National Guidelines for Safe Management of Health Care Waste

Ministry of Medical Services

and

Ministry of Public Health and Sanitation
National Guidelines for Safe Management of Health Care Waste
The Ministries of health would wish to acknowledge the contributions of all those who participated in the development of the National Guidelines for Safe Health Care Waste Management. The development of these guidelines followed a participatory process which involved many stakeholders. The process was guided by an inter-sectoral team of professionals' from various institutions which included government ministries, research institutions and private sectors.

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Lastly, I acknowledge WHO Kenya country office for financial support.

Kepha M. Ombacho,
Chief Public Health Officer, Kenya
FOREWORD

The public is becoming increasingly aware of the diversity of the hazardous waste generated from health care activities. Health Care Waste Management (HCWM) stream which includes storage, collection, transportation and disposal pose major human health and environmental risks. It is therefore essential to manage these wastes through technically feasible and economically viable disposal systems that are consistent with acceptable public health and environmental safe guards. The largest generators of healthcare waste are hospitals, medical training institutions, research laboratories, and the pharmaceutical, veterinary, and cosmetic industries.

Sound management of healthcare waste is crucial for the protection of health and the environment hence it should be integrated into the health care system. The actions involved in implementing effective healthcare waste management programs require multi-sectoral cooperation and interventions at all levels.

Through the implementation of these guidelines, the Ministries of Health are establishing a framework for the management of health care waste for protection of human and environmental health. The guidelines advocates for training of healthcare providers and increasing public awareness as essential elements in safe management of healthcare waste.

The guidelines are designed for use by all healthcare providers, manufacturers of pharmaceutical products, medical training institutions as well as medical research laboratories, public health managers, and any other interested stakeholders within the broader healthcare industry. The guide is also useful to officers of the local authorities charged with the responsibility of waste management. These guidelines will go a long way in supporting the implementation of the Heath Care Waste Management Plan that envisages increasing the number of facilities with health care waste management systems from 20% to 100% for the period 2008 – 2012.

Our two ministries are well positioned to play their role and contribute towards ensuring that all Kenyans enjoy a high quality of life as envisaged in Vision 2030. To achieve this, our ministries will endeavour to use available resources as efficiently as possible in order to maximize results and receive value for money. We renew our commitment to creating an enabling environment for the implementation of these guidelines in partnership with development partners, private sector and other stakeholders to reduce risks on human health and environment.

Mary W. Ngari, CBS
Permanent Secretary
Ministry of Medical Services

Mark K. Bor, CBS
Permanent Secretary
Ministry of Public Health and Sanitation
The National Guidelines for Safe Management of Healthcare Waste is as a result of the need to regulate the disposal of hazardous wastes arising from the healthcare industry. The emergence and re-emergence of diseases such as HIV/AIDS and Hepatitis B and C with high per capita consumption of medical commodities and generation of the hazardous waste thereof has made the development of these guidelines inevitable.

If not properly managed, the large volumes of potentially hazardous waste can pollute the environment and consequently be injurious to public health. The implementation of these guidelines therefore, is essential for the achievement of sound management of healthcare waste. A deliberate attempt will be made to avail for use within the wider healthcare industry. Efforts have been made to include the most recent recommendations of healthcare waste management guidelines from the World Health Organization.

In order to train health care facility managers, operators of waste handling equipment, waste handlers (generators, handlers, collectors and transporters), training manuals will be developed to facilitate this process. Further, awareness on the need for safe management of health care wastes will be created to technical oriented health management teams and consumer oriented boards and committees.

