med Council / Comm&Ed Working Group																				
9.1.3	Health Inspectors/Senior Health Assistants and Public Health Nurses at district level capacitated to provide on-the-job training to all HCWM stakeholders at HCF level - Develop on-the-job coaching materials - Develop awareness materials - Coach HCF staff		MoHSW EHD / NHTC / Comm&Ed Working Group																				
9.1.4	Develop materials to strengthen involvement of all categories of staff at HCFs to raise awareness of the dangers of HCW and to understand the negative impacts of HCW on humans and the natural environment - to be tested in HCWM pilot project - Revive and s		MoHSW EHD / NHTC / MCA-L																				
9.1.5	Develop materials to strengthen involvement of communities/general public in HCWM (particularly through CHW/VHWS) to raise awareness at community level of the dangers of HCW and to understand the negative impacts of HCW on humans and the natural		MoHSW EHD / DHMTs / MCA-L																				
9	MEDIUM TERM PLAN (3 - 5 years) - Capacity Building and Training																						
9.1	Continue to build sound knowledge, skills attitudes and awareness around HCWM																						
9.1.1	Implement HCWM policies and procedures through continuing education programmes, induction programmes and MoHSW annual training master plans. - Ensure HCWM part of pre-service training	MoHSW-EHD	MoHSW H Ed, MoHSW HR, LNC, Med Council, Ed Institutions /Education Institutions																				
9.1.2	Institutionalise a HCWM course for all key HCWM stakeholders - Ensure HCWM training included in Annual Training Master Plan and sufficient budget allocated		MoHSW H Ed/MoHSW H Ed /MCA-L /Comm&Ed Working Group																				
9.1.3	Health Inspectors, Senior Health Assistants and Public Health Nurses at district level provide ongoing on-the-job training to all HCWM stakeholders at HCF level		MoHSW H Ed / NHTC / MCA-L/ Comm&Ed Working Group																				
9.1.4	Ongoing - strengthening involvement of all categories of staff at HCFs to raise awareness of the dangers of HCW and to understand the negative impacts of HCW on humans and the natural environment. Test awareness materials, then finalise for bulk productio		MoHSW H Ed / NHTC / MCA-L																				
9.1.5	Implement ongoing awareness raising to strengthen involvement of communities/general public in HCWM to raise awareness at community level of the dangers of HCW and to understand the negative impacts of HCW on humans and the natural environment		MoHSW H Ed /DHMTs/CHW/VHWS/ MCA-L																				
Key Performance Indicator	HCWM Training incorporated into MoHSW Master Training Plan Training courses implemented by trained trainers who cascade training to HCF staff to manage HCWM correctly HCW/Infection Control/Health and Safety committees at HCF level meet regularly to impro																						

Activity Plan No. 10: Financial Management		Issues Addressed:	Sufficient, sustainable and well managed financial resources will be made available for the implementation and management of an effective HCWM System																								
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
10	SHORT TERM PLAN (0-2 years) Financial Management																										
10.1	Review the estimated costs for implementation of the NHCWM Plan and approve mechanisms for operating and funding																										
10.1.1	Review the estimated costs associated with implementation of the HCWM plan (incorporating the preferred HCWM scenario) for completeness and adequacy		MoHSW HP&S																								
10.1.2	Recommend appropriate methodology for operating and funding the implementation of the HCWM plan																										
10.1.2.1	Recommend appropriate methodology for operating and funding the implementation of the HCWM plan. This will include undertaking a risk-analysis, and may require the identification of suitable partners for a PPP		MoHSW HP&S / Fin. Cont. / PPP Unit																								
10.1.2.2	Identify capital and recurrent costs that must be provided for in MoHSW budget for 2012/13 & MTEF																										
10.1.3	Approve the envisaged contractual arrangements, and the capital / recurrent funding requirements, of the HCWM plan		MoHSW DGHS / Treasury																								
10.2	Adopt a system that records and analyses all waste related information and recurrent costs at HCFs to facilitate financial management budgeting																										
10.2.1	Develop recording system for usage of consumable HCWM items and HCWM-related services																										
10.2.1.1	Develop recording system for usage of consumable HCWM items and HCWM-related services		MoHSW EHD / HCWCG																								
10.2.1.2	Introduce recording system at all HCFs; train HCF personnel in its use		MoHSW EHD / HCWCG / DHMTs																								
10.2.2	Collect and analyse HCWM-related quantities and costs at all hospitals on a half-yearly basis; disseminate to hospitals for guidance purposes.		MoHSW EHD / HCWCG / HP&S / CHAL																								
10.2.3	Agree on and introduce HCWM line-items in financial reporting system	DGHS MoHSW	MoHSW Fin. Cont. / CHAL																								
10.3	Harmonise the budgeting process for HCWM across all public HCFs and ensure cost implications for the NHCWMP are identified and quantified at each HCF for budgeting and management purposes																										
10.3.1	Develop budgeting framework for HCWM costs (capital and recurrent) to be used by public HCFs. Framework to be accompanied by a 'guidance' document, highlighting actual and potential implications of the HCWM plan. (In particular, the framework must be expl		MoHSW EHD / Fin. Cont. / HP&S / HCWCG / CHAL																								
10.3.1.1	Develop budgeting framework for HCWM costs (capital and recurrent) to be used by public HCFs. Framework to be accompanied by a 'guidance' document, highlighting actual and potential implications of the HCWM plan. (In particular, the framework must be expl																										
10.3.1.2	Train HCF Accountants in application of budget framework for HCWM costs		MoHSW Fin. Cont.																								
10.3.2	Develop and present budgets for HCWM costs (capital and recurrent) in accordance with agreed framework, taking into account all activities and requirements associated with implementation of the HCWM plan.		MoHSW EHD / HCF Management / HCWCG																								
10.3.3	Review and if necessary adjust HCWM budgets for individual HCFs.		MoHSW Fin. Cont. / HP&S / HCWCG																								
10.4	Investigate the desirability and viability of cost-recovery made on HCWM services from individual public and/or private																										
10.4.1	Investigate the possibility of cost-recovery through user fees etc. This includes application of the Polluter Pays and the Cost Recovery		MoHSW EHD / DHMTs / HP&S / Fin. Cont. / HCWCG																								

