MINISTRY OF HEALTH

Health Care Waste Management in Ghana

MOH Policy and Guidelines for Health Institutions

Health Care Waste Management Policy

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Table of Contents

Clients – Patients and their caregivers, visitors to the health facilities

Etiologic Agents: Organisms or other agents that cause a particular disease

Hazardous Waste: Waste that can have a significant adverse effect on public health and/or the environment due to its infectiousness, toxicity, corrosiveness, carcinogenicity or other properties.

Health Care Waste: All untreated solid and liquid waste (both hazardous and non-hazardous) generated during the administration of medical care, veterinary care or the performance of medical research involving humans and animals. These include infectious, pathological, radioactive, pharmaceutical and other hazardous wastes.

Infectious Waste: Waste containing pathogenic organisms like bacteria, viruses, parasites and fungi in sufficient quantities to cause disease in susceptible hosts.

Pathogens: Disease causing agents

Pathological Waste: Tissues, organs, body parts, foetuses, etc. that have the potential to be infectious and are therefore sometimes classified as a subcategory of infectious wastes.

Sharps Container: Puncture resistant waste container used for disposal of needles and associated syringes.

Sharps: All items that pose a risk of injury and infection due to their puncture and cutting properties e.g. needles, scalpels, knives, glass, syringes, pipettes and similar items having a point or sharp edge or that are likely to break during transportation and result in a pointed or sharp edge.

which are ineffective. There is also no valid monitoring mechanism to verify compliance to agreed norms and practices. A survey carried out in 2001 to assess health care waste management in health facilities in Ghana showed that waste management practices were below acceptable standards and posed risks to staff and communities. Key findings of that survey include:

- Absence of a national policy and guidelines and standard operating procedures
- Different systems in place for waste segregation
- No colour coding in place and waste were not labelled;
- Containers for waste were unacceptable and not standardized.
- Vehicles for transporting waste were inadequate;
- Storage sites for waste within the facilities were open, accessible to unauthorised persons and animals, breeding grounds for flies, rodents and other insects;
- Final disposal of waste was unacceptable; burying and open burning were the norm and in some cases infectious waste was dumped on open grounds.

In order to address these shortfalls, the Ministry of Health set up a working group made up of stakeholders in the sector, both public and private to develop a policy and guidelines for managing health care waste.

1.2 Objectives of the Policy and Guidelines

The policy seeks to ensure that health care waste is managed effectively in compliance with existing laws and regulations and others to be passed in future in order to protect health care workers, their clients (patients, caregivers and visitors) and the environment from potentially disease-causing waste materials. The Guidelines provide standards, procedures and processes for handling health care waste in the sector institutions and mechanisms for performance and performance monitoring.

1.3 The Policy and Legal Context

Waste management in Ghana is a multi-sectoral effort with the Ministry of Local Government and the Environmental Protection Agency playing key roles. This responsibility is discharged through the District, Municipal and

Metropolitan assemblies which are directly under the Ministry of Local Government and the offices of the Environmental Protection Agency. The ultimate responsibility for ensuring that waste is disposed of, however, lies with the person or institution that generates the waste in line with the principle of 'the polluter pays'. Health care institutions are therefore responsible for the waste that is generated by their activities and are required to take practical steps to ensure their separation, storage, treatment and safe disposal.

1.3.1 Legal

There is no specific law that addresses the management of health care waste in Ghana at the moment. The best provision sighted is found in the National Building Regulations, 1996 LI 1630 which states in Section 145 (8) that hazardous refuse shall be handled separately from domestic refuse. However, various laws assign responsibilities that impinge on waste management to the District Assemblies and the Environmental Protection Agency. This situation leaves room for the performance of the function to fall through the cracks There is the need for a specific law that addresses how health care waste should be handled in order to avoid any ambiguities, especially since the lack of proper management of health care waste has grave consequences to society.

Some of the laws that have relevance to Health Care Waste Management include:

- The Constitution of the Republic of Ghana, 1992
  The Environmental Protection Agency Act, 1994 (Act 490)
- Environmental Assessment Regulations, 1999 (LI 1652)
- The Local Government Act, 1993 (Act 462)
- National Building Regulations, 1996 (LI 1630)
- Town and Country Planning Ordinances, 1944 (Cap 84)
- Vaccination Ordinance Cap 76
- Quarantine Ordinance Cap 77
- Mosquito Ordinance Cap 75
- Infectious Disease Ordinance
- Food and Drugs Law 305b (1992)
  Mortuaries and Funeral Facilities Act, 1998 (Act 563)

- The Criminal Code, 1960 (Act 29)

The Constitution of Ghana enshrines the human rights of the individual and requires the President to report to Parliament at least once a year all the steps taken to ensure the realization of policy objectives contained in Chapter 6 and in particular, the realization of basic human rights, a healthy economy, the right to work, the right to good health care and the right to education (Section 34(2)). Section 41 of the Constitution lists certain duties and responsibilities associated with the exercise and enjoyment of rights and freedoms, among which is the duty to protect and safeguard the environment.

The Criminal Code, 1960 (Act 29) 296(1) provides that whoever places or permits to be placed, any carrion, filth, dirt, refuse, or rubbish, or any offensive or otherwise unwholesome matter, on any street, yard, enclosure, or open space, except at such places as may be set apart by the local authority or health officer for that purpose commits a punishable offence. The code went further in section 297 (1), to state that when an offence has been committed under section 296 (1) but the offender has not been identified or discovered, the fact of any carrion or other substance mentioned in that subsection being found in front of any premises shall be prima facie evidence of its having been placed there by the occupier of the premises. By going to this extreme, the law seeks to ensure that residents take responsibility for the streets in front of them as well as their premises. There are similar provisions in the other laws cited above. The National Building Regulations, 1996 (LI 1630) stipulates in Section 145 (1) that a building for residential, commercial, industrial, civic or cultural use shall have a facility for refuse disposal. It went further to state in Section 145 (2) a requirement that each dwelling unit shall have a standardised dustbin or other receptacle approved by the District Assembly in which all refuse generated shall be stored temporarily. It provides for transfer stations, to be located within reach and preferably protected from rain and the prevention of spreading, pest infestation and scavenging activities.

The Policy and Guidelines apply primarily to all health institutions whether public, private, quasi-governmental, non-governmental or faith-based, that operate in the country at all levels: Tertiary/Teaching/Specialist Hospitals, Regional Hospitals, District Hospitals and Subdistrict Health Institutions i.e. Health Centres/Clinics and Community Clinics. Health Research Institutions, Laboratories, Alternative Health Care Providers, Mortuaries, Funeral Homes and Undertakers, Pharmacies and Chemists are also included. Whilst reference may be made to general domestic waste generated by these institutions, the focus of the Policy and Guidelines is health care waste that is considered hazardous. Institutions and companies with responsibility for treatment, transport and disposal of waste are also expected to familiarize themselves with the provisions of the Policy and Guidelines and must comply with them.

[illegible] Policy Statement

All waste that meets the definitions of hazardous waste shall be considered as such and be treated in line with this policy and other legal requirements in force at the time.

3.1 Every health institution shall have the responsibility to separate, store, label, treat, transport and dispose of all waste in the manner prescribed in this policy and other laws and regulations regarding Health Care Waste Management so as to safeguard the safety of its workers, clients and the environment.

3.2 All health institutions and their officers have a duty of care to:

- Store waste correctly and prevent its spillage or loss of any kind;
- Segregate wastes that require different methods of disposal;
- Label waste to identify its source and contents;

  Pass waste on only to persons authorized to receive it;

  Receive waste only when properly authorised to do so and only from an authorised person;
- Describe the waste (on the appropriate forms) in sufficient detail that subsequent carriers and disposers can deal with it safely and are liable for any negligence on the part of the institution or its officers.

3.3 Health institutions shall ensure that every waste they generate and pass on to a transporter or waste management company to be transported to a disposal site or to be disposed of, is accompanied by a signed statement certifying that the waste has been properly segregated, stored and treated in accordance with this policy and guidelines and no longer constitutes a hazard. In cases where the institution lacks the facility to treat and therefore hands in untreated waste, the certificate shall disclose this fact. There shall be affixed to every waste a label which indicates the classification, the processes it has gone through and the initials of the officer(s) who processed it.

3.4 The appropriate colour coding and material shall be adopted for waste containers by all health institutions in order to facilitate identification of the type of waste using the 3-colour system. Health Care Waste shall therefore be segregated as follows:

Classification of Waste	Container Type / Colour
Non-hazardous waste	Black container
Sharps	Yellow puncture resistant containers
Other infectious waste	Yellow
Radioactive Waste	Yellow with Radioactive Symbol
Pharmaceutical & other chemical wastes	Brown

3.5 All health institutions shall recruit and train health care waste management officers and ensure that they are well equipped to handle health care waste. Health care waste management training should be incorporated in both pre- and in- service training of health personnel. This training notwithstanding, where it is preferred to do so for reasons of cost, efficiency, or other reason the waste management function may be outsourced to a duly certified waste management company.

3.6 Accurate records on waste management activities shall be kept by all health institutions and waste management companies. These records shall be made available for inspection by the designated authorities. Such records shall be maintained for a minimum of five years after the disposal of the waste.

3.7 Places of final disposal of treated waste shall be identified and acquired, where such acquisition is necessary, in accordance with existing legal regulations and shall be protected from unauthorised entry, pests and scavenging activities. The disposal method used shall be in line with the approved method for each type of waste. Every region/institution is responsible for determining the disposal method for a particular waste, based on the recommendations in Section 4.4 of the Technical Guidelines (Chapter 4) in this document, which spells out the approved and preferred disposal methods.

3.8 Wherever practicable, the disposal site approved by the District, Municipal or Metropolitan Assembly in consultation with an officer of the Environmental Protection Agency for the disposal of waste shall have a section designated for the disposal of treated health care waste.

3.9 Provided the principle of treating and disposing of waste as close as possible to the point of generation is observed, health institutions in the same vicinity may share facilities in order to minimize costs.

Chapter 4: Technical Guidelines

In pursuit of the policies set out in the preceding sections, the technical guidelines provided below shall apply.