Dr. F. Kimani,
Director of Medical Services

Dr. S. K. Sharif,
Director of Public Health and Sanitation
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<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>AOP</td>
<td>Annual Operation Plan</td>
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<tr>
<td>BCC</td>
<td>Behaviour Change Communication</td>
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<td>CCN</td>
<td>City Council of Nairobi</td>
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<td>EA</td>
<td>Environmental Audit</td>
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<td>EAI</td>
<td>Environmental Impact Assessment</td>
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<td>EMCA</td>
<td>Environmental Management and Coordination Act (1999)</td>
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<td>FEFO</td>
<td>First to Expire, First Out</td>
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<td>FIFO</td>
<td>First In, First Out</td>
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<td>HBV</td>
<td>Hepatitis B Virus</td>
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<td>HCF</td>
<td>Health Care Facility</td>
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<td>HCV</td>
<td>Hepatitis C Virus</td>
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<td>HCW</td>
<td>Health Care Waste</td>
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<td>HCWM</td>
<td>Health Care Waste Management</td>
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<td>HCWMP</td>
<td>Health Care Waste Management Plan</td>
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<td>HCWMT</td>
<td>Health Care Waste Management Team</td>
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<td>HFMT</td>
<td>Health Facility Management Team</td>
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<td>KEMRI</td>
<td>Kenya Medical Research Institute</td>
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<td>KMLTTB</td>
<td>Kenya Medical Laboratory Technicians and Technologists Board.</td>
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<td>KMTC</td>
<td>Kenya Medical Training College</td>
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<td>KNH</td>
<td>Kenyatta National Hospital</td>
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<td>MGBs</td>
<td>Mobile Garbage Bins</td>
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<td>NEMA</td>
<td>National Environment Management Authority</td>
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<td>OH&amp;S</td>
<td>Occupational Health and Safety</td>
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<td>OHSMS</td>
<td>Occupational Health and Safety Management System</td>
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<td>POPs</td>
<td>Persistent Organic Pollutants</td>
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<td>PPE</td>
<td>Personal protective Equipment</td>
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<td>RVP</td>
<td>Rift Valley Province</td>
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<td>SOP</td>
<td>Standard Operating Procedure</td>
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<td>VCTs</td>
<td>Voluntary Counselling and Testing Centres</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WMP</td>
<td>Waste Management Plan</td>
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<td>WMT</td>
<td>Waste Management Team</td>
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<tr>
<td><strong>Biochemical transformation:</strong> The breakdown of compounds by enzymes.</td>
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<td><strong>Biodegradable substance:</strong> A substance that can be degraded by microorganisms.</td>
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<td><strong>Biomedical waste:</strong> Any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological products.</td>
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<tr>
<td><strong>Board:</strong> The Radiation Protection Board as established under the Radiation Protection Act, Chapter 243, Laws of Kenya.</td>
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<td><strong>Chemical transformation:</strong> Change of substance through chemical reactions</td>
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<td><strong>Clinical waste:</strong> Any waste arising from provision of healthcare or bio-medical research.</td>
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<td><strong>Cytotoxic waste/genotoxic:</strong> Waste generated during management of cancer.</td>
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<td><strong>Disposal site:</strong> Any area of land on which waste disposal facilities are physically located or final discharge point without the intention of retrieval but does not mean a re-use or re-cycling plant or site.</td>
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<td><strong>Domestic Waste:</strong> Means waste generated from residences.</td>
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<tr>
<td><strong>Environment:</strong> Surroundings, including water, air, soil and their interrelationship, as well as all relationship between them and any living organisms.</td>
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<td><strong>Environmentally Sound Management of Waste:</strong> Taking all practical steps to ensure that waste is managed in a manner which will protect human health and the environment against the adverse effects which may result from the waste.</td>
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<td><strong>Exporter:</strong> Any person who causes trans-boundary movement of waste out of the country.</td>
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<td><strong>General waste:</strong> Waste that is generated from a health care facility and not from a medical procedure and therefore no infectious content in it.</td>
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<td><strong>Generator:</strong> Any person whose activities produces healthcare waste or is in possession and/or control of those wastes.</td>
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<td><strong>Hazard:</strong> A substance, mixture or substances, process or situation that have the potential to cause harm to human health or adverse effect to the environment.</td>
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<td><strong>Hazardous waste:</strong> A waste that is considered to be of special risk to human health or environment and therefore needs special management.</td>
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<tr>
<td><strong>Healthcare waste:</strong> Waste that is generated during the diagnosis, treatment or immunization of human beings or animals, in bio-medical research and in the production or testing of biological products.</td>
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<td><strong>Importer:</strong> Any person who causes trans-boundary movement of waste into the country.</td>
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<td><strong>Incineration:</strong> The controlled burning of solids, liquids, gaseous combustible waste to produce gases and residues containing little or no combustible materials.</td>
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<tr>
<td><strong>Infectious waste:</strong> All kind of waste that may transmit viral, bacterial, fungal or parasitic diseases to human beings and animals.</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Label</td>
<td>The written, printed, or graphic matter on or attached to the container or wrapper of packaged waste.</td>
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<td>Mixed material waste</td>
<td>Waste from products containing a mixture of substances, at least one being xenobiotic or waste from the manufacture of such products and where simple sorting may not separate the substances.</td>
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<td>Municipal solid waste</td>
<td>Waste from household, commerce, administration and service companies that are disposed off through the public waste management system.</td>
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<td>Packaging</td>
<td>The container together with the protective wrapping used to carry waste during storage and transportation.</td>
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<td>Poison</td>
<td>A substance that can cause disturbance of structure or function, leading to injury or death when absorbed in relatively small amounts by human beings, plants and animals.</td>
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<td>Prior Informed Consent (PIC)</td>
<td>The international operation procedure for exchanging, receiving and handling notification information by the competent authority on waste.</td>
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<td>Protective clothing</td>
<td>Any clothes, materials or devices that are designed to provide protection to the user when handling hazardous material.</td>
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<tr>
<td>Radioactive Waste</td>
<td>Any radioactive material that has been, or will be, discarded as of being of no further use.</td>
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<tr>
<td>Recycling of waste</td>
<td>The processing of waste material into a new product of similar chemical composition.</td>
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<tr>
<td>Reprocessing</td>
<td>The processing of waste into a new product of different chemical composition.</td>
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<tr>
<td>Reuse</td>
<td>Waste reused with or without cleaning and/or repairing.</td>
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<td>Segregation</td>
<td>Any activity that separates waste materials for processing.</td>
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<td>Storage</td>
<td>Temporary placement of waste in a suitable location or facility where isolation, environmental and health protection and human control are provided in order to ensure that waste is subsequently retrieved for treatment and conditioning and/or disposal.</td>
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<td>Thermo-transformation</td>
<td>Change of a substance through application of high temperature with or without pressure.</td>
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<tr>
<td>Toxic Chemical</td>
<td>Any substance, which on entry into an organism through ingestion, inhalation and dermal contact is injurious, causes physiological, or biochemical disturbances or otherwise causes deterioration of the functions of the organism in any way.</td>
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<tr>
<td>Treatment</td>
<td>When used in reference to waste management, it means, any method, technique or process designed to change the biological character or composition of healthcare waste so as to reduce or eliminate its potential for causing harm.</td>
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<tr>
<td>Waste Generator</td>
<td>Any person whose activities or activities under his or her direction produces waste or if that person is not known, the person who is in possession or control of that waste.</td>
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<tr>
<td>Waste Management</td>
<td>The activities, administrative and operational, that are used in handling, packaging, treatment, conditioning, reducing, recycling, reusing, storage and disposal of waste.</td>
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**Executive Summary**