Activity Plan No. 11: Develop Enabling Mechanisms		Issues Addressed:	HCW will be closely managed through the application of regulations, standards guidelines and other management systems and tools to effectively address the application of environmental, safety and infection control requirements in the cradle to grave proce																				
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
11	SHORT TERM PLAN (0-2 years) Develop Enabling Mechanisms																						
11.1	Develop framework for HCWM regulations and environmental standards to be enacted and supported by guidelines and																						
11.1.1	Establish a regulatory framework for HCWM that is guided by standards for the proper management of HCW	MCA-L / MoTEC CLO	MoHSW EHD & CLO / MoTEC DOE / MoLGC / MNR DWA / Legal Reform																				
11.1.1.1	Set up a working group to work with the environmental lawyer on the development and writing of regulations for HCWM																						
11.1.2	Elaborate pre-requisites and procedures for licensing of HCRW collectors and treatment facilities																						
11.1.2.1	Set up a working group to determine the licensing requirements for inclusion into the regulations for HCWM																						
11.1.3	Standards and specifications for critical equipment	MCA-L / MoHSW EHD	MoTEC DOE / DHMTs / HCFs																				
11.1.3.1	Identify relevant standards and specifications for equipment to segregation, contain, store and transport HCW and include in																						
11.1.3.2	Identify relevant standards for the treatment and disposal of HCW and include in regulations																						
11.1.3.3	Prepare HCWM standards document																						
11.1.4	Guidelines and other support tools to implements a HCWM System	MCA-L / MoHSW EHD	MoHSW EHD / DHMTs / HCFs of selected pilot sites																				
11.1.4.1	Draw up guidelines and other support material required to implement an improved HCWM System																						
11.1.5	Disseminate the standards and guidelines	MCA-L / MoHSW EHD	MoHSW EHD / DHMTs / HCFs of selected pilot sites																				
11.1.5.1	Disseminate the standards and guidelines and other material required to implement an improved system to be trials in the pilot sites																						
11	MEDIUM TERM PLAN (3 - 5 years) - Develop Enabling Mechanisms																						
11.1	Develop framework for HCWM regulations and environmental standards to be enacted and supportedf by guidelines and																						
11.1.1	Establish a regulatory framework for HCWM that is guided by standards for the proper management of HCW	DGHS MoTEC & CLO	MoHSW EHD / MoTEC DOE																				
11.1.1.2	Promulgate the regulations and enforce																						
11.1.2	Elaborate pre-requisites and procedures for licensing of HCRW collectors and treatment facilities																						
11.1.2.2	Apply the pre-requisites for licensing for collectors and treatment facilities	MoHSW EHD	DHMTs / HCFs																				
11.1.5	Disseminate the standards and guidelines																						
11.1.5.2	Continue the trial of the standards and guidelines in the pilot sites																						
11.1.5.3	Disseminate the standards and guidelines to all other districts																						
Key Performance Indicator	Regulations promulgated, applied and enforced Licensing of collectors and treatment facilities applied Standards and guidelines for HCWM agreed and applied																						

Activity Plan No. 12: Information System, Monitoring and Evaluation		Issues Addressed:	Indicators for the recording of HCW statistics will be incorporated into the HMI System and compliance with HCWM regulations, standards, guidelines and other environmental management systems will be consistently monitored and enforced through a comprehens																								
Strategic Obj No.	Activities	Initiator	Responsible Partners	2010				2011				2012				2013				2014							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
12	SHORT TERM PLAN (0 - 2 years) - Information System, Monitoring and Evaluation																										
12.1	Set up an effective data gathering and recording system at each HCF that integrates with the broader HIMS																										
12.1.1	Set up a data gathering and recording system for identified indicators related to HCWM and align with HMIS system for each facility	MCA-L (HCWM-TA AND HMIS)/ MoHSW EHD	Health Planning & Statistics Dept (HPSD) / DHMTs / QA Unit																								
12.1.1.1	Identify indicators and include into the HMIS System																										
12.1.2	Plan for the inclusion of indicators into HMIS for testing in pilot																										
12.1.2.1	Identify the pilot test areas in liaison with HMIS Contractors																										
12.1.2.2	In collaboration with HMIS Contractors, plan the pilot test for the collection of HCWM data and set up in the test sites																										
12.1.4	Capacitate DHMTs and QA unit in conducting HCWM inspections																										
12.1.4.1	In collaboration with HMIS Project, train the DHMTs and QA to conduct inspections on the recording of data and apply in the pilot test																										
12.2	Adopt monitoring and evaluation systems to ensure compliance of all HCFs with HCWM regulations, standards, guidelines, environmental management systems and quality assurance requirements																										
12.2.1	Mandatory monitoring and auditing of HCWM and verify compliance with regulations	MCA-L / MoHSW EHD	MoTEC DOE / MMS / MoLGC																								
12.2.1.1	Introduce a mandatory system for monitoring and auditing HCWM in accordance with the regulations		MoHSW EHD & MCA-L																								
12.2.2	Self-regulatory EMS for HCFs to mitigate impacts		MoTEC DOE / MoLGC / MMS / DHMTs / MoHSW QA Unit / HPSD																								
12.2.2.1	Set up a system for self-regulation of HCFs																										
12.2.3	Establish procedures for external Audits SH&E and quality audits and report back to management																										
12.2.3.1	Include HCWM into SH&E Audits and Quality Audits																										
12.2.4	HCWM procedures for accreditation of HCF in HC Accreditation System																										
12.2.4.1	Review and elaborate HCWM procedures for accreditation of HCF in HC Accreditation System																										
12.2.5	Annual evaluation and environmental management reporting system																										
12.2.5.1	Establish an Annual evaluation and environmental management reporting system for HCWM																										
12.2.6	Institutional Memory																										
12.2.6.1	Devise procedures for the improvement of institutional memory																										