4.1 Classification of Health Care Waste

Health care waste includes all untreated solid and liquid waste (both hazardous and non-hazardous) generated during the administration of medical care, or the performance of medical research involving humans and animals. These include infectious, pathological, radioactive, pharmaceutical and other hazardous wastes.

Generally, between 75-90% of the waste produced by health-care providers is non-risk or "general" health-care waste, comparable to domestic waste. The remaining 10-25% of health care waste is regarded as hazardous. These guidelines therefore identify two broad categories of health care waste. These are:

1. General or non-hazardous waste not contaminated with blood, body fluids, or other harmful agents or materials (also referred to as domestic or municipal wastes) such as paper, fabrics, glass, food residues and containers;

2. Wastes considered hazardous due to their risk of creating a variety of health risks as a result of their actual or presumed biological, chemical and/or radioactive contamination. Due to their potentially hazardous nature, these wastes require care from the point of generation until final disposal.

The classification system adopted is based on the point of generation, method of storage and the treatment options available, as shown in Table 1. These categories are a general guide and are not meant to be all-inclusive and specific to all situations that may be encountered in a health care facility. Therefore, as questionable situations arise, each health care facility must decide if a particular device, material or substance should be regarded as hazardous waste, based on

available information and guidance from the District Assembly, Ministry of Health or Environmental Protection Agency.

Table 1: Classification of Health Care Waste in Ghana

TYPE	CLASSIFICATION AND DESCRIPTION	CONTENT/EXAMPLES
	GENERAL/NORMAL WASTE This type of hospital waste is similar to domestic waste. It is not harmful except for the fact that it is produced within the hospital environment and therefore requires special handling. It includes sweepings from lawns, corridors, offices, workshop, stores, waste from kitchen, etc	• Paper, cardboard, plastic materials including those from points of generation, kitchen waste, ash, sawdust, pieces of wood etc
B	INFECTIOUS WASTE This refers to waste generated by both in-patients/out-patients and animals which is known or likely to contain pathogenic micro-organisms. It includes materials that can be dangerous or infectious to patients, health care workers and the public. It therefore requires special management both inside and outside the hospital until it is finally disposed of. This may further be classified under the following sub classifications	• Laboratory waste generated by microbiological investigation. • Potentially infected blood and human and animal tissue (e.g HIV)
B 1	SHARPS These are sharp-edged wastes with puncture and/or cutting properties that pose risk of injury and infection. They may be stained or contaminated with blood or body fluids from injection rooms, surgical equipment etc	• Needles, syringes, surgical blades, scalpels, test tubes, ampoules, glass instruments, pipettes etc
B 2	PATIENT WASTE These are wastes generated from in- or out-patient activities and may be contaminated or stained with blood or body fluids from surgical operations, injection room (other than sharps) etc	• Stained or contaminated material (e.g. soiled cotton wool, used bandages/dressings, gloves, linen, blood transfusion bags, urine, faeces)
B 3	CULTURE/SPECIMEN Clinical specimen, laboratory culture and human tissue.	• Culture specimen (e.g experimental specimen (animals), tissue culture, urine, stool) Urine, faeces (stool) from laboratory Experimental specimen (animals)
	PATHOLOGICAL/ORGANIC HUMAN/ANIMAL TISSUE This type of waste includes amputations and other body tissues resulting from surgical operations, autopsy (post-mortem), and birth and requires special treatment for ethical and aesthetic reasons	• Internal body organs, amputated limbs, placentas foetus Human liquid wastes (e.g urine, blood products)
	HAZARDOUS WASTE This type of waste from hospital consist of physical and chemical characteristics similar to industrial hazardous waste and therefore require special management	• Includes pharmaceutical laboratory [illegible] substances, heavy metals and other chemical

TYPE	CLASSIFICATION AND DESCRIPTION	CONTENT/EXAMPLES
D 1	PHARMACEUTICAL WASTE [illegible]	contaminated • Expired [illegible] plants • [illegible]
D 2	PHOTOGRAPHIC CHEMICAL WASTE Any waste material solid or liquid produced from image processing at the radiology department	• Photo[illegible] • Fixer [illegible] • X-ray [illegible]
D 3	RADIOACTIVE WASTE Any solid, liquid, or pathological waste contaminated with radioactive isotopes of any kind	• Solid [illegible] swabs [illegible] equipment [illegible] • Liquid [illegible] solution [illegible] patient [illegible] • Spent [illegible] • Excreta [illegible] • Radio[illegible]
D 4	LABORATORY WASTE This is basically made up of spent chemicals from research and analytical laboratories, and pharmaceutical companies	• Acid [illegible] substance [illegible] heavy metals
D 4.1	ACIDS	• Chromo sulphuric acid • Glacial [illegible] • Hydro[illegible] • Oxalic [illegible]
D 4.2	ALKALIS	• Sodium [illegible] • Potas[illegible]
D 4.3	VOLATILE SOLVENTS	• Ethanol [illegible] chloroform [illegible]
D 4.4	ORGANIC SUBSTANCES	• Hexane [illegible] chloride type
D 4.5	HEAVY METALS	• Mercury
E	INCINERATOR ASH AND SLUDGE This is the waste generated from the combustion of hospital waste which will have to be disposed of in a landfill site	• Incinerator fly ash and its residue • Lead

4.2 Overview of Implementation of Safe Health Care Waste Handling and Disposal System

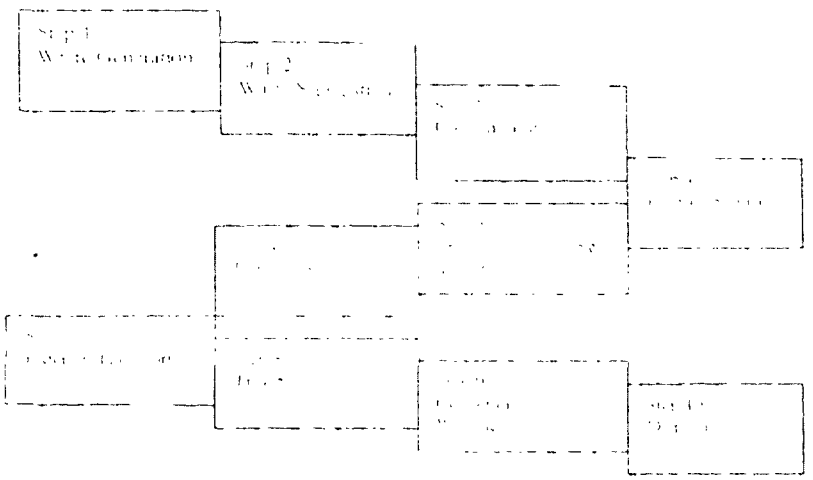
4.2.1 Steps in Health Care Waste Management

The stages in Health Care Waste Management (HCWM) are production/generation of waste, segregation of the waste into appropriate receptacles (containerisation), internal storage (in the wards and other

departments), packaging/labelling and internal transportation to an external storage site i.e transit storage site e.g. an on-site central storage point. All these stages take place within the facility and are followed by transportation to a treatment plant, (on or off-site) and final disposal.

The stages in HCWM are summarized in figure 1. In each institution, the head of the facility must ensure that the steps are followed to ensure adequate collection and disposal of the health care wastes. Furthermore, microplanning should be carried out starting from the facility and subdistrict level to ensure the most cost-effective means of collecting, transporting, treating and final disposal of the waste.

Fig 1: Steps in Health Care Waste Management



HCWM is most effective when proper methods are employed at each step whilst bearing in mind the following considerations:

The nature of waste, level of toxicity and risk to health.

- Legal - the prevailing regulations (on health and environment)
- Financial – investment and running costs as against the facility's/district's /region's budget.
- Technical – technologies available on the market and existing options in the sub-region.
- Patient load/quantity of waste generated daily

- Sustainability – viewed alongside the availability of energy sources and other utilities to run equipment.
  Local community preferences – whilst some communities may have an aversion for some treatment options available for some types of waste for cultural, religious and other reasons; (e.g. use of steam autoclaves or incineration of body parts), others may welcome treatment options solely on the basis of technological feasibility and environmental friendliness. For whatever reasons approved, treatment options are chosen by a locality, health care institutions and waste management companies shall ensure that safety and efficiency are not compromised.

4.2.2 Segregation and Containment of Waste

The following guidelines shall apply to waste segregation and containment:

- Each type of waste requires a different method of disposal. Therefore, it is important that health care waste is segregated into the various sub-categories for safety reasons, to facilitate minimization and application of the different disposal methods, which are required for different types of waste based on the classifications in Table 1. Appropriate handling, treatment and disposal of waste by sub-category will help to reduce costs as the type of waste influences the disposal method used, hence disposal costs. Non-segregarion of the waste renders all health care waste generated infectious or hazardous and results in higher management costs.

  Segregation should be at source; that is it should take place as close as possible to the point of generation of the waste and should always be the responsibility of the waste producer.

  Each waste stream segregated must be placed in an appropriately colour-coded container as shown in Table 2.

- For effective planning, each level of the health system should make estimates of their own waste production: this implies that each facility should estimate the waste it generates. This includes all wastes generated during clinical care (including surgery), routine and mass immunization. The estimates should be collated by the DHMT in each district to obtain the district waste generated and further, by the RHMT to estimate

regional waste generation. Each region should then submit returns on these levels quarterly to GHS headquarters.

- The teaching hospitals and GHS should submit their returns to the MOH or an appropriate body or department designated by the MOH, which should further collate the statistics into a composite estimate of the national health care waste.

A sample form for assessment of waste generation is shown in Appendix 1 for use by health facilities and other levels of the health care system.

4.2.3 Colour Coding:

Colour coding of waste containers and plastic bags should be used to facilitate efficient segregation of wastes.

The recommended colour-coding scheme for Ghana (adapted from WHO) is as follows:

BLACK General waste (e.g. kitchen waste remnants of food, paper, cardboard, sweepings etc)

YELLOW Infectious waste (e.g. sharps, patient waste (e.g. swabs, dressings etc), human/animal tissue and cultures/specimens).

BROWN Hazardous waste (e.g. expired drugs, vaccines, chemicals etc)

Table 2 shows the colour coding for the storage medium and transportation of health care waste. Colour coding for the plastic bags should always correspond or match with the waste containers both at the internal and external storage sites.