Health-care establishments have a “duty of care” for the environment and for public health, and have particular responsibilities in relation to the waste they produce. The onus is on such establishments to ensure that there are no adverse health and environmental consequences of their waste handling, treatment, and disposal activities.

In publishing these guidelines, the health ministries aim not only to promote a sound managerial approach and the use of appropriate technologies, but also to inform health care managers about the health risks that result from inadequate management of health-care waste.

The advice and guidance offered are intended to assist both national bodies and individual medical institutions to improve health-care waste management. The intended target groups include healthcare providers, biomedical research institutions, medical schools, public health and hospital managers, and other administrators of health-care establishments, policy-makers, regulators, waste managers, environmental health professionals and any other interested stakeholders within the broader healthcare industry.

All individuals exposed to hazardous health care waste are potentially at risk, including those within health-care establishments, and those outside these sources who either handle such waste or are exposed to it as a consequence of careless management. The main groups at risk are health care providers, patients in health-care establishments or receiving home care, visitors to health-care establishments, and workers in support services allied to health-care establishments, such as hospital cleaners, laundry staff, waste handlers, and scavengers.

The guidelines address several categories of health care waste, which include infectious wastes, sharps, pathological wastes, pharmaceutical wastes, radioactive wastes, genotoxic/cytotoxic waste, chemical wastes and waste with high content of heavy metals, pressured containers and non infectious waste. Management of waste water from health care facilities has also been addressed.