Section 7.0 Monitoring Plan

Table 7.1: Broad Level HCWM Monitoring Indicator Matrix

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Associated Process/Survey Indicators	Source of data	Method of collection	Frequency of collection	Responsibility
BROAD LEVEL INDICATORS							
1. Minimisation segregation, storage and collection.	i. % of the total number of HCFs (hospitals and HCs) in the country that has a <i>good system</i> in place for managing HCW	N: # (No.) of HCFs (disaggregated to hospitals & HCs, public & private) where good system in place D: total # HCFs in country (hospitals & HCs; public & private)	B T1 d & e B IN 1-2 B P 1-3 B E 1	Checklists	QA and HCF inspections/audits	Quarterly	MoH EHD, DHI and HCWM Committee MoH QA Unit HMIS
	ii. % of the total number of HCFs (hospitals and HCs) in the country where the correct colour-coded liners and containers for the three-bin system are in place.	N: # (No.) of HCFs (disaggregated to hospitals & HCs, public & private) where correct equipment in place D: total # HCFs in country (hospitals & HCs; public & private)	B T1 a-c,e,	Checklist & reports, audit reports HMIS data	QA and HCF inspections/audits	Quarterly	MoH EHD, DHI and HCWM Committee MoH QA Unit HMIS
	iii. % of the total number of HCFs (hospitals and HCs) in the country where the storage practices are <i>good</i>	N: # (No.) of HCFs (disaggregated to hospitals & HCs, public & private) where good storage practices are in place D: total # HCFs in country (hospitals & HCs; public & private)	B T1 b, c, f	Checklist	QA and HCF inspections/audits	Quarterly	MoH EHD, DHI and HCWM Committee MoH QA Unit HMIS
	iv. Proportion of the total number of HCFs (hospitals and HCs) in the country that dispose of anatomical waste on-site in placenta pits; on-site in an incinerator and off-f, g, site at district incinerator.	Ratio of # HCFs in the country using on-site placenta pits: # HCFs using on-site incineration: # HCFs using off-site district incinerator : comparative pie-charts over time.	B T1 f	MoH EHD consolidated report	HCF inspections/audits	Annually	MoH EHD; DHMT: DHI

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Associated Process/Survey Indicators	Source of data	Method of collection	Frequency of collection	Responsibility
	v. % of the total number of public and private healthcare laboratories in the country that have an effective system in place for managing laboratory wastes	N: # of public & private HC laboratories where an effective lab waste system in place D: total # public & private laboratories in the country	B T 1 h, l, j Survey S6	Checklist, audit reports	HCF inspections/audits	Quarterly	MoH EHD; DHMT: DHI
	vi. % of the total number of public and private pharmacies in the country that have an effective system in place for managing pharmaceutical wastes	N: # of public & private pharmacies where an effective pharm waste system in place D: total # public & private pharmacies in the country	B T 1 k, l, m Survey S7	Checklist, audit reports	HCF inspections/audits	Quarterly	MoH EHD; DHMT: DHI
2. Incinerators	i. % of the total number of HCFs (hospitals and HCs) in the country that have access to an incinerator for treatment of their HCRW	N: # of HCFs (disaggregated to hospitals & HCs, public & private) where a brick burner or incinerator is in place D: total # HCFs in country (hospitals & HCs; public & private)	B T 2 Survey S1	Checklist and audit reports	Periodic reviews	Quarterly	MoH EHD; DHMT: DHI MoH QA Unit
	ii. % of the total number of existing on-site incinerators in the country that operate an <i>effective</i> system	N: # incinerators operating efficiently and effectively in compliance with HCW regulations (Annexure 2: Schedule X) D: total # incinerators (brick burners and incinerators) in the country	B T 2 a, c	Emission test results Audit reports	Inspections/audits	Quarterly/annually	MoH EHD; DHMT: DHI
3. Disposal	i. % of the total number of all on-site disposal pits at HCFs (hospitals and HCs) in the country that are operated a <i>good system</i> that is in accordance with HCWM regulations and	N: # of on-site ash disposal pits that comply with regulations & standards D: total # of on-site ash disposal pits in the country	B T 3 a-b	Checklist, audit reports	HCF inspections/audits	Quarterly	MoH EHD; DHMT: DHI

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Associated Process/Survey Indicators	Source of data	Method of collection	Frequency of collection	Responsibility
	standards						
	ii. Proportion of the total number of HCFs (hospitals and HCs) in the country that have on-site disposal of treated HCRW, and those who transport off-site for treatment and/or disposal.	Ratio of # HCFs in the country using on-site ash pits for treated HCRW: # HCFs using off-site treatment and disposal facilities: comparative pie-charts over time.	B T3 a, b	Checklist, audit reports	HCF inspections/audits	Quarterly	MoH EHD; DHMT: DHI Responsible Clinical and Admin staff at facility level
4. Health and Safety Measures	i. % of the total number of HCF (hospitals and HCs) in the country that has a <i>good</i> health and safety measures in place for handling HCRW	N: # (No.) of HCFs (disaggregated to hospitals & HCs, public & private) where good health and safety measures are in place D: total # HCFs in country (hospitals & HCs; public & private)	B T4 a, b	Checklist, records of PPE,	QA and HCF inspections/audits	Quarterly	MoH EHD, DHI and HCWM Committee MoH QA Unit HMIS
5. Off-site collection and transport	ii. % of the total number of monitoring actually carried out to check compliance of the transporter of the external collection and transport operator to the contract specifications and HCW regulations.			Monitoring records, checklist, transport records	QA and HCF inspections/audits	Annually	MoH EHD, DHI and QA Unit HMIS
6. The HCWM Team	iii. % of the total number of HCFs (hospitals and HCs) in the country that have <i>good</i> management structures in place for the effective control of HCWM.	N: # (No.) of HCFs (disaggregated to hospitals & HCs, public & private) where good management structures are in place D: total # HCFs in country (hospitals & HCs; public & private)	B N1 a, b	Organograms, Checklist	QA and HCF inspections/audits	Annually	MoH EHD, DHI and HCWM Committee MoH QA Unit HMIS
7. Monitoring, reporting and	i. % of the total number of HCFs (hospitals and HCs) in the country that has a	N: # (No.) of HCFs (disaggregated to hospitals & HCs, public & private) where	B N2 a – e Survey S2	Reports, Checklist	QA and HCF inspections/audits	Annually	MoH EHD, DHI and HCWM Committee MoH

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Associated Process/Survey Indicators	Source of data	Method of collection	Frequency of collection	Responsibility
statistical analysis for HCWM	good monitoring and reporting system in place for HCWM.	good monitoring and reporting systems are in place D: total # HCFs in country (hospitals & HCs; public & private)					QA Unit HMIS
	ii. Number of HCW-related incidents including needlesticks reported in the past year in the country	Number of HCW-related incidents including needlesticks that have been reported in the country over the period of a year (Disaggregated per district)	B N2 f	Incident reports	Incident reporting and feedback procedure from HCF level via DHI to EHD	As required	MoH EHD HSPD DHMTs
8. Planning (including financial	i. % of the total number of districts in the country that have approved HCWM plans in place	N: # of districts where an approved HCWM plan is in place D: total # districts in country (public & private)	B T1-T4 B IN1-2 B P1-3 B E1	District HCWM Plans	Submissions from districts	Annually	MoH EHD DHMTs
	ii. % of the total number of hospitals in the country that have approved HCWM plans in place	N: # of hospitals (disaggregated public & private) where an approved HCWM plan is in place D: total # hospitals in country (public & private)	B P1 a - c	Hospital HCWM Plans	Submissions from hospitals to districts	Annually	MoH EHD DHMTs
	iii. % of total number of districts in the country that have HCWM as a separate line item in their budget	N: # of districts where HCWM is a separate line item in the district budget D: total # districts in the country	B P2 a, b P3 c	District HCWM Plans and budgets	Submissions from districts	Annually	MoH EHD HSPD DHMTs
	iv. % of total number hospitals in the country that have HCWM as a separate line item in their budget	N: # of hospitals (disaggregated public & private) where HCWM is a separate line item in the district budget D: total # hospitals in country (public & private)	B P2 a, b	Hospital HCWM Plans and budgets	Submissions from hospitals to districts	Annually	MoH EHD HSPD DHMTs
	v. % of the total number of hospitals in the country that budget <i>effectively</i> for	N: # of hospitals (disaggregated public & private) where HCWM is	B P2 b P3 c	Hospital HCWM Plans and budgets	Submissions from hospitals to districts	Annually	MoH EHD DHMTs