Table 2: Colour Coding for Storage and Transportation

Waste Type	Description of Waste	Colour Code
A	General Waste	• Black plastic bag, bin and other containers of appropriate sizes
B	Infectious Waste	
B1	Sharps	• Yellow puncture resistant plastic bag
B2	Other Waste	• Yellow plastic bag [illegible] container
B3	Culture Specimen	• Yellow plastic bag [illegible]
C	Pathological Organic Human Tissues	• Yellow plastic bags [illegible]
D	Hazardous Waste	• Brown plastic bag [illegible]
D1	Pharmaceutical Waste	• Brown plastic bags, bin [illegible]
D2	Photographic Chemical Waste	• Brown plastic containers
	- Photographic developer	- To be recycled/reused
	- Fixer solution	- To be neutralized
	- X-ray photographic film	
D3	Radioactive Waste	• Yellow containers with radioactive symbol.
	- Solid Combustible compactable	Durable plastic bags which can be sealed
	- Solid Combustible non compactable	Puncture resistant containers (metal)
	- Liquid Aqueous	- Glass [illegible] secondary container [illegible]
	- Spent sealed sources	- Container in which [illegible] origin [illegible]
D4	Laboratory Waste	• Brown [illegible]
	- Acids	- [illegible]
	- Alkalis	- [illegible]
	- Salts	[illegible]
	- Organic Substances	- Organic [illegible]
	- Heavy metal e.g. Mercury	Heavy metal [illegible]
E	Incinerator Ash and Sludge	Where separated • Yellow metal [illegible] • Yellow [illegible] Otherwise: • Yellow metal [illegible] and sludge

All health care waste should be packaged in appropriately labelled and colour-coded containers according to the recommendations provided in Table 2 above. Containers used must be appropriate for the type of waste being handled. These

containers must be robust and resistant to corrosion. After use, they must be well sealed to prevent spillage during handling and transportation.

4.2.4 Storage

Storage is the process entailing how the waste is contained during the time lapse between its generation and collection for final disposal. This is classified into Internal Storage and External Storage. Consideration for storage must be based on the classification or type of waste being dealt with and the potential risk of infection to health-care workers and waste disposal staff. Labels on containers should be permanent and legible for the entire storage period.

4.2.5 Internal Storage

Internal storage is the temporary placement of waste at the point of generation (e.g. ward, OPD) before transfer to external storage points and **should not exceed 24 hours**. Internal storage considerations should be based on the classification or type of waste being dealt with and the potential risk of infection to health-care workers and waste disposal staff. The following measures should be taken to ensure safe management of waste at the points of generation:

i. Storage time shall be reduced as much as practicable. Multiple daily removal of the waste is recommended;
ii. Every site within the Health Care Facility e.g. ward, theatre, laboratory, pharmacy, kitchen, laundry etc.) should be provided with sufficient number of suitable waste containers;
iii. Polythene bags must be placed in rigid containers with the opening folding outward over the rim to minimize contamination of the surrounding. The top of the container should have a wider diameter than the base;
iv. Disposable polythene bags shall be of appropriate size with a minimum of 60 microns and maximum of 100 microns in thickness;

v. Filled bags shall be sealed off using a plastic strip which when fastened cannot be re-opened; the bags should be sealed when ¾ full. To serve as a reminder, the bags should have a mark showing the ¾ mark.

vi Sharps shall be stored in puncture-resistant containers made of thick cardboard, strong plastic, plywood or metal;

vii. Sharps shall not be manipulated (e.g. by breaking or bending) before disposal and needles shall not be recapped before discarding since this is a common cause of puncture injury; the use of devices like needle cutters which frees the syringe of the needle by destroying and removing the latter is a safe alternative (still under consideration for use in developing countries) may be considered an exception to this rule.

viii. Puncture resistant containers shall be placed as close as possible to the area where sharp items are used;

ix. Infectious and hazardous waste shall be segregated at the point of origin rather than at the transfer or external storage site to facilitate appropriate packaging, colour coding and transportation;

x. Storage bins shall be placed in roofed built-in areas protected from water, rain, wind, animals and pests such as rodents, cockroaches etc and scavengers;

xi. Bio-hazard  marks and other warning signs shall be conspicuously posted on doors leading to storage sites to prevent people from unnecessarily gaining access to the area:

xii. Access (entrance) to storage area shall be securely locked when unattended;

xiii. Storage areas shall have sufficient space to afford easy access or removal of waste:

xiv. Health care waste shall be collected one way to external storage site without returning to the point of generation: thus the need for sizable receptacles for effecting the transfer

xv. Transfer of waste bags from internal to external storage shall be done with care to prevent rupturing or opening of bags which can contaminate the environment;

xvi. Vehicles (carts etc) used for transporting waste from internal to external storage sites shall be made of a smooth surface material (e.g. plastic) for easy cleansing and disinfection

xvii. The containers used for internal storage as well as the storage sites should be cleaned, disinfected and fumigated frequently

4.2.6 External Storage

External storage refers to storage at the transit point where waste is stored after removal from internal storage until it is collected and transported for treatment and final disposal. The external storage is usually situated within the health care facility, while treatment and/or disposal sites could be on-site or outside the facility. The frequency of removal of waste stored depends on the volume and nature of waste generated. The following measures should be taken to ensure the safe disposal of the waste;

Facilities for external storage should be removed from kitchen, laundry, ward etc but be within the precincts of the facility and shall be easily accessible to collection vehicles;

ii The facility shall be enclosed and surrounded by an impervious wall of appropriate height and provided with a gate and lock;

iii The walls and floors shall be smooth, without cracks, impervious, easy to clean and disinfect; cleaning and disinfection must be carried out as frequently as possible.

iv The site shall be spacious and well ventilated and may, for cost effectiveness in managing wastes in small facilities, accept waste from other Health Care Facilities if it has the capacity to process the increased volume and the type of waste.

v. All loading and unloading of waste shall take place within the designated collection area around the storage point;

vi. Larger volume waste bins – 240 litres and above – should be available at the external storage facility to receive waste containers from the internal storage points. These bins shall be marked for ease of identification of content and the markings must correspond with the colour code used for polythene bags in internal storage;

vii Health care waste shall not be compressed during collection;

viii Waste bins shall be washed and disinfected after each collection and more frequently if required.

ix Waste water from the point of generation and storage area must be drained into septic tanks and soakaways and must not be allowed to drain off into storm water drainage or streams; liquid wastes must be

appropriately treated (e.g. disinfection, neutralization) prior to final disposal.

x External storage facilities must meet certain basic standards for the type of waste stored e.g. refrigerators for storing organic tissues should be considered and provided in facilities. This will ensure that the temperature of body parts will be such as to prevent further decomposition or multiplication of pathogens; where refrigeration is not available, these materials should be disposed of without delay

xi. Bio-hazard marks and other warning signs shall be conspicuously posted on doors to prevent people from unnecessarily gaining access to the area;

xii. Only authorized persons shall have access to external storage area

xiii. Staff should be trained to understand the principles of segregation and to follow procedures for colour coding, storage and documentation.

xiv. Records on waste generated and processed including the type of waste, volumes and/or weight, and the persons who processed them at the various stages should be kept.

4.2.7 General Requirements for Waste Collection Containers

Containers for waste collection should meet the following requirements:

- They should be non transparent.
- They should be impervious to moisture.
- They should be of sufficient strength to prevent damage during handling or use;
- They should be leak proof;
  They should have close fitting lids;
- They should be fitted with handles for easy manipulation;
- They should be light weight and convenient for lifting;
- They should be designed to minimize physical contact.

4.2.8 Standards for Disinfection of Reusable Health Care Waste Containers:

Adequate disinfection will be based on swab tests or similar sampling procedures for relevant biological indicators conduced by an environmental health officer (or other competent person) and processed by an accredited laboratory for bacterial and fungal cultures.

The frequency of testing should be as follows:

Initial testing prior to commencement of operations - this is to be carried out daily for 5 days.

- Testing during usual operation – weekly sample swab tests of disinfected reusable health care risk waste containers before reuse.

Quarterly reports are to be compiled by the responsible person (Waste Control Manager) regarding the level of disinfection and copies sent to the DHMT and from DHMT to RHMT and then to GHS and MOH headquarters as appropriate, as well as to the relevant district assemblies and EPA.

4.2.9 Collection and Transportation of Health Care Wastes

Collection and transportation of health care waste from Health Care Facilities should dovetail into the general waste management plan of the District Assembly.

At the institutional level, all health care waste should be sorted on site before collection and transportation. The recommended colour coding must be used. This will allow easy identification of content of containers thus preventing careless handling and the risk of secondary infection. Wastes from health facilities shall be packaged and transported separately based on the adopted classification as shown in Table 2.
Transporters of waste should be trained in identification and handling of different waste streams.

4.2.10 General Requirements for the Transportation of Health Care Waste

Collection, transportation and disposal of health care waste shall only be done by accredited Waste Management Contractors and certified by the District Assembly. Relevant departments of the District Assemblies should work in collaboration with the Health Care Facilities in the district;
All necessary care must be taken to prevent odour nuisance to the neighbourhoods during transportation;

Where infectious wastes and other wastes have been mixed together, they must be considered infectious and managed as such.
Health care waste must be transported directly to the disposal or treatment site within the shortest possible time;
Vehicles used for transportation of health care waste must be so constructed as to prevent the scattering of packaged wastes, odour nuisance, and must be leak proof;
Waste must not be compacted or subjected to any other treatment that could cause bags or containers to rupture;
All vehicles used for the transportation of health care waste shall carry the biohazard mark on all sides;
Labels should be firmly attached to containers so that they do not become detached during transportation and handling;

4.2.11 Requirements for the Transportation of Radioactive Waste Containers

Radioactive waste containers must be brightly coloured (normally yellow), should be marked "Radioactive Waste" and should bear the international radioactive symbol to distinguish it from containers meant to receive other types of waste. All radioactive waste packages or containers should have labels bearing the radiation symbol on them. The label should be completed and signed by the officer in charge of waste management in the organization. The labels should be firmly attached to the containers or packages so that they do not become detached during transportation and handling. The printing on the labels should be permanent and legible for the entire storage and transportation period.