These guidelines recommend safe, efficient, sustainable, affordable and culturally acceptable methods for the treatment and disposal of health-care waste, both within and outside health-care establishments. Particular attention is paid to basic processes and technologies for safe health care waste management.

Smaller health-care establishments in remote locations or with very limited resources may wish to confine themselves to the minimal healthcare waste management recommended in these guidelines.

It is recommended that personnel involved in management of health care waste be trained and special attention be accorded to occupational safety and health. Environmental impact assessment is recommended for new facilities while EnvironmentalAudit is a requirement for existing facilities.

Implementation of these guidelines will protect public health and provide a safer working environment, minimize waste generation and environmental impacts of waste treatment and disposal, enhance the safe handling of healthcare waste and set standardized healthcare waste management practices. These guidelines also specify roles and responsibilities of all those engaged in or affecting the generation, storage, transportation, treatment, and disposal of healthcare waste.
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Chapter 1.0

INTRODUCTION

1.1 About these Guidelines

These guidelines provide a minimum standard for safeguarding public health and the environment through efficient management of health care waste. All types of health care waste are considered in these guidelines and each health care facility (HCF) is responsible for managing its waste, from the point of generation to final disposal, i.e. “Cradle to grave”.

The guidelines provide a framework of waste management strategies outlined below:

i. Teams for waste management, planning and auditing;
ii. Reduce, recycle and reuse
iii. Waste labelling and containment;
iv. Proper waste handling, segregation, storage and transport;
v. Correct waste treatment and disposal

These guidelines is recommended to all stakeholders in the health industry and in particular all those involved in delivery of health care within the health care system in Kenya. Specific training programs targeting different actors at all levels of health care will be developed. In addition to covering all the areas within the waste stream, issues of occupational safety and health will be included in the training.

Adoption of these guidelines should be accompanied by commitment of each HCF through the establishment of a Health Care Waste Management Team (HCWMT) and development of a Health Care Waste Management Plan (HCWMP) that will assist HCF to manage its waste. The operations of these guidelines should be incorporated into the facility Annual Operation Plan (AOP).

1.2 Background

The management of health-care waste is an integral part of a national health-care system. Hazardous waste is generated during the provision of healthcare, bio-medical research, manufacture of pharmaceutical, veterinary and other healthcare products. Health-care activities generate significant amounts of hazardous waste such as mercury and expired pharmaceuticals, as well as general waste. Health-care waste can cause serious harm if not managed properly.

In the year 2000, WHO estimated that injections with contaminated syringes caused 21 million hepatitis B virus (HBV) infections (32% of all new infections), two million hepatitis C virus (HCV) infections (40% of all new infections) and 260,000 HIV infections (5% of all new infections). Recognizing the magnitude of this problem, many developing countries have taken to respond to this need. These include the establishment of regulatory frameworks, development of national plans, and the development of innovative approaches. However, funding for health-care waste management remains inadequate.

A holistic approach to health-care waste management should include a clear delineation of responsibilities, occupational health and safety programs, waste minimization and segregation, development and adoption of safe and environmentally-sound technologies, and capacity building. There are over 4500 public and private facilities offering healthcare services in Kenya. Out of these, the government owns about half while the other half belongs to the private organizations. These facilities provide health care services to an estimated population
These health care facilities generate health care waste in the course of serving the people. The hazards associated with scattered, small sources of health-care waste should not be overlooked. Waste from these sources includes those generated by; private clinics, hospitals, nursing homes, health centres, dispensaries, home-based health care and illicit intravenous drug use.

1.3 Objectives
The objectives of these Guidelines are to maintain public health safety by:
   i. Minimizing health care waste generation and impacts to the environment
   ii. Setting standardized healthcare waste management practices.
   iii. Specifying roles and responsibilities of health care waste managers and handlers.

1.4 Scope
These guidelines are intended for use by all healthcare providers, bio-medical research institutions, medical schools and any other interested stakeholders within the broader healthcare industry.
Chapter 2.0

HEALTH EFFECTS OF HEALTH CARE WASTE MANAGEMENT

Healthcare facilities produce waste during the diagnosis, treatment and carrying out of research. Annually these facilities produce large quantities of infectious, pathological, sharps, chemicals, pharmaceutical and radioactive wastes. It is on this basis that the Ministries of health have developed these National guidelines for safe healthcare waste management.