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Associated Process/Survey Indicators	Source of data	Method of collection	Frequency of collection	Responsibility
	HCWM	budgeted effectively D: total # hospitals in country (public & private)					
9. Education, training and awareness	i. % of the total number of districts where adequate training has been conducted and up to date records of training in HCWM are available	N: # of districts where adequate training is conducted and where up-to-date records of training in HCWM for the past year D: total # districts in the country	B E1 a – d Survey S3	District training plan and records HCF Training records Staff establishment lists	Periodic reviews	Monthly, collated annually	DHI DHMT
	ii. % of the total number of districts where at least one awareness-raising activity/programme has been conducted throughout the district in the past year	N: # of districts where at least one HCWM awareness-raising activity has been carried out throughout the district during the past year D: total # districts in the country	B E1 e	District Training plan and reports	Periodic reviews	Annually	DHI and DHMT MoH EHD HR

Table 7.2: Process Level HCWM Monitoring Indicator Matrix

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
PROCESS LEVEL INDICATORS						
Technical indicators						
T1. Minimisation, segregation, storage and collection.	a. % of the total number of <i>waste storage points</i> out of the total number <i>waste storage points</i> per HCF that have the correct colour-coded liners and containers for the three-bin system in place	N: # <i>waste storage points</i> with correct colour coded liners and containers in place in HCF D: total # <i>waste storage points</i> in that HCF	HCWM inspection checklist, audit reports	HCF inspections	Weekly	DHI and Hospital HCW Committees
	b. % of <i>waste storage points</i> out of the total number <i>waste storage points</i> per HCF where HCW is correctly separated into the three-bin system	N: # <i>waste storage points</i> where HCW is correctly separated into the three-bin system in the HCF D: total # <i>waste storage points</i> in that HCF	HCWM inspection checklist, audit reports	HCF inspections	Monthly	DHI and Hospital HCW Committees
	c. % of total number of hospitals in a district with waste storage areas	N: # of hospitals (disaggregated public & private) in a district with adequate central storage area for HCWM D: total # hospitals in district (public & private)	HCWM inspection checklist, audit reports	Inspections	Quarterly	DHI and Hospital HCW Committees
	d. % of the total number of HCFs (hospitals and HCs) in the district that has a good system in place for HCWM	N: # of HCFs (disaggregated to hospitals & HCs, public & private) in a district where a good system for HCWM is in place. D: total # HCFs in the district (hospitals & HCs; public & private)	HCWM inspection checklist, audit reports	Inspections, checklists	Quarterly	DHI and Hospital HCW Committees
	e. % of the total number of HCFs (hospitals and HCs) in a district where the correct colour-coded liners and containers for the three-bin system are in place.	N: # of HCFs (disaggregated to hospitals & HCs, public & private) in a district where correct colour-coded liners and containers for the three-bin system are in place. D: total # HCFs in the district (hospitals & HCs; public & private)	HCWM inspection checklist, audit reports	Periodic reviews	Quarterly	DHI and Hospital HCW Committees
	f. Proportion of the total number of HCFs in the district that dispose of	Ratio of # HCFs in the district using on-site placenta pits: # HCFs using on-site	HCWM inspection	HCF inspections	Weekly	DHI and Hospital HCW

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
	anatomical waste in on-site placenta pits; on-site in an incinerator or off-site at district incinerator	incineration: # HCFs using off-site district incinerator : comparative pie-charts over time.	checklist, audit reports			Committees
	g. % of the total number of HCFs (hospitals and HCs) in the district that have regular collection of HCRW for proper treatment and disposal.	N: # of HCFs (disaggregated to hospitals & HCs, public & private) in a district that has a regular collection of HCRW in place. D: total # HCFs in the district (hospitals & HCs; public & private)	HCWM inspection checklist, audit reports	HCF inspections	Monthly	DHI and Hospital HCW Committees
	h. % of the total number of public and private HC laboratories in the district that have the correct containers for storing laboratory wastes	N: # of public & private HC laboratories in the district that have the correct containers for storing laboratory wastes D: total # public & private laboratories in the district	HCWM inspection checklist, audit reports	HCF inspections	Monthly	DHI and Hospital HCW Committees
	i. % of the total number of public and private HC laboratories in the district that have regular collection of laboratory wastes	N: # of public & private HC laboratories in the district that have regular collection of laboratory wastes D: total # public & private laboratories in the district	HCWM inspection checklist, audit reports	HCF inspections	Monthly	DHI and Hospital HCW Committees
	j. % of the total number of public and private HC laboratories in the district that have the correct systems in place for dispatching laboratory wastes for proper treatment and disposal	N: # of public & private HC laboratories in the district that have the correct systems in place for dispatching laboratory wastes for proper treatment and disposal D: total # public & private laboratories in the district	HCWM inspection checklist, audit reports	Inspections	Monthly	DHI and Hospital HCW Committees
	k. % of the total number of public and private pharmacies in the district that have the correct containers for storing of pharmaceutical wastes	N: # of public & private pharmacies in the district that have the correct containers for storing of pharmaceutical wastes D: total # public & private pharmacies in the district	HCWM inspection checklist, audit reports	Inspections	Monthly	DHI and Hospital HCW Committees
	l. % of the total number of public and private pharmacies in the district that have regular collection of pharmaceutical wastes	N: # of public & private pharmacies in the district that have regular collection of pharmaceutical wastes D: total # public & private pharmacies in the district	HCWM inspection checklist, audit reports	Inspections	Monthly	DHI and Hospital HCW Committees