Radioactive waste should be adequately packaged and contained for transport to ensure safety, not only of those involved in the transport operation, but also for those who could be affected as a result of transport operations in accordance with the International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Material Requirements, (1996, Safety Standards Series ST-1, IAEA, Vienna). Drivers transporting radioactive material have to be suitably trained and carry contingency plans on the vehicle detailing action to be taken in the event of an accident.

The Radiation Protection Institute of the Ghana Atomic Energy Commission is preparing a regulation on the Safe Transport of Radioactive Materials, which should be complied with

4.3 Contracting with Health Care Waste Contractor

Where the facility is not equipped to carry out on-site treatment and disposal of health care waste, the institution should engage a Waste Management Contractor based on EPA guidelines i.e. the contractor must be licensed by the District Assembly to collect and transport its wastes to a designated site for treatment and disposal.

As a minimum requirement, a contract entered into between a Waste Management Contractor and the health care institution should contain the following:

- Type and quantity of waste to be transported;
- Final destination of waste to be transported (municipal disposal site or the waste treatment facility of another health care facility);
- What could be recycled, if anything;
- Terms of sub-contracting, if permitted;
  Reporting format and information flow and feed-back mechanisms;
  Conditions for termination of contract;
- Financial standing of the contractor.

Before commissioning a Health Care Waste Contractor, the head of the institution/facility should verify the particulars of the Contractor with respect to the following:

  Whether licensed by the District Assembly;
  Type of license e.g. whether for collection, transportation and / or disposal;
- Type of waste that can be handled by the contractor (scope of contract);
- Times for renewal of the license, which should be done annually;
- Contractor's capacity, e.g. fleet size, work-force, creditworthiness etc;
- Knowledge / experience in handling health care waste;
  Any other points of interest.

4.4. Treatment Options for Various Waste Streams

The recommended treatment options for various waste streams to guide each level of health institutions are provided in Table 3. They are based on technology available and cost considerations. However, within limits provided by this policy, safety considerations and existing laws, each region should determine the configuration of treatment options that is feasible considering the resources available to it and other regional peculiarities. For instance, equipment with the capacity to handle more waste than individual institutions generate can be strategically located to serve more than one institution for cost effectiveness, if spatial location permits accessibility. Where, considering the volume of waste generated, the cost of segregation and transportation to that centre is much cheaper than buying incinerators for each facility only to process very small volumes of waste that are generated infrequently, it will be better to share resources. Such considerations are important for facilitating the rational use of resources. This necessitates a process of micro planning using a bottom-up approach.

Table 3: Treatment and Disposal Options.

WASTE TYPE	TREATMENT / (LEVEL OF HEALTH SYSTEM EQUIPMENT)	FINAL DISPOSAL
General waste (food, paper, packing materials) etc	Biodigestion, Composting, Incineration (controlled combustion) Health Centre/Out-Patient Clinic – Composting, Low cost incinerators District – Composting, Biodigestion, Incineration Regional Hospitals – Incineration, Biodigestion. Teaching Hospital – Incineration	Landfill
Infectious Waste Sharps	All levels Chemical disinfection, incineration at all levels	Landfill
Parents' waste	All levels – Incineration	Landfill
Culture /specimen	Discontinuation by autoclaving/incineration – All levels	Landfill
Pathological /organic Human tissue	Incineration – All levels Burial at approved Burial Grounds, - Health Centres.	Landfill
Hazardous Waste Pharmaceutical tablets and capsules	Crushing – All levels	Landfill
Syrups and injectables	Crushing of injectables; syrups should be diluted and washed down the drains – All	Landfill

WASTE TYPE	TREATMENT / (LEVEL OF HEALTH SYSTEM EQUIPMENT)	FINAL DISPOSAL
	levels	
Cytotoxic drugs, Photographic chemical waste, Vaccines	Incinerate at high temperature All levels	Landfill
Photographic developer, Fixer solution, X-ray photographic film	Incinerate at high temperature 1000°C	Landfill
Radioactive waste	Compaction, storage decay Immobilization. Ghana Atomic Energy to be consulted – All levels	Specially designed landfill
Laboratory Waste Acids	Dilute with large volumes of water (12x) For those that are infectious, chemical disinfection and incineration – All levels	Sewage Landfill
Alkali	Dilute with large volumes of water (12x) – All level	Sewage
Solvents	Chemical decontamination (see EPA guidelines)	Sewage
Organic Substances	Chemical decontamination (see EPA guidelines)	Sewage
Heavy Metals	Compacation	Sewage

4.5 Recommended Equipment

For safety and effectiveness, some equipment is required for each stage of the waste disposal process. The types of waste and the recommended disposal equipment options for various waste streams at different levels of facility are summarized in Table 4:

Table 4: Equipment for Waste Management

Stage of Waste Management cycle	Equipment Required by level
Step 1 – Waste Generation	Personal Protection Equipment PPE Gloves Overalls, aprons, boots, nose masks and goggles, and top loading weighing scales, colour coded bags and bins
Step 2 – Waste Segregation	PPE
Step 3 – Contamination	PPE Sharps Containers, colour coded plastic bags,
Step 4 – Internal Storage	PPE
Step 5 – Internal Collection and Transport	Trolleys, Wheelbarrows (with stainless steel wheels), PPE to ensure the safety of workers
Step 6 – External Storage	Colour Coded bins (Begin by involving local manufacturers of plastics in order to produce bins and plastic bags locally) PPE
Step 7 – External Transport	Trucks, PPE

Step 1 Treatment	Treatment equipment Labo[illegible] PPE
Step 2 Collection of Residue	PPE dust pans brooms [illegible]
Step 3 Final Disposal	PPE spades [illegible]

4.6 Waste Minimization

Health facilities must aim at reducing the impact of health care risk waste in their operations by minimizing the generation of health care risk waste at source and, to a lesser extent, recycling

This may be achieved through the following measures:

- Keeping individual waste streams segregated, thereby keeping hazardous waste segregated from the non-hazardous.
- Improving inventory control by using up old stocks of drugs and chemicals before ordering or using new stock; ordering hazardous chemicals only when needed and in minimal quantities to avoid outdated inventory.

Consideration should be given to recycling as much waste as possible in instances where this does not increase health risks or costs e.g. recycling of uncontaminated cardboard boxes and waste paper.

4.7 Waste Water Treatment and Disposal

Waste water from Health Care facilities is of similar quality to urban waste water, but may also contain various potentially hazardous components if the recommendations in Table 5 (Treatment and disposal options) are not followed.

Hazardous components of waste water from Health Care facilities include the following:

i) Bacteria, viruses and helminths discharged from wards treating patients with infectious diseases.
ii) Hazardous chemicals from cleaning and disinfection operations
iii) Pharmaceuticals from pharmacies and various wards.
iv) Radioactive isotopes.

Waste in categories ii, iii and iv must be segregated and treated appropriately

Waste water in category i and other general liquid effluents should be connected to the sewerage system if available, or otherwise to a technically sound on-site system. However, during epidemics or where highly infectious patients are involved, high-risk type wastes should be pre-treated by chemical disinfection before disposal.

Table 5: Recommended Treatment and Disposal Equipment

Recommended Equipment	Facility / Level
1 Highly efficient (high temperature, filtered incinerators) Equipment / Controlled combustion treatment facilities.	Teaching Hospital (large capacity incinerators), Regional and District hospitals (medium capacity incinerators). Subdistrict facilities (small capacity incinerators)
[illegible]	Facilities at all levels
[illegible]	Regional, district levels
[illegible]	All levels
[illegible]	All levels
6 Compost pits	District hospitals and health centres in rural areas
7 Protected pits (final disposal of sludge)	District hospitals and health centres in rural areas, regional hospitals

The initial cost outlay of equipment recommended to be used at various levels is presented in Appendix 3:

4.8 Spillage Procedures

Whilst all efforts should be made to avoid loss or spillage of any kind, in the event of the latter occurring, a clear procedure must be followed. A ready supply of all necessary equipment must be in place for use whenever such an event occurs. It is important that information and training for staff is provided prior to any such eventuality.

The aim of a spillage procedure is to:

- contain the spillage
- limit the escape

- protect staff, patients and visitors
  protect the environment
- restore the area to normalcy as quickly as possible.
  minimize the effect of the spillage on normal service provision

4.8.1 Procedure for Handling Spillage of Clinical Waste

The main risk is that of cross infection, and the procedure consists of donning protective clothing consistent with the risk, in most cases disposable gloves, and apron if appropriate, and placing the waste items into the appropriate yellow bag, or into a sharps box, in the case of needles, blades or other sharp items, taking special care not to receive a sharps injury. Sharps must not be retrieved by hand

The following guidelines shall therefore apply:

- Staff cleaning spills shall wear protective clothing suitable for the spillage at hand.
- Standard cleaning equipment including a mop and cleaning bucket plus cleaning agents shall be readily available for spills management and shall be stored and sign-posted in an area known to all staff.

  The procedure for spill management will depend on the following:
  - Nature of the spill, e.g. blood, urine and faeces.
  - Possible pathogens that may be involved.
  - Size of the spill i.e. spot, splash, puddle, large spill.
  - Type of surface involved i.e. linoleum, carpet, wood, laminated, etc.
  - Area involved i.e. preparatory laboratory, ward, common access areas, etc.
  - Likelihood of bare skin contact with the soiled area.

  For a small spill, disinfect using a disinfectant cleaning solution preferably chlorine based such as Bleach and clean.

  For a large spill, flood with disinfectant, mop and clean the area with disinfectant cleaning solution using a mop and allow to air dry or clean with absorbent paper (where available) which is then placed in a yellow bag.