2.1 Hazards From Health-Care Waste

Health-care waste includes a large component of general waste (75-90%) and a smaller proportion of hazardous waste (10-25%). The general waste includes paper, plastic packaging, food remains which emanate mainly from housekeeping and administrative activities in a health facility.

Failure to segregate hazardous waste from general waste renders the entire volume of HCW infectious according to the precautionary principle, hence the importance of setting up a safe and integrated health care waste management system.

Exposure to hazardous health-care waste can result in disease or injury. The hazardous related to HCW include infections, injuries due to sharps, poisoning and radioactive exposure. All individuals exposed to hazardous health-care waste are potentially at risk, including those within health-care establishments that generate hazardous waste, and those outside these sources who either handle such waste or are exposed to it as a consequence of careless management.

The main groups at risk are the following:
   i. Health care providers
   ii. Patients in health-care establishments or receiving home care;
   iii. Visitors to health-care establishments;
   iv. Workers in support services allied to health-care establishments, such as hospital cleaners, laundry staff, and waste handlers including scavengers

2.2 Health Effects

The improper management of medical waste causes serious environmental problems in terms of air, water and land pollution. The nature of pollutants can be classified as biological, chemical and radioactive. Environment problems can arise from the mere generation of medical waste and from the process of handling, treatment and disposal.

Mismanagement of hospital waste implies a combination of improper handling of waste during generation, collection, storage, transport and treatment. Improper handling comprises several unsafe actions, such as handling without personal protective equipment (PPE), poor storage (e.g. high temperature conditions combined with prolonged storage times before treatment), manual transport for longer distances, use of uncovered containers instead of closed plastic bags, etc. Other examples include exposure times beyond acceptable limits, lack of worker and equipment decontamination procedures, etc., all of which affect hospital workers in different ways.

Medical equipment used to penetrate skin and muscles like needles, blades, etc. have been documented to spread diseases from contaminated sharps to workers and patients. When waste that has not been pre-treated is being
transported outside the hospital, or dumped openly, pathogens can enter the atmosphere. These pathogens can find their way to drinking water, foodstuffs, soil, etc., or they can remain in the ambient air.

Chemical pollutants that cause outdoor air pollution have two major sources: open burning and incinerators. The presence of plastics and hazardous materials in the waste will generate harmful gases – such as oxides of sulphur, oxides of nitrogen, carbon dioxide, etc. – and suspended particulate matter which may contain heavy metals. These when inhaled can cause respiratory diseases. Certain organic gases, such as dioxins and furans, are carcinogenic whose effects have longer latency periods. Open burning of medical waste is practiced in many Kenyan Health Facilities.
Chapter 3.0

CHARACTERIZATION OF HEALTH CARE WASTE

Health-care waste includes all the waste generated from health-care facilities, laboratories and research centres. In addition, it includes such waste originating from “minor” and/or “scattered” sources.

3.1 Categories of Waste

These categories include infectious, pathological, sharps, pharmaceutical, radioactive, genotoxic/cytotoxic, non infectious, pressured containers, chemical waste and that waste with high content of heavy metals.

3.1.1 Infectious waste

This category of waste is suspected to contain pathogenic microorganisms. It includes:

i. Cultures and stocks of infectious agents from laboratory work;

ii. Waste from surgery and autopsies on patients with infectious diseases e.g. tissues, and materials or equipment that have been in contact with blood or other body fluids;

iii. Waste from patients in isolation wards (e.g. excreta, dressings from infected or surgical wounds, clothes soiled with human blood or other body fluids);

iv. Waste that has been in contact with patients undergoing haemodialysis (e.g. dialysis equipment such as tubing and filters, disposable towels, gowns, aprons, gloves, and laboratory coats among others);

v. Any other instruments or materials including food remains that have been in contact with infected persons or animals (e.g. HIV/AIDS, Diabetes home based care and intravenous drug use).

3.1.2 Pathological waste

i. Pathological waste consists of tissues, organs, body parts, human foetuses and animal carcasses, blood, infected animals from laboratories, and body fluids.

ii. Within this category, recognizable human or animal body parts are also called anatomical waste.

iii. This category should be considered as a subcategory of infectious waste, even though it may also include healthy body parts.