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
	m. % of the total number of public and private pharmacies in the district that have the correct systems in place for dispatching pharmaceutical wastes for proper treatment and disposal	N: # of public & private pharmacies in the district that have the correct systems in place for dispatching pharmaceutical wastes for proper treatment and disposal D: total # public & private pharmacies in the district	HCWM inspection checklist, audit reports	Inspections	Monthly	DHI and Hospital HCW Committees
T2. Incinerators	a. % of total number of existing on-site incinerators in a district that are operating efficiently and effectively (see Annexure 2 of this document)	N: # incinerators in district operating efficiently and effectively in compliance with HCW regulations (Schedule X) D: total # incinerators (brick burners and incinerators) in the district	HCWM inspection checklist, audit reports	Inspections	Monthly	MoH EHD DHI and Hospital HCW Committees
	b. % of total number of all HCFs (Hospitals and HCs) in a district that have access to an incinerator	N: # of HCFs (disaggregated to hospitals & HCs, public & private) in a district that have access to an incinerator D: total # HCFs in district (hospitals & HCs; public & private)	HCWM inspection checklist, audit reports	Periodic reviews	Quarterly	DHI and Hospital HCW Committees
	c. Change in the total number of incinerators in the district over a baseline number in 2012 over time (3 year period)	Number: Baseline # incinerators in use (including brick burners) in the district in 2012 MINUS the # incinerators in use in the district in the current year. Negative figure indicates desired decrease in number.	HCWM inspection checklist, audit reports	Periodic reviews	Annually	DHI and Hospital HCW Committees
T3. Disposal	a. % of total number of on-site ash disposal pits in a district that are operated in accordance with HCWM regulations and standards	N: # of on-site ash disposal pits in the district that comply with regulations & standards D: total # of on-site ash disposal pits in the district	HCWM inspection checklist, audit reports	HCF inspections	Monthly	DHI and Hospital HCW Committees
	b. Proportion out of the total number of HCFs in the district that practise on-site disposal of treated HCRW, and those that transport HCRW off-site for treatment and disposal	Ratio of # HCFs in the district that practise on-site disposal of treated HCRW : # HCFs in the district that transport HCRW off-site for treatment and disposal	HCWM inspection checklist, audit reports	Periodic reviews	Quarterly	DHI and Hospital HCW Committees
T4. Health and safety	a. % of total number of HCFs (hospitals and Health Centres) in a district where	N: # of HCFs in district (disaggregated to hospitals & HCs, public & private) where	HCWM inspection	Inspections	Monthly	DHI and Hospital HCW

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
measures in place for all staff handling HCRW	PPE appropriate for HCW handling (i.e. nitrile gloves, aprons and masks) is provided to all staff cadres	correct PPE appropriate for HCW handling (i.e. nitrile gloves, aprons and masks) is provided to all staff cadres D: total # HCFs in district (hospitals & HCs; public & private)	checklist, audit reports			Committees
	b. % of total number of HCFs (hospitals and Health Centres) in a district where a physical inspection of all emergency equipment is carried out monthly (i.e. PPE, spill kits, etc)	N: # of HCFs in district (disaggregated to hospitals & HCs, public & private) where a physical inspection of all emergency equipment is carried out monthly (i.e. PPE, spill kits, etc) D: total # HCFs in district (hospitals & HCs; public & private)	HCWM emergency equipment inspection checklist, audit reports	Inspections	Monthly	DHI and Hospital HCW Committees
T5. Off-site collection and transport	a. % of planned monitoring inspections carried out to check compliance of the (external) collection and transport operator with contract specifications and HCW regulations	N: # of actual inspections conducted on an appointed transport operator in a year D: total # planned inspections on the transport operator in a year.	Transporters licence, HCWM vehicle inspection checklist, contract conditions	Inspections	Quarterly	MoH EHD, District Administrator, DHI and Hospital HCW Committees
Institutional /organisational indicators						
IN1. HCWM Team	a. % of the total number of hospitals in a district where a functioning* HCWM Committee exists (either separately or part of Infection Control and/or Health and Safety Committee/s) [* i.e. committee meets at least quarterly]	N: # of hospitals (disaggregated public & private) in a district where a functioning HCWM Committee exists (either separately or part of Infection Control and/or Health and Safety Committee/s) D: total # hospitals in district (public & private)	Committee membership lists, Terms of Reference, minutes and reports on initiatives	Periodic reviews	Quarterly	DHI and Hospital HCW Committees
	b. % of the total number of HCFs in a district where a designated person is allocated responsibility for HCWM in the HCF	N: # of HCFs (disaggregated to hospitals & HCs, public & private) in a district where a designated person is allocated responsibility for HCWM in the HCF D: total # HCFs in district (hospitals & HCs; public & private)	HCWM inspection checklist, audit reports	Periodic reviews	Annually	DHI and Hospital HCW Committees
IN2. Monitoring,	a. % of the total number of HCFs in a	N: # of HCFs (disaggregated to hospitals	HCWM	Periodic	Annually	DHI and Hospital

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
reporting system and statistical analysis for HCWM	district where procedures are in place for the collection of HCW data	& HCs, public & private) in a district where procedures are in place for the collection of HCW data D: total # HCFs in district (hospitals & HCs; public & private)	inspection checklist, audit reports	reviews		HCW Committees
	b. % of the total number of HCFs in a district where procedures are in place for collating and reporting HCW data	N: # of HCFs (disaggregated to hospitals & HCs, public & private) in a district where procedures are in place for collating and reporting HCW data D: total # HCFs in district (hospitals & HCs; public & private)	HCWM inspection checklist, audit reports	Periodic reviews	Annually	DHI and Hospital HCW Committees
	c. % of the total number of HCFs in a district where remedial action is taken on reported adverse incidents, accidents and injuries	N: # of HCFs (disaggregated to hospitals & HCs, public & private) in a district where remedial action is taken on reported adverse incidents, accidents and injuries D: total # HCFs in district (hospitals & HCs; public & private)	HCWM inspection checklist, audit reports	Periodic reviews	Annually	DHI and Hospital HCW Committees
	d. % of total number of HCFs (hospitals and Health Centres) in a district where an internal physical HCWM inspection of the whole facility and standard of operation is carried out monthly	N: # of HCFs in district (disaggregated to hospitals & HCs, public & private) where a physical inspection of all HCWM activities and standard of operation and compliance is carried out monthly D: total # HCFs in district (hospitals & HCs; public & private)	HCWM routine inspection checklist, audit reports	Inspections	Monthly	DHI and Hospital HCW Committees
	e. % of the total number of HCFs in a district where a programme and procedures are in place for external compliance audits to be conducted regularly	N: # of HCFs (disaggregated to hospitals & HCs, public & private) in a district where a programme and procedures are in place for compliance audits to be conducted regularly D: total # HCFs in district (hospitals & HCs; public & private)	HCWM inspection checklist, audit reports	Periodic reviews	Annually/ 6-monthly	DHI and Hospital HCW Committees
	f. Number of HCW-related incidents including needlesticks reported in the past year per district	Number of HCW-related incidents including needlesticks that have been reported in a district over the period of a	Incident reporting per facility	Health & Safety Records per	Monthly, collated annually	DHI and Hospital HCW Committees