  Large spills of cultures or concentrated infectious agents shall also be flooded with high-level disinfectant (like bleach) before cleaning and then decontaminated with fresh disinfectant.

xvii. The containers used for internal storage as well as the storage sites should be cleaned, disinfected and fumigated frequently

4.2.6 External Storage

External storage refers to storage at the transit point where waste is stored after removal from internal storage until it is collected and transported for treatment and final disposal. The external storage is usually situated within the health care facility, while treatment and/or disposal sites could be on-site or outside the facility. The frequency of removal of waste stored depends on the volume and nature of waste generated. The following measures should be taken to ensure the safe disposal of the waste;

Facilities for external storage should be removed from kitchen, laundry, ward etc but be within the precincts of the facility and shall be easily accessible to collection vehicles;

ii The facility shall be enclosed and surrounded by an impervious wall of appropriate height and provided with a gate and lock;

iii. The walls and floors shall be smooth, without cracks, impervious, easy to clean and disinfect; cleaning and disinfection must be carried out as frequently as possible.

iv The site shall be spacious and well ventilated and may, for cost effectiveness in managing wastes in small facilities, accept waste from other Health Care Facilities if it has the capacity to process the increased volume and the type of waste.

v. All loading and unloading of waste shall take place within the designated collection area around the storage point;

vi. Larger volume waste bins – 240 litres and above – should be available at the external storage facility to receive waste containers from the internal storage points. These bins shall be marked for ease of identification of content and the markings must correspond with the colour code used for polythene bags in internal storage;

vii Health care waste shall not be compressed during collection;

viii Waste bins shall be washed and disinfected after each collection and more frequently if required.

ix Waste water from the point of generation and storage area must be drained into septic tanks and soakaways and must not be allowed to drain off into storm water drainage or streams; liquid wastes must be

appropriately treated (e.g. disinfection, neutralization) prior to final disposal.

x External storage facilities must meet certain basic standards for the type of waste stored e.g. refrigerators for storing organic tissues should be considered and provided in facilities. This will ensure that the temperature of body parts will be such as to prevent further decomposition or multiplication of pathogens; where refrigeration is not available, these materials should be disposed of without delay

xi. Bio-hazard marks and other warning signs shall be conspicuously posted on doors to prevent people from unnecessarily gaining access to the area;

xii. Only authorized persons shall have access to external storage area

xiii. Staff should be trained to understand the principles of segregation and to follow procedures for colour coding, storage and documentation.

xiv. Records on waste generated and processed including the type of waste, volumes and/or weight, and the persons who processed them at the various stages should be kept.

4.2.7 General Requirements for Waste Collection Containers

Containers for waste collection should meet the following requirements:

- They should be non-transparent;
- They should be impervious to moisture.
- They should be of sufficient strength to prevent damage during handling or use;
- They should be leak proof;
  They should have close fitting lids;
- They should be fitted with handles for easy manipulation;
- They should be light weight and convenient for lifting;
- They should be designed to minimize physical contact.

4.2.8 Standards for Disinfection of Reusable Health Care Waste Containers:

Adequate disinfection will be based on swab tests or similar sampling procedures for relevant biological indicators conduced by an environmental health officer (or other competent person) and processed by an accredited laboratory for bacterial and fungal cultures.

The frequency of testing should be as follows:

Initial testing prior to commencement of operations - this is to be carried out daily for 5 days.

- Testing during usual operation – weekly sample swab tests of disinfected reusable health care risk waste containers before reuse.

Quarterly reports are to be compiled by the responsible person (Waste Control Manager) regarding the level of disinfection and copies sent to the DHMT and from DHMT to RHMT and then to GHS and MOH headquarters as appropriate, as well as to the relevant district assemblies and EPA.

4.2.9 Collection and Transportation of Health Care Wastes

Collection and transportation of health care waste from Health Care Facilities should dovetail into the general waste management plan of the District Assembly.

At the institutional level, all health care waste should be sorted on site before collection and transportation. The recommended colour coding must be used. This will allow easy identification of content of containers thus preventing careless handling and the risk of secondary infection. Wastes from health facilities shall be packaged and transported separately based on the adopted classification as shown in Table 2.
Transporters of waste should be trained in identification and handling of different waste streams.

4.2.10 General Requirements for the Transportation of Health Care Waste

Collection, transportation and disposal of health care waste shall only be done by accredited Waste Management Contractors and certified by the District Assembly. Relevant departments of the District Assemblies should work in collaboration with the Health Care Facilities in the district;
All necessary care must be taken to prevent odour nuisance to the neighbourhoods during transportation;

Where infectious wastes and other wastes have been mixed together, they must be considered infectious and managed as such.
Health care waste must be transported directly to the disposal or treatment site within the shortest possible time;
Vehicles used for transportation of health care waste must be so constructed as to prevent the scattering of packaged wastes, odour nuisance, and must be leak proof;
Waste must not be compacted or subjected to any other treatment that could cause bags or containers to rupture;
All vehicles used for the transportation of health care waste shall carry the biohazard mark on all sides;
Labels should be firmly attached to containers so that they do not become detached during transportation and handling;

4.2.11 Requirements for the Transportation of Radioactive Waste Containers

Radioactive waste containers must be brightly coloured (normally yellow), should be marked "Radioactive Waste" and should bear the international radioactive symbol to distinguish it from containers meant to receive other types of waste. All radioactive waste packages or containers should have labels bearing the radiation symbol on them. The label should be completed and signed by the officer in charge of waste management in the organization. The labels should be firmly attached to the containers or packages so that they do not become detached during transportation and handling. The printing on the labels should be permanent and legible for the entire storage and transportation period.

Radioactive waste should be adequately packaged and contained for transport to ensure safety, not only of those involved in the transport operation, but also for those who could be affected as a result of transport operations in accordance with the International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Material Requirements, (1996, Safety Standards Series ST-1, IAEA, Vienna). Drivers transporting radioactive material have to be suitably trained and carry contingency plans on the vehicle detailing action to be taken in the event of an accident.

The Radiation Protection Institute of the Ghana Atomic Energy Commission is preparing a regulation on the Safe Transport of Radioactive Materials, which should be complied with

4.3 Contracting with Health Care Waste Contractor

Where the facility is not equipped to carry out on-site treatment and disposal of health care waste, the institution should engage a Waste Management Contractor based on EPA guidelines i.e. the contractor must be licensed by the District Assembly to collect and transport its wastes to a designated site for treatment and disposal.

As a minimum requirement, a contract entered into between a Waste Management Contractor and the health care institution should contain the following:

- Type and quantity of waste to be transported;
- Final destination of waste to be transported (municipal disposal site or the waste treatment facility of another health care facility);
- What could be recycled, if anything;
- Terms of sub-contracting, if permitted;
  Reporting format and information flow and feed-back mechanisms;
  Conditions for termination of contract;
- Financial standing of the contractor.

Before commissioning a Health Care Waste Contractor, the head of the institution/facility should verify the particulars of the Contractor with respect to the following:

  Whether licensed by the District Assembly;
  Type of license e.g. whether for collection, transportation and / or disposal;
- Type of waste that can be handled by the contractor (scope of contract);
- Times for renewal of the license, which should be done annually;
- Contractor's capacity, e.g. fleet size, work-force, creditworthiness etc;
- Knowledge / experience in handling health care waste;
  Any other points of interest.

4.4. Treatment Options for Various Waste Streams

The recommended treatment options for various waste streams to guide each level of health institutions are provided in Table 3. They are based on technology available and cost considerations. However, within limits provided by this policy, safety considerations and existing laws, each region should determine the configuration of treatment options that is feasible considering the resources available to it and other regional peculiarities. For instance, equipment with the capacity to handle more waste than individual institutions generate can be strategically located to serve more than one institution for cost effectiveness, if spatial location permits accessibility. Where, considering the volume of waste generated, the cost of segregation and transportation to that centre is much cheaper than buying incinerators for each facility only to process very small volumes of waste that are generated infrequently, it will be better to share resources. Such considerations are important for facilitating the rational use of resources. This necessitates a process of micro planning using a bottom-up approach.

Table 3: Treatment and Disposal Options.

WASTE TYPE	TREATMENT / (LEVEL OF HEALTH SYSTEM EQUIPMENT)	FINAL DISPOSAL
General waste (food, paper, packing materials) etc	Biodigestion, Composting, Incineration (controlled combustion) Health Centre/Out-Patient Clinic – Composting, Low cost incinerators District – Composting, Biodigestion, Incineration Regional Hospitals – Incineration, Biodigestion. Teaching Hospital – Incineration	Landfill, [illegible]
Infectious Waste Sharp	All levels Chemical disinfection, incineration at all levels	Landfill
Patients' waste	All levels – Incineration	Landfill
Culture/specimen	Discontinuation by autoclaving/incineration – All levels	Landfill
Pathological/organic Human tissue	Incineration – All levels Burial at approved Burial Grounds, - Health Centres.	Landfill
Hazardous Waste Pharmaceutical tablets and capsules	Crushing – All levels	Landfill
Syrups and injectables	Crushing of injectables; syrups should be diluted and washed down the drains – All	Landfill

WASTE TYPE	TREATMENT / (LEVEL OF HEALTH SYSTEM EQUIPMENT)	FINAL DISPOSAL
	levels	
Cytotoxic drugs, Photographic chemical waste, Vaccines	Incinerate at high temperature All levels	Landfill
Photographic developer, Fixer solution, X-ray photographic film	Incinerate at high temperature 1000°C	Landfill
Radioactive waste	Compaction, storage decay Immobilization. Ghana Atomic Energy to be consulted – All levels	Specially designed landfill
Laboratory Waste Acids	Dilute with large volumes of water (12x) For those that are infectious, chemical disinfection and incineration All levels	Sewage Landfill
Alkali	Dilute with large volumes of water (12x) – All levels	Sewage
Solvents	Chemical decontamination (see EPA guidelines)	Sewage
Organic Substances	Chemical decontamination (see EPA guidelines)	Sewage
Heavy Metals	Compaction	Sewage

4.5 Recommended Equipment

For safety and effectiveness, some equipment is required for each stage of the waste disposal process. The types of waste and the recommended disposal equipment options for various waste streams at different levels of facility are summarized in Table 4:

Table 4: Equipment for Waste Management

Stage of Waste Management cycle	Equipment Required by level
Step 1 – Waste Generation	Personal Protection Equipment PPE – Gloves Overalls, aprons, boots, nose masks and goggles, and top loading weighing scales, colour coded bags and bins
Step 2 – Waste Segregation	PPE
Step 3 – Contamination	PPE Sharps Containers, colour coded plastic bags.
Step 4 – Local Storage	PPE
Step 5 – Internal Collection and Transport	Trolleys, Wheelbarrows (with stainless steel wheels), PPE to ensure the safety of workers
Step 6 – Extended Storage	Colour Coded bins (Begin to involve local manufacturers of plastics in order to produce bins and plastic bags locally) PPE
Stage 7 – External Transport	Trucks, PPE

Step 8	Treatment	Treatment equipment [illegible] PPE
Step 9	Collection of Residue	PPE [illegible]
Step 10	Final Disposal	PPE, spades [illegible]

4.6 Waste Minimization

Health facilities must aim at reducing the impact of health care risk waste in their operations by minimizing the generation of health care risk waste at source and, to a lesser extent, recycling.