3.1.3 Sharps

i. Sharps are items that could cause cuts or puncture skin, and may include needles, hypodermic needles, scalpel and other blades, knives, infusion sets, saws, broken glass, and nails among others.

ii. Whether or not they are infected, such items should be considered as highly hazardous health-care waste.

3.1.4 Pharmaceutical waste

i. Pharmaceutical waste includes expired, spilt, and contaminated pharmaceutical products.

ii. This also includes drugs, vaccines, and sera that are no longer required.

iii. The category also includes discarded items used in the handling of pharmaceuticals, such as bottles or boxes with residues, and drug vials.

3.1.5 Radioactive waste

i. Radioactive waste includes solid, liquid, and gaseous materials contaminated with radionuclide.

ii. It is produced as a result of procedures such as in-vitro analysis of body tissue and fluid, in-vivo organ imaging and tumour localization, and various investigative and therapeutic practices.
iii. In addition, the waste is also produced from health-care and research activities involving radionuclide, and related activities such as equipment maintenance and storage.

3.1.6 Genotoxic/cytotoxic waste
i. Genotoxic waste is highly hazardous and may have carcinogenic properties.
ii. It raises serious safety problems, both inside hospitals and after disposal, and should be given special attention.
iii. Genotoxic waste may include certain cytostatic drugs often used in cancer therapy, vomit, urine, or faeces from patients treated with cytostatic drugs, chemicals, and radioactive material.

3.1.7 Chemical wastes
i. Chemical waste consists of discarded solid, liquid, and gaseous chemicals, for example from diagnostic and experimental work and from cleaning, housekeeping, and disinfecting procedures.
ii. Chemical waste from health care may be hazardous or nonhazardous.
iii. In the context of protecting health, it is considered to be hazardous if it is toxic, corrosive, flammable, reactive and or genotoxic.
iv. The non-hazardous chemical wastes consist of chemicals with none of the above properties. These are commonly used in the maintenance of health facilities e.g. disinfectants, detergents, insecticides, and engine oils for machinery and equipment.

3.1.8 Waste with heavy metal content
i. This category includes waste containing Mercury, Cadmium, Lead and drugs containing arsenic among others.
ii. Drugs containing Arsenic should be treated as pharmaceutical waste.
iii. Mercury wastes are typically generated by spillage from broken clinical equipment (their volume is decreasing with the substitution of solid-state electronic sensing instruments i.e. thermometers, blood-pressure gauges, etc.), residues from dentistry procedures and fluorescent tubes.
iv. Whenever possible, spilled drops of mercury should be recovered.
v. Cadmium waste comes mainly from discarded batteries.
vi. It should be noted that certain “reinforced wood panels” used in radiation proofing of X-ray and diagnostic departments may contain Lead.

3.1.9 Non infectious wastes/General wastes
Waste generated from offices, kitchens, packaging material and from stores. It is similar to domestic waste.

3.2 Sources of Health-Care Waste
There are a wide variety of sources of healthcare waste such as, hospitals, clinics, other healthcare institutions, bio-medical research facilities, home-based healthcare, blood banks, veterinary clinics, medical schools etc. At the facility level the composition of wastes is often characteristic of the type of source.
Other health care establishments include community home based care, emergency health care services, blood transfusion centres, outreach health services, funeral homes and mortuaries, laboratories and VCTs.

3.2.1 Sources of Health Care Waste Within a Health Care Facility.
The sources include the following areas: Medical wards, Surgical wards, Operating theatre, Maternity unit, Recovery and intensive care, Isolation wards, Dialysis units, Oncology unit, Out-patient clinic, Emergency room, Dressing and injection room, Radiology, Medical laboratories, Research, Nuclear medicine, Blood bank, Pharmacy and Central Sterile Supply Department.

The list of sources of health care waste outlined above will vary according to the type of facility.
Chapter 4.0  
**LEGISLATIVE FRAMEWORK**

The legal basis for the formulation and implementation of the National Health Care Waste guidelines is provided for by the Public Health Act Cap. 242, Environmental Management and Coordination Act, (EMCA) 1999 and Occupational Safety and Health Act, 2007 of the Laws of Kenya. These guidelines will also operationalize the national policy on injection safety and medical waste management, 2007.