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
		year (Disaggregated per incident type including needlesticks)		facility; DHI collated records per district; Annual report		
Planning (including financial)						
P1. HCWM Plans	a. % of the total number of Hospitals in the district that have a HCWM Plan	N: # of hospitals (disaggregated public & private) in a district that have a HCWM Plan D: total # hospitals in district (public & private)	HCWM Plan	Periodic reviews	Annually	MoH EHD DHI and Hospital HCW Committees
	b. % of the total number of Hospitals in the district that review their HCWMP annually	N: # of hospitals (disaggregated public & private) in a district that review their HCWM Plan annually D: total # hospitals in district (public & private)	Reviewed HCWM Plans	Annual reviews	Annually	MoH EHD DHI and Hospital HCW Committees
	c. % of the total number of Hospitals in the district that have an approved HCWM vehicle and equipment repairs and maintenance plan	N: # of hospitals (disaggregated public & private) in a district that have a HCWM vehicle and equipment repairs and maintenance plan D: total # hospitals in district (public & private)	HCWM Vehicle and Equipment Repairs and Maintenance Plan	Periodic reviews	Annually	District Administration DHI and Hospital HCW Committees Estate Management Maintenance Team
P2. HCWM Budgeting	a. % of the total number of hospitals in a district where budget is allocated as a separate line item for HCWM consumable items (containers, liners and diesel); repairs and maintenance, and training in HCWM	N: # of hospitals (disaggregated public & private) in a district where budget is allocated as a separate line item for HCWM consumable items (containers, liners and diesel); repairs and maintenance, and training in HCWM D: total # hospitals in district (public & private)	HCWM inspection checklist, audit reports	Periodic reviews	Annually	DHI and Hospital HCW Committees
	b. % of the total number of hospital in a district where the budget is <i>effectively managed</i> for HCWM	N: # of hospitals (disaggregated public & private) in a district where budget is <i>effectively managed</i> for HCWM.	HCWM inspection checklist, audit	Periodic reviews	Annually	District Administration DHI

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
		D: total # hospitals in district (public & private)	reports			
P3. HCWM Procurement of containers and equipment	a. % of the total number of hospitals in a district where procurement of containers and equipment for HCWM is effectively managed.	N: # of hospitals (disaggregated public & private) in a district where the effective management for the procurement of containers and equipment for HCWM is in place. D: total # hospitals in district (public & private)	HCWM inspection checklist, audit reports	Periodic reviews	Annually	District Administration and procurement
	b. % of the total number of hospitals in a district where procurement of diesel is effectively managed.	N: # of hospitals (disaggregated public & private) in a district where procurement of diesel is managed effectively. D: total # hospitals in district (public & private)	HCWM inspection checklist, audit reports	Periodic reviews	Annually	District Administration and procurement
Education and awareness						
E1. Education/training and awareness is implemented in all districts	a. % of the total number of staff per cadre in an HCF that have received training (in-service; CE, refresher) on HCWM over the past year	N: # of staff disaggregated by cadre in a HCF that have received training (in-service; CE, refresher) on HCWM over the past year D: total # staff (disaggregated by cadre) in the HCF Illustrated as bar chart	HCF Training records Staff establishment lists	Periodic reviews	Monthly, collated annually	DHI and Hospital HCW Committees
	b. % of the total number of DHMT staff per cadre in a District that have received training (in-service; CE, refresher) on HCWM over the past year	N: # of DHMT staff disaggregated by cadre in a District that have received training (in-service; CE, refresher) on HCWM D: total # DHMT staff disaggregated by cadre in the district. Illustrated as bar chart		Periodic reviews	Annually	DHI and DHMT MoH EHD HR
	c. % of the total number of HCFs in a district where an induction training programme on HCWM is in place and implemented for newly recruited staff	N: # of HCFs in the district where there is a record of staff undergoing induction training in HCWM within the past year. D: total # HCFs in the district	HCF Training records	Periodic reviews	Annually	DHI and Hospital HCW Committees
	d. % of the total number of incinerator facilities whose incinerator staff have been trained within the past two years.	N: # of incinerator facilities where there is a record of trained incinerator staff within the past 2 years	HCF training records	Periodic reviews	Annually	DHI and Hospital HCW Committees

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
		D: total # incinerator facilities in the district				
	e. Number of HCWM awareness-raising activities/programmes that have been conducted throughout a single district in the past year	Number: # HCWM awareness-raising activities/programmes have been carried out throughout the district during the past year	DHMT report	Periodic reviews	Annually	MoH EHD; DHMT: DHI

Table 7.3: Survey HCWM Monitoring Indicator Matrix and required baseline data

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
SURVEY INDICATORS						
S1. Number of incinerators in the country	Change in the of the total number of incinerators in the country over the baseline total number in 2012 over time (3 yearly intervals) (Incinerator Survey – TS advise on reference for recent incinerator study)	Number: Baseline # incinerators in use (including brick burners) in the country in 2012 <u>MINUS</u> the # incinerators in use in current year. Negative figure indicates decrease in number.	Survey questionnaire MoH EHD consolidated reports	Survey	3-yearly, or sooner if needed	MoH EHD
S2. Waste minimisation	Change in amount of HCRW generated per patient/bed occupied per day	Rate: N: Average amount of HCRW generated per HCF in a year D: Average no. of patients treated at the HCF in a year divided by 365	Survey questionnaire MoH EHD consolidated reports	Survey	3-yearly	MoH EHD
S3. 70 % of HCF staff trained in over 3 years	% of HCF staff trained in HCWM at an all HCFs over previous 3 years	Consolidated figures for Lesotho N: # of total staff that have received HCWM training in all HCFs (in-service; CE, refresher) over the past 3 years D: total # staff in all HCFs in Lesotho	HCF Training records Staff establishment lists	Survey	3-yearly	MoH EHD
S4. Number of Health Care Facilities	Number of HCFs in the country (disaggregated by type, district, public/private ownership)	Number used as denominator	Health Sector Reports	Survey	3-5 yearly	MoH HSPD
S5. Staff numbers disaggregated by cadre, per HCF, per district	Number of staff per cadre, per HCF and per district	Number used a denominator	Staff Establishment List	Survey	3-5 yearly	MoH HR; HSPD
S6. Number of public and private healthcare laboratories per district	Number of HC laboratories, public and private, per district	Number used a denominator	Register	Survey	3-5 yearly	MoH HSPD
S7. Number of public	Number of pharmacies, public	Number used a denominator	Register	Survey	3-5 yearly	MoH HSPD