This may be achieved through the following measures:

- Keeping individual waste streams segregated, thereby keeping hazardous waste segregated from the non-hazardous.
- Improving inventory control by using up old stocks of drugs and chemicals before ordering or using new stock; ordering hazardous chemicals only when needed and in minimal quantities to avoid outdated inventory.

Consideration should be given to recycling as much waste as possible in instances where this does not increase health risks or costs e.g. recycling of uncontaminated cardboard boxes and waste paper.

4.7 Waste Water Treatment and Disposal

Waste water from Health Care facilities is of similar quality to urban waste water, but may also contain various potentially hazardous components if the recommendations in Table 5 (Treatment and disposal options) are not followed.

Hazardous components of waste water from Health Care facilities include the following:

i) Bacteria, viruses and helminths discharged from wards treating patients with infectious diseases.
ii) Hazardous chemicals from cleaning and disinfection operations
iii) Pharmaceuticals from pharmacies and various wards
iv) Radioactive isotopes.

Waste in categories ii, iii and iv must be segregated and treated appropriately

Waste water in category i and other general liquid effluents should be connected to the sewerage system if available, or otherwise to a technically sound on-site system. However, during epidemics or where highly infectious patients are involved, high-risk type wastes should be pre-treated by chemical disinfection before disposal.

Table 5: Recommended Treatment and Disposal Equipment

Recommended Equipment	Facility / Level
1 Highly efficient (high temperature, filtered incinerators) Equipment / Controlled combustion treatment facilities.	Teaching Hospital (large capacity incinerators), Regional and District hospitals (medium capacity incinerators). Subdistrict facilities (small capacity incinerators)
2 Autoclaves	Facilities at all levels
Drainage tex	Regional, district levels
4 Ball mill's	All levels
5 Crusher	All levels
6 Compost pits	District hospitals and health centres in rural areas
7 Protected pits (final disposal of sludge)	District hospitals and health centres in rural areas regional hospitals

The initial cost outlay of equipment recommended to be used at various levels is presented in Appendix 3:

4.8 Spillage Procedures

Whilst all efforts should be made to avoid loss or spillage of any kind, in the event of the latter occurring, a clear procedure must be followed. A ready supply of all necessary equipment must be in place for use whenever such an event occurs. It is important that information and training for staff is provided prior to any such eventuality.

The aim of a spillage procedure is to:

- contain the spillage
- limit the escape

- protect staff, patients and visitors
  protect the environment
- restore the area to normalcy as quickly as possible.
  minimize the effect of the spillage on normal service provision

4.8.1 Procedure for Handling Spillage of Clinical Waste

The main risk is that of cross infection, and the procedure consists of donning protective clothing consistent with the risk, in most cases disposable gloves, and apron if appropriate, and placing the waste items into the appropriate yellow bag, or into a sharps box, in the case of needles, blades or other sharp items, taking special care not to receive a sharps injury. Sharps must not be retrieved by hand.

The following guidelines shall therefore apply:

- Staff cleaning spills shall wear protective clothing suitable for the spillage at hand.
- Standard cleaning equipment including a mop and cleaning bucket plus cleaning agents shall be readily available for spills management and shall be stored and sign-posted in an area known to all staff.

  The procedure for spill management will depend on the following:
  - Nature of the spill, e.g. blood, urine and faeces.
  - Possible pathogens that may be involved.
  - Size of the spill i.e. spot, splash, puddle, large spill.
  - Type of surface involved i.e. linoleum, carpet, wood, laminated, etc.
  - Area involved i.e. preparatory laboratory, ward, common access areas, etc.
  - Likelihood of bare skin contact with the soiled area.

  For a small spill, disinfect using a disinfectant cleaning solution preferably chlorine based such as Bleach and clean.

  For a large spill, flood with disinfectant, mop and clean the area with disinfectant cleaning solution using a mop and allow to air dry or clean with absorbent paper (where available) which is then placed in a yellow bag.

  Large spills of cultures or concentrated infectious agents shall also be flooded with high-level disinfectant (like bleach) before cleaning and then decontaminated with fresh disinfectant.

4.8.2 Spillage of Chemicals

The essential steps are:

- Contain the spillage to prevent further spread
- Prevent exposure of:
  - Other persons in the vicinity
  - Staff dealing with the spill
- Absorb and dispose as quickly as possible
- Decontaminate the area and return it to normal use

Similar principles apply to any other chemical spillage. For chemicals like *glutaraldehyde*, which readily evaporate to produce very irritant fumes, a respirator designed for use with organic vapours should be worn. The liquid should be mopped up as quickly as possible with absorbent, disposable materials, which must then be double bagged and removed to the open-air waste storage compound as soon as possible.

The area of the spill should be well ventilated, and will require sufficient time for the vapour to disperse before being reoccupied.

Mercury is another chemical whose handling should be mentioned. The main risk is that of skin absorption on contact with mercury, and by inhalation of mercury vapour, which may slowly vaporise into the air from exposed surfaces of mercury. The risk is increased in hot, confined areas.

Mercury readily combines with other metals to form 'amalgams; which in turn emit mercury vapour, and from which mercury may be absorbed by skin contact. Prevent contact with rings, (by removal of jewellery, or wearing of disposable gloves), and with any metal equipment, as they may be difficult or impossible to decontaminate.

The aim of the spillage procedure is to collect any significant quantity of free mercury (that could possibly be recycled) and to chemically combine any small remaining residues as quickly as possible with a hot suspension of sulphur and slaked lime (calcium hydroxide) that may be obtained from the facility's laboratory. After drying out, the powder mixture is collected into a tightly capped plastic bottle.

4.9 Contingency Plan

Each facility shall develop a contingency plan to provide guidance to waste management and other staff as well as visitors to facilities on measures to be implemented in the event of unexpected incidents. This plan is to include among others measures to manage spillages, fire, flooding and other hazards peculiar to the locality.

4.10 Health and Safety

The Ministry of Local Government and Rural Development through the District Assemblies jointly with the Ministry of Health and its implementing agencies as well as other corporate and individual employers within the health sector are responsible for providing the necessary resources for correct and effective health care waste management. Managers in the above MDAs and other organizations are expected to provide safe systems of work for staff generating, handling, storing, transporting treating and carrying out final disposal of waste.

They are to institute a system of regular medical screening and immunizations for all staff involved in waste management.

They are to provide appropriate information and training for all relevant staff. They are to conduct regular monitoring and periodic reviews of the system, so that deficiencies are corrected within a reasonable timescale and the system continuously improved in the light of experience gained.

Individual employees of the health sector are expected to exercise reasonable care to protect themselves and others who may be affected by their actions or inactions.

In order to avoid any injuries or infection of people, health care waste handlers must

a) Co-operate in matters of health and safety
b) Correctly use personal protective equipment and any other work equipment designated for the task.
c) Correctly apply the information and training received at induction and subsequently in handling issues such as:

i) Taking all necessary measures to ensure that re-usable containers are effectively disinfected before re-use.
ii) Providing adequate service storage areas for health care waste.
iii) Making provision for minimal manual handling of health care risk waste.

d) Report any perceived hazards in their working environment or deficiencies in the safe system of work to their manager.

In the event of an injury arising out of waste handling, it must immediately be reported to the relevant manager or supervisor and action taken based on the infection prevention and HIV / AIDS policies of the MOH / GHS.

4.11 Record Keeping and Documentation

Each health institution is required to maintain records of its waste management. In addition to stores and logistics management records at the institutional level discussed under Section 7.1.1, issues regarding the type of waste, where it is generated, when separated, by whom and every other subsequent action until final disposal or handing over to a waste disposal company, when such is the case, shall be documented. The following are important specific information, which should be documented by each institution:

i) Information on Waste types and Handling Processes
- Date
- The type and volume/weight of waste generated;
- The type, origin and weight of waste received from other health care facilities (in cases where facilities are shared);
- The means of transportation, type and volume transported;
- The particulars of the commissioned waste contractor (name of company, type of license, site of treatment and / or final disposal);
- Disposal method and quantities per method: e.g. volume incinerated, volume at every point of intermediate treatment, volume finally disposed of.

ii) In addition, results of tests for standards for disinfection should be circulated to the DHMTs / RHMTs, GHS, MOH, DAs and EPA on a

quarterly basis as specified under the section on Monitoring and Control.

iii) Records of environmental performance for incinerators should also be sent to the above authorities every 6 months.

iv) The DHMTs and RHMTs shall ensure record compilation and analysis by the health facilities under their jurisdiction.

It is essential that training in the safe and correct management of health care waste is provided to all staff including health managers.

i. Pre- Service and Post-Basic training of health workers should include health care waste management. There is the need therefore to review health-training institutions' curricula to incorporate waste management.

ii. Health care waste management should also be incorporated into in-service training curricula. This training should be tailored to the needs of staff

iii. Health managers shall ensure that all their staff undergo in-service training in health care waste management.

iv Training Curricula, Guidelines, and Training Manuals on health care waste management shall be developed to facilitate Pre-Service, In-Service and Post Basic training.

v. Standard Operating Procedures (based on the national guidelines) shall be developed and communicated to all persons involved in the handling, transporting and disposal of health care wastes as well as their supervisors.

vi. These standards should form the basis for the in-service training to be provided for managers and staff involved in the day-to-day disposal of health care waste. Their training should also cover contingency management of incidents involving health care management.

vii. The MOH shall co-ordinate the drawing up of training curricula which should be adaptable for regional and district training in health care waste management and should be budgeted for in the annual budget at all levels of the health care system and the necessary funds allocated to it as a matter of priority.

viii. Collaboration between the health sector and universities as well as other research institutions should be strengthened to facilitate the development of and adaptation of technologies available for health care waste management.