Outcome	Indicator	Computation of indicator N: Numerator D: Denominator	Source of data	Method of collection	Frequency of collection	Responsibility
and private pharmacies per district (register)	and private, per district					

HCW Recording at Scott Hospital

HCW generated by Scott Hospital

Day	Date	Beds occupied	HCRW						HCGW		TOTAL HCW MASS kg
			Infectious		Sharps		Placentas	Total HCRW Mass kg	No. of 110-litre boxes	Mass kg	
			Liners	Mass kg	Safety boxes 5-lit	Mass kg	Mass kg				
Fri	26-Feb-10	50									
Sat	27-Feb-10	53									
Sun	28-Feb-10	52									
Mon	01-Mar-10	54	12	20.68		0.00	4.81	25.49	12	50.57	76.06
Tue	02-Mar-10	64									
Wed	03-Mar-10	65	11	22.99		0.00	1.34	24.33	12	65.04	89.36
Thu	04-Mar-10	77									
Fri	05-Mar-10	71	15	31.82	2	1.82	0.00	33.64	11	55.63	89.27
Sat	06-Mar-10	66									
Sun	07-Mar-10	66									
Mon	08-Mar-10	79	9	30.21		0.00	5.35	35.56	9	45.89	81.45
Tue	09-Mar-10	69									
Wed	10-Mar-10	64	21	36.70	1	0.58	4.85	42.13	11	44.50	86.63
Thu	11-Mar-10	67									
Fri	12-Mar-10		22	42.44	15	13.09	2.29	57.82	8	39.26	97.08
Totals:		897	90	184.8	18	15.5	18.6	219.0	63	300.9	519.8
Per occupied bed / day:				0.21		0.02	0.02	0.25		0.34	0.59

Adjusted to account for partially-full boxes

HCW Recording at Queen II Hospital

HCW generated by Queen II Hospital

Day	Date	Beds occupied	HCRW									HCGW				TOTAL HCW MASS kg	
			Infectious		Sharps				Placentas	Other pathological waste		Total HCRW Mass kg	No. of 110-litre boxes	Waste in black liners kg	Cardboard boxes and other packaging kg		Total HCGW mass kg
			Liners	Mass kg	Safety boxes 5-lit	Safety boxes 10-lit	Safety boxes 20-lit	Mass kg	Mass kg	No. of 20-lit spec-cans	Mass kg						
Mon	15-Mar-10	472															
Tue	16-Mar-10	500	39	206.48		1	1	5.22	0.00	10	65.77	277.47	28	160.025	38.90	198.93	476.40
Wed	17-Mar-10	488	39	194.835				0	8.17		0.00	203.00	21	124.555	9.74	134.30	337.30
Thu	18-Mar-10	469	29	135.48				0	0.00		0.00	135.48	21	138.26	9.03	147.29	282.76
Fri	19-Mar-10	421	43	204.24	4			3.35	13.83	3	19.22	240.63	24	162.78	35.89	198.67	439.30
Sat	20-Mar-10	429	17	106.27	2			1.70	0.00	6	41.94	149.90	11	63.11	1.92	65.03	214.93
Sun	21-Mar-10	449	26	158.77				0	0.00		0.00	158.77	0	0.00	0.00	0.00	158.77
Mon	22-Mar-10	436	18	83.43	3			3.30	0.00		0.00	86.73	26	194.10	5.05	199.15	285.88
Tue	23-Mar-10	437	28	157.63	4			3.94	24.50		0.00	186.07	25	169.04	37.83	206.87	392.93
Wed	24-Mar-10	447	34	182.59	1			0.61	7.09		0.00	190.28	27	162.78	11.00	173.78	364.06
Thu	25-Mar-10	411	26	121.45				0	10.32	8	43.57	175.34	30	245.60	23.13	268.73	444.07
Fri	26-Mar-10	467	21	109.97	1	1		3.29	6.74	8	54.18	174.18	24	193.47	5.02	198.49	372.67
Sat	27-Mar-10	456	14	104.15	1		1	3.97	10.07	6	54.35	172.53	14	111.58	3.80	115.38	287.91
Sun	28-Mar-10	423	11	63.65	2	1		3.92	9.75		0.00	77.31	16	140.07	3.28	143.35	220.66
Mon	29-Mar-10		42	225.46	28	4	1	36.03	14.90	4	25.90	302.28	20	125.50	7.28	132.78	435.06
Totals:		6,305	387	2,054.4	46	7	3	65.3	105.4	45	304.9	2,530.0	287	1,990.8	191.9	2,182.7	4,712.7
Per occupied bed / day:				0.326				0.010	0.017		0.048	0.40		0.32		0.35	0.75