6 Information, Education, Advocacy, Communication, Advocacy

6.1 Information, Education and Communication

There is no gainsaying the importance of education of a people. The more conscious the society is of the risks from health care waste and how to minimise them, the more effective health care waste management will be. If our citizens understand the classification of waste, the need for waste minimization and separation using the recommended colour codes from their studies in school and adult education programmes, they will handle properly the waste they generate as patients and visitors to our hospitals, thereby facilitating health care waste management in the health facilities. This is even more critical considering the prevailing situation in which, in the face of the inadequacy of health personnel, relatives of patients have to play more roles in caring for their relatives on admission.

The IEC plan will involve the use of mass media to educate the public on the importance of health care waste management, the coding system and what type of waste is to be placed in a particular type of vessel and the other essential elements of such education. Relevant aspects of the education should also be incorporated into the curricula of basic schools and adult education programmes. The public health units should incorporate information on health care waste management into outreach education programmes. Finally, at the institutional level, signs and posters should be strategically posted to educate and guide the public.

6.2 Advocacy

Advocacy should be undertaken vigorously to solicit support for the policy from all stakeholders. The findings of the evaluation of health care waste management practices undertaken by the health sector should be disseminated to all the ministries involved at the highest possible level. The attention of the development partners and all civil society organizations should be drawn to the existing situation in order

to obtain the widest possible support including financial commitment and the development of a legal framework. Feature articles in the print media drawing key messages from the findings of the study should be published. This is necessary for whipping up the multi-sector collaboration and financial support that is required for the success of the programme. There should also be media encounters, all in an effort to move health care waste management to the top of our priorities. We ought to be saying that *if we cannot handle the waste that we generate in the process of curing our people and this can become a serious source of health problems, then our people are better off without a health system. Our health institutions should be safe places to acquire cure not infections.*

To secure the commitment of private health institutions, the MOH should involve them through their respective trade associations, in programs meant to implement the policy. The implementation of the policy has financial implications for health institutions, which may tend to be a disincentive in the face of scarce resources. The private health institutions in particular should be encouraged to participate in the training programs that the MOH will organise for the health institutions under cost sharing arrangements. The assistance of development partners, NGOs and other civil society organizations should be sought in order to reduce the financial burden on the institutions at least at the beginning. In the long term, more durable solutions to the funding problem that are consistent with the existing cost recovery policy should be explored.

The advocacy program should also encourage health care training institutions to include health care waste management into their curricula. All efforts should be made to inform and educate key stakeholders in order to achieve unity of purpose and action. These efforts should include institutions that are responsible for approving new health institutions, e.g. Private Hospitals and Maternity Homes Board, to ensure that they insist on the health care waste management readiness of new institutions in terms of facilities, human resources, plans and other aspects of capacity to deliver. The same rigorous standards should be maintained in the monitoring of existing institutions and sanctions should include the withdrawal of certificates until the relevant shortfalls are corrected.

Health care waste management involves more than one sector. Intersectoral collaboration is therefore necessary for the effectiveness of the implementation of the programmes since the key players come from different ministries with their individual command structure

7.1 General Principles of Implementation

One of the key principles that inform the implementation plan outlined in the ensuing sections include '*the polluter pays*' principle which requires the generator of waste to be legally and financially responsible for its disposal. The other principles are:

The Basel Convention - concerned with trans-boundary movements of hazardous waste including health care waste

The Precautionary Principle, which advocates the adoption of measures to protect health and safety when the magnitude of the particular risk is uncertain.

The Proximity Principle, which requires hazardous waste including health care waste to be disposed of at the closest possible location to, its source in order to minimise the risks involved in its transport.

The Environmental Policy seeks to guide development in accordance with quality requirements to prevent, reduce and, as far as possible, eliminate pollution and nuisances.

The National Environmental Sanitation Policy, 1999 also requires all health care institutions to establish institutional waste management systems for the primary management of wastes. It requires Health Care Facilities to pre-treat health care waste (e.g. by autoclaving) prior to storage. The policy further states that District Assemblies shall provide separate collection of hazardous and health care waste. Transport of such waste shall be in closed no-compaction vehicles, which should be cleaned and/or disinfected at the end of every collection day

7.1.1 At the Institutional Level

At the institutional level, the Public Health Units of the larger public health institutions shall have the overall responsibility for the management of health care waste. This is in line with the MOH's policy to set up public health units to be responsible for all public health activities in hospitals. Each health care facility shall establish a Health Care Waste Management Committee (HCWMC) appointed by the head of the institution, or make an alternative arrangement to supervise, advise and monitor waste management within the facilities. In smaller institutions or private sector institutions, the appointment of a properly trained HCW Manager with the requisite authority to effectively implement HCW policies and guidelines shall suffice.

The membership of HCWMC shall include:

- The Head of the Institution or His/Her Appointee (who will serve as the Chairman)
- All Departmental Heads
- Infection Control Officer
- The Radiation Control Officer (likely to be a trained radiographer)
- The Matron or Sister in Charge
- The Financial Controller
- The Public Health Unit Head/Environmental Health officer (who will be the HCW Manager)
- Union Representatives
- The Local Authority Representatives
- Representatives of the Local Community.

The Health Care Waste Management Committee shall meet regularly (at least quarterly) to discuss issues related to health care waste management in the hospital.

The Committee shall begin its work with an initial assessment of the HCWM practices and procedures currently in place. This should provide baseline information for the monitoring and review activities.

The Committee shall review any HCWM plans already in place and develop new ones in line with this policy and guidelines. Where there is no plan in existence, the

committee shall develop one using a participatory approach in order to enlist the support of all concerned right from the outset.

The committee shall implement the plan so developed by appointing and supervising substantive officers. There shall be periodic site visits to observe the HCWM staff at work in addition to the regular reports that the substantive staff are required to submit to the Committee.

Training for the HCWM staff shall be a priority; both pre- and in- service training shall be offered to all staff to ensure that they are very much abreast with developments in the HCWM.

The HCW Manager shall do supervision of the labourers and other auxiliary staff. However, this function shall not be the preserve of the line managers. Considering the fact that waste is generated in all sections of the institutions, it would be expedient for the managers of the respective departments to have authority over the auxiliary staff. There should therefore be effective coordination between the HCW Managers and the heads of department in which the auxiliary staff work so that supervision will be effective. HCW Managers themselves should pay surprise visits to all departments to observe their staff at work and to ensure that the work is being done as planned. These visits will also provide opportunities for coaching whilst engendering discipline.

Participatory planning and evaluative methods should be adopted with the institutions taking the stance of a learning organization. *How things can be done better* should be the focus.

The activities of the health care waste management staff shall be documented. Proper store keeping measures in respect of logistics should be adopted. These records are useful in validating evaluative findings. For instance the number and type (in terms of colour coding) of polythene bags and plastic waste containers in store, numbers issued out and the quantities received, when issues and receipts took place and who received or issued them and to whom they were issued will all be valuable information that could be used to validate records of waste processed.

This documentation shall cover all the aspects of waste management: The type, volume and/or weight of waste, where it was generated and the person processing it

should all be documented. A label attached to the bin or plastic bag should also provide this information.

7.1.2 Local Arrangements

Local arrangements include those activities that the institution and their respective communities and district assemblies can come together to involve their people in for effective implementation of the policy. The inclusion of a representative of the district assemblies and the community on the HCWMCs is to facilitate the involvement of the community and also to safeguard their interest. Matters related to acquisition of land for final disposal sites, protection of disposal sites against unauthorized visits and scavenging are issues that require community cooperation.

The local authorities should also be involved in the negotiation for facility sharing agreements with neighbouring institutions. By involving the local authorities in the HCWMC, such decisions can be facilitated in a manner that promotes the active support of all. Political and administrative boundaries need not influence such cooperation; what is key is the proximity and cost effectiveness.

The district/municipal/metropolitan authorities are to enforce compliance to standards and should take responsibility for external transportation and final disposal of waste.

District health authorities who will also be supervised by the regional health directorate will do direct supervision of the individual institutions. Information flow regarding statistical information on HCWM will be communicated along these lines with the institutions reporting to the District Director of Health Services who will collate the reports from all institutions under his care and forward it to the Regional Director of Health Services who, in turn, will forward the collated regional information to the Head of Occupational and Environmental Health Unit at the National level.

7.1.3 At the National Level

At the national level, the Occupational and Environmental Health Unit of the Public Health Division will collaborate with all the divisions to ensure

smooth implementation of the policy

The various technologies for processing waste should be assessed and rationalised. The standards of emission, etc should be developed and a structure put in place to monitor them. The Ghana Standards Board and the EPA should approve the technologies.

The MOH and Ministry of Finance should make some budget allocations to assist the health institutions with the initial investment in health care waste treatment equipment. The development partners, NGOs and civil society should be involved in resource mobilization.

7.2 Dissemination Strategy

In developing this policy and guidelines, a participatory approach was adopted. Consequently, representatives of stakeholder organizations came together in workshops and discussed the issues of concern regarding HCWM. This approach promoted the spirit of teamwork and ownership of the policies and guidelines. The dissemination strategy envisioned will follow the same participatory approach used in preparing the policy

The following activities are envisaged:

a) The Policy and Guidelines will be presented to a national workshop of stakeholders who will review and validate the policy as well as the National Action Plan (NAP).

b) The document will be presented to regional directors and other senior health managers, district directors and managements of teaching and regional hospitals and professional health associations for their input. Any relevant amendments arising from those sources will be made.

c) The final document will be presented to the Honourable Minister for Health

d) It will also be presented to health workers, relevant NGOs, opinion leaders and the public; and in those districts in which the border

towns involved in the West African Corridor Project are located as well as other selected pilot districts.

e) Managers at the regional level will then be expected to organize dissemination sessions to explain the contents of the policy to staff in their regions, districts, sub districts and health facilities.

f) Funds will therefore have to be mobilized to ensure that the regional and district disseminations progress on schedule.

7.3 Implementation Road Map

The proposed timetable for the dissemination of the policy and its implementation are summarized in Table 7.

Table 7: Work Plan

Strategy	Activities	Timing	Responsible Persons
1. Strengthen institutional and legal framework for health care waste (mw) management	▪ Review of draft HCWM policy and guidelines by working group	Feb- March, 2004	Co ordinator
	▪ Development of National HCWM action plan (NAP)	April, 2004	Dir PPME, MOH
	▪ National workshop on HCWM To launch NAP and steering committee	May 2004	Dir PPME, MOH
	▪ Finalization of policy & action plan	May, 2004	Co ordinator
	▪ Recommendation to Honourable Minister of Health for endorsement	July 2004	[illegible]
	Legislation - Draft a law on health care waste management	Jan - July, 2005	Hon Minister of Health
2. Dissemination	▪ Dissemination at regional & district levels- presentation of doc at senior managers, RHMT & DHMT meetings	August - Nov 2004	Steering Committee
3. Improve health care waste management process	▪ Provide adequate pre – collection materials.	July - December 2004 and on going	Dir PPME
	▪ Provide adequate health care waste packaging and storage bins.		MOH, GHS, HASS, CHOs, Teaching hospitals
	▪ Provide incinerators and other identified relevant equipment for treatment of wastes (by levels)		

Strategy	Activities	Timing	Responsible Persons
	• Provide vehicles for transporting wastes for treatment and final disposal Provide health personnel with personal protective equipment (PPE)		
4. Training health personnel	• Development of standard Operating Procedures for each stage of the HCWM process Short –term overseas training in HCWM for key persons	June, 2004 July – October, 2004	Steering Committee HRDD
	• Develop training programmes (including modules) for health personnel – TOT and Basic training on health care waste management	Ibid	Consultants/Working group
	• Recruit environmental health officers	June, 2004	HRDD
	• Selection of pilot districts including border towns in corridor project districts	[illegible]	Dir PPME [illegible]
	Training for Environmental Health & other HCWM staff on o HCWM o Environmental and health impact assessment	[illegible]	HRDD [illegible] Committee
5. Establishment of Institutional structures	Institutionalisation of reporting structure Formation of health care waste committees at all levels and in health institutions and allocation of responsibilities • District Microplanning • Supervision of health care waste management in institutions, sub districts and districts	[illegible] December [illegible] on going	Steering Committee regional [illegible] directors
6. Development of partnerships – public – private and civil society in health care waste management	Identification of potential collaborating sectors and field of interventions. Development of a charter of responsibilities between sub-sectors within health care waste management Establish formal mechanism of collaboration, exchange and communication among health facilities and other stakeholders at the local level Plan operational activities of waste management plan	September – Dec 2004	Dir PPME, Steering committee
7. Follow up	Supervisory visits from HQ,	January	

Strategy	Activities	Timing	Responsible Persons
[illegible]	regional and district & institutional levels.	December 2005 & on going	RDHS, DDHS, [illegible], teaching hospital [illegible] of facilities
	Mid-term Survey on progress of HCWM	January – March, 2006	
	• [illegible]	Jan – March 2006	
[illegible]	• Formation of steering committees • Adoption of work plan • Meetings of committee to provide direction to project • Monitoring of implementation activities	April 2004 June 2004 December, 2006	Dir PPMI Co ordinator Steering committee

7.4 Responsibility for Implementation

This policy is meant to provide guidance for the health sector as a whole. Each sub sector namely, the Ghana Health Service, the Teaching Hospitals, Quasi-Government Hospitals, Mission Hospitals and the Private sector health institutions are to implement these policies and guidelines
The MOH therefore has the responsibility for its implementation

There are however other ministries that play complementary roles: The district/municipal/metropolitan assemblies, the Ministry of the environment and Science, Ministry of Local Government and rural Development, and Veterinary Services Department. The policy is therefore meant to dovetail the plans and responsibilities of these MDAs. Thus whilst the MOH through the individual institutions is responsible for segregating, storing and treating HCW, the district/municipal/metropolitan assemblies have to ensure that the waste is transported and disposed of in the appropriate manner. In practise therefore, the health institutions' responsibility translate into the proper segregation,

treatment where possible and transport to the transit point. The district/municipal/metropolitan assemblies have to ensure that there are well-trained and effective companies in the system to do the transportation and disposal and in some cases, treatment. They are the ones to screen, license and supervise the private waste management companies.

[illegible] Monitoring and Review

Monitoring and review are very critical functions for the effectiveness of any programme. No matter how well a programme is planned and implemented, there are chances that some details may be overlooked. Good supervision and monitoring, as processes are underway, are critical in addition to post audits, to assure the discovery of errors and their correction in good time. They also provide the opportunity to review the plans as well as training programmes in order to make them more effective. Periodic reviews are also important in accessing program impact. Thus the effectiveness of the programmes will be assessed from both the point of view of management processes and programme impacts. The guidelines for Monitoring and Review are presented in the Sections 8.1 to 8.2.3.

8.1 Monitoring and Control

The objective of monitoring and control is to ensure that problems and risks involved are identified while preventing the development of future problems and enhancing safety.

Compliance with laid down regulations and guidelines will be the norm while district assemblies are expected to enforce compliance.

Though the HCWM committees are to advise on the handling and disposal of waste, daily supervision is to be carried out by the waste control manager (line manager of labourers and auxiliary staff involved in waste management) who in turn is answerable to the head of the institution. The institutional heads therefore have overall responsibility for ensuring that procedures are in place, are being implemented and sanctions enforced where appropriate. They are expected to work closely with the HCWM committee which they (or their representative) chair and conduct regular spot checks.

In addition to daily and weekly inspections of procedures, the following parameters are to be monitored:

a) Standard Operating Procedures (SOPs) which should be developed by the various subsectors in health for their staff involved at each stage of handling

waste should be monitored frequently by supervisors in the health facility, by the DHMTS and the RHMTS.

The SOPs should cover areas like waste minimization, segregation of waste, transportation, storage, treatment and final disposal. In addition, it should cover the disinfection of reusable health care risk waste containers based on standards for disinfection as required by this guideline.

b) Minimum environmental performance requirements for controlled combustion treatment facilities like incinerators should be carried out at the onset of use of the facility and at least once yearly based on guidelines to be provided by the EPA.

Where it may be considered more effective to conduct these determinations centrally, arrangements should be made to organize testing from national level.

8.2 Audits

8.2.1 Periodic Management Audit

Each regional directorate should arrange to carry out their own internal audit on waste management practices in their facilities at least once annually, and follow up any serious incident, which is relevant to waste management procedures. This is in an effort to amend procedures where appropriate in order to improve the management of the waste. The results of the audit should be forwarded to GHS / MOH headquarters and communicated to health institutions involved.

8.2.2 External Random Audit

Random audits on waste management will be carried out each year by the Ministry of Health, which may delegate the Occupational and Environmental Health Unit, Institutional Care Division or other appropriate department to carry out this function on its behalf.

Additionally, audits offered by audit bodies external to the MOH will be encouraged to facilitate objective evaluations, which favour comparisons with international norms on waste management.

8.2.3. Audit Tool

Audit tools designed for measuring compliance with clinical waste procedures should be used for audits. An example of such an audit tool is to be found at Appendix 2

8.3 Reviews

There should be a review of the performance to the HCWM programme two years after the launch of the policy and at the end of the fifth year to assess the compliance and the programmes impacts. These reviews will use the findings of studies conducted on health care waste practices in the hospitals as baseline and will assess the progress of the programme against the key indicators established. The types of waste disposal methods in use, emissions from incinerators and whether the composition meets the standards set by the relevant authorities and other issues will be tracked down.

Bibliography

[illegible]

[illegible] [illegible]

[illegible] [illegible] [illegible]

Waste Collection point	Waste Category (Specify)	Quantity of Waste Generated per Day (Weight and Volume)													
		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
		Kg	Litre	Kg	Litre	Kg	Litre	Kg	Litre	Litre	Kg	Litre	Kg	Litre	Kg

A2.1: Sharps Handling and Disposal

Ward / Dept [illegible] Date [illegible] Time [illegible]

CRITERIA	Y	N	N/A	COMMENTS	REMEDIAL ACTION
The box used is as specified in The Safe Use and Disposal of Sharps Policy					
The box is assembled in accordance with manufacturer's instructions					
The sharps container is safely sited in a suitable position (chosen by risk assessment) for convenient use, but inaccessible to young children					
The sharps container is filled according to the manufacturer's instructions					
The contents of sharps boxes are appropriate					
The sharps container is free from protruding sharps					
The sharps containers are available according to local needs					
The sharps containers are labelled with ward name / number, and dated when full					
Full sharps containers are secured / sealed prior to collection					
Full sharps containers are safely stored prior to collection					
Correct response obtained from a ward/unit member of staff, to the question "What action would you take following a needle stick injury?					

Comments

Appendix 3: Equipment Options and Initial Cost Outlay

	Equipment	Cost
1	Incinerators	
	a. Medium Volume incinerators (LPG Powered; 20 cubic metres capacity)	US$25000 - 40000
	b. Small volume incinerators 8 cubic metres (Biological, waste and others locally manufactured with De Montfort)	US$8,250.00
	c. Large volume incinerators (meet EU Emission Standards)	US$500,0000
2	Autoclave	Refer to BEE/GHS
3	Compost Pit	c3,000,000
4	Biodigestor	Refer to EMU/GHS
5	Ball mills	c5,000,000 - c8,000,000
6	Crusher (high speed pulverizer) c5,000,000 - c8,000,000	

Appendix 4: Relevant Control of Infection Policies and Other Guidance

1 GHS, Policy and Procedures for Infection Prevention Control on Health Facilities, 2002

2. GHS / WHO / GAVI Infection Safety Policy and Strategic Plan, 2000

A2.2 Waste Disposal

CRITERIA	Y	N	N/A	COMMENTS	REMEDIAL ACTION
The Waste Management Policy is available to staff					
The Policy on the safe disposal of immunization waste is available					
Waste Management Posters are on display					
Sharps are disposed of in a safe manner according to local arrangement					
Sharps containers are appropriate for Special Waste collections					
Cardboard boxes are used that are safe to collection					
Waste bins are in good condition and lined with the correct colour bag					
Waste bins are in clean condition					
Waste bins are not overfilled, and depicted [illegible]					
Correct colour [illegible] appropriate					
Correct [illegible]					
Waste bags are secure, not more than 2/3 full, and correctly labelled					
Bags awaiting collection are safely stored away from the public					
If heavy gauge bags are required, an appropriate cord tie is used to secure the bag					
Random [illegible] understand the Waste Management Policy					