Adjusted to account for partially-full boxes

HC HCW Recording at Scott Hospital

Public Health Centres

Day	Date	Matsieng					St Barnabas					St Peter Claver					Kolo					Motsekuoa					Mofoka				
		Pat- ients	Infec- tious	Sh- arps	Total HCRW	HCGW	Pat- ients	Infec- tious	Sh- arps	Total HCRW	HCGW	Pat- ients	Infec- tious	Sh- arps	Total HCRW	HCGW	Pat- ients	Infec- tious	Sh- arps	Total HCRW	HCGW	Pat- ients	Infec- tious	Sh- arps	Total HCRW	HCGW	Pat- ients	Infec- tious	Sh- arps	Total HCRW	HCGW
Thu	25-Feb-10	51					21					38					42					75					48				
Fri	26-Feb-10	82					24					47					17				1	43					29				
Sat	27-Feb-10																					3									
Sun	28-Feb-10																					2									
Mon	01-Mar-10	106					113					83					26					79					41				
Tue	02-Mar-10	78					33				1	77					32					46					44				
Wed	03-Mar-10	79					87					31					42				1	76					71				1
Thu	04-Mar-10	83	1.96				36	1.18	5.3			46	1.38				16	2.17				61	1.81			1	83	0.79			
Fri	05-Mar-10	59					27					43					42				1	79					52				
Sat	06-Mar-10																2					1				1					
Sun	07-Mar-10																0					2									
Mon	08-Mar-10	163				1	41				1	78				38					111				2	60				1	
Tue	09-Mar-10	99					30					52			1	29					93					56					
Wed	10-Mar-10	56				1	4					49			1	56				1	99					78					
Thu	11-Mar-10																														
Fri	12-Mar-10		1.43	2.27				0.95	1.29		1		1.08	1.54			0.58	1.97					1.79				2.98	1.44			
Totals:		856	3.39	2.27	5.66	2	416	2.13	1.29	3.42	3	544	2.46	1.54	4.00	2	342	2.75	1.97	4.72	4	770	1.81	1.79	3.60	4	562	3.77	1.44	5.21	2
Estimated HCGW mass*:						13					19					13					26					26					13
Mass / patient		0.004	0.003	0.007	0.015		0.005	0.003	0.008	0.046		0.005	0.003	0.008	0.024		0.008	0.006	0.014	0.076		0.002	0.002	0.004	0.034		0.007	0.003	0.010	0.023	

Value not included as waste is from prior period

* Average net mass of HCGW in boxes (Scott & Queen II) = 6.38kg

Overall Public HC's					
	Pat- ients	Infec- tious	Sh- arps	Total HCRW	HCGW
Totals:	3,490	16.31	10.30	26.61	17
Estimated HCGW mass*:					108
Mass / patient kg:		0.005	0.003	0.008	0.031

HC HCW Recording at Queen II Hospital

		Private Hospitals / Clinics										Private Health Centre					BTS								
Day	Date	Maseru Pvt Hosp					Lehlakeng (Maternity)					Willies Hosp					Baylor					Blood Transfusion Service			
		Pat-ients	Inf. + path.	Sh-arms	Total HCRW	HCGW	Pat-ients	Inf. + path.	Sh-arms	Total HCRW	HCGW	Pat-ients	Inf. + path.	Sh-arms	Total HCRW	HCGW	Pat-ients	Infec-tious	Sh-arms	Total HCRW	HCGW	Infec-tious	Sh-arms	Total HCRW	
Mon	15-Mar-10						7		21.43		1	24				2	200			2					
Tue	16-Mar-10	8					7				1	35				3	95					8			
Wed	17-Mar-10	8	7.68				2	4			1	28				2	99	8.94			3	3.35			
Thu	18-Mar-10	8					2	6			1	33				2	83				2				
Fri	19-Mar-10	8	11.48				1	6	7.51		1	13	23.42		1.5	27	3.30				2	5.72			
Sat	20-Mar-10	6					1	5			1	29				2									
Sun	21-Mar-10	7					1	4			1	31				2									
Mon	22-Mar-10	9	17.79				1	4			1	37				3	167	2.085			4				
Tue	23-Mar-10	12					2	6			1	32				2.5	107				2				
Wed	24-Mar-10	14					2	8			1	22				2	125				4				
Thu	25-Mar-10	10	25.81				3	11	3.14		1	30				2	111	6.95			2				
Fri	26-Mar-10	14					3	9			1	35	41.17			2	9				1	29.77	15.3		
Sat	27-Mar-10	10					2	8			1	38				3									
Sun	28-Mar-10	14					2	5			1	25													
Mon	29-Mar-10	10	39.30	7.52			2	9.28	13.69		1	19.63	4.91			2.90	14.72								
Totals:		138	102.06	7.52	109.58	24	90	19.92	13.69	33.61	14	412	84.21	4.91	89.12	27	1,023	24.17	14.72	38.89	28	38.83	15.30	54.13	
Estimated HCGW mass:						153					89				172					179	Per day				
Mass / patient kg:			0.740	0.054	0.794	1.109		0.221	0.152	0.373	0.989		0.204	0.012	0.216	0.417		0.024	0.014	0.038	0.175	2.774	1.093	3.866	

		Public Health Centres															Overall Public HC's									
Day	Date	Thabu Bosiu					Qoaling Filter					Mabote Filter					Likotsi Filter					Pat-ients	Infec-tious	Sh-arms	Total HCRW	HCGW
		Pat-ients	Infec-tious	Sh-arms	Total HCRW	HCGW	Pat-ients	Infec-tious	Sh-arms	Total HCRW	HCGW	Pat-ients	Infec-tious	Sh-arms	Total HCRW	HCGW	Pat-ients	Infec-tious	Sh-arms	Total HCRW	HCGW					
Mon	15-Mar-10	13					163	28.43	16.94			241				3	80									
Tue	16-Mar-10	12					148				1	204				2	70									
Wed	17-Mar-10	4					120				1	180				1	66	1.94								
Thu	18-Mar-10	7					96				2	216				2	60									
Fri	19-Mar-10	7	0.35				125	4.89			1	299				4	60	1.65	3.91							
Sat	20-Mar-10																									
Sun	21-Mar-10																									
Mon	22-Mar-10	4					156				2	163				2	60									
Tue	23-Mar-10	2				1	112				1	141				2	60									
Wed	24-Mar-10	5					115				2	186				2	62									
Thu	25-Mar-10	2					92					1	175			1	62									
Fri	26-Mar-10	6					43				1	183					60									
Sat	27-Mar-10																									
Sun	28-Mar-10																									
Mon	29-Mar-10		0.39	5.25				13.37	12.71				11.77	24.22			4.89	4.00								
Totals:		62	0.74	5.25	5.99	1	1,170	18.25	12.71	30.96	12	1,988	11.77	24.22	35.99	16	640	8.47	7.91	16.38	10	3,860	39.22	50.09	89.31	39
Estimated HCGW						6					77				102					64						
Mass / patient kg:			0.012	0.085	1.141	0.097		0.016	0.011	0.027	0.066		0.006	0.012	0.018	0.051		0.013	0.012	0.025	0.100	0.010	0.013	0.023	0.065	

Average figure inserted to complete range
 Value not included as waste is from prior period
 * Average net mass of HCGW in boxes (Scott & Queen II) = 6.38kg

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- ^{xii} Ministry of Health , National Health care Waste Management Plan, March 2005 page 78
- ^{xiii} Ministry of Health , Health Services Decentralisation Strategic Plan Feb 2009
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- ^{xv} MoH-CHAL Infection Prevention and Control Policies and Guidelines 2006
- ^{xvi} Health Services Decentralisation Strategic Plan Feb 2009
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