4.1 The Public Health Act, Chapter 242, Laws of Kenya.  
The Public Health Act makes provisions for securing and maintaining health in Kenya by making it an offence for any land owner or occupier to engage in or allow engagement in activities that are likely to cause nuisance, are injurious or dangerous to health, to be undertaken in his/her land.

4.2 Environmental Management and Coordination Act, 1999 (EMCA 1999).  
This Act is aimed at improving the legal and administrative co-ordination of the various sectoral initiatives in the field of environment. It provides a framework for ensuring that environmental considerations are successfully integrated to the country’s overall economic and social development. Regulations made under the Act stipulate specific requirements regarding the issues addressed in the parts, some which are summarized as follows:

It provides for identification and management of waste likely to be produced from proposed projects including health care facilities. It also makes provision for monitoring and evaluation of waste management through environmental audits.

4.2.2 Legal Notice No. 121: Waste Management Regulations, 2006.  
These regulations focus on the management of solid waste, industrial waste, hazardous waste, pesticides and toxic substances, biomedical wastes and radioactive substances. They provide details on the responsibility of the waste generator, adoption of cleaner production principles, waste handling and transportation, waste treatment and disposal.

4.2.3 Legal Notice No. 120: Water Quality Regulations, 2006.  
The regulations address pollution of water resources as well as their conservation. Any development likely to affect water resources (both the surface and ground water) through pollution or use is required by law to comply with these regulations. They provide effluent discharge control standards for both surface and underground water.

4.3 E-Waste Management Guidelines, July 2011.  
These guidelines provide vital information in ensuring the development of a management framework which is needed to enable proper collection and recycling and to ‘set the standards’ therein. It seeks to ensure that health and safety aspects of the people involved in the operations are protected, along with issues of emissions and waste emerging from such operations. The existing e-waste management systems from different stakeholders in the private sector should be streamlined to attract recyclers who make the recycling process safe and efficient.

4.4 Occupational Safety and Health Act, 2007.  
This Act applies to all work places in which any person is either temporarily or permanently and lawfully at work. It stipulates the provisions for securing the health, safety and welfare of persons at work. The Act
also protects other persons not at work against risks to safety and health arising out of or in connection with activities of the persons at work.

The Act deals with issues that include general duties of occupier (persons in actual occupation of a workplace), machinery safety, health general provisions, safety general provisions, chemical safety and welfare general provisions among others.

4.5 The Food, Drugs and Chemical Substances Act, Cap. 254, Laws of Kenya.

It is an Act of Parliament that makes provision for the prevention of adulteration of food, drugs and chemical substances and for matters incidental thereto and connected therewith. This Act prohibits disposal of chemical substances in a manner likely to cause contamination of food or water for human consumption or in a manner liable to be injurious or dangerous to the health of any person.
Chapter 5.0
GUIDING PRINCIPLES AND STRATEGIES

5.1 Guiding Principles for Health Care Waste

In view of the challenge posed by health-care waste and its management, the health sector activities are guided by the following guiding principles:

i. Every person has a right to a clean and healthy environment as enshrined in the constitution of Kenya, 2010.

ii. Preventing the health risks associated with exposure to health-care waste for both health workers and the public by promoting environmentally sound management policies for health-care waste;

iii. Compliance with the Waste Management Regulation of 2006 (EMCA, 1999), and other relevant laws

iv. Supporting global efforts to reduce the amount of noxious emissions released into the atmosphere to reduce disease and defer the onset of global change;

5.2 Basic Principles of Integrated Waste Management

This refers to a waste management system in the context of social and ecological dynamics of material flow, which employs all suitable techniques that are compatible with proper environmental and health safeguards. It is based on seven basic principles of integrated waste management, which includes:

5.2.1 Duty of care principle:
Any organization that generates waste has a duty to dispose of the waste safely.

5.2.2 Sustainable development:
Basic resources should be used by man in a way that they are not irreversibly depleted.

5.2.3 Precautionary approach:
One must always assume that waste is hazardous until shown to be safe.

5.2.4 Rational utilization of resources:
Resources should be allocated to those activities, which result in the greatest improvement in relation to the input.

5.2.5 Responsibility of waste generator:
The waste generator should be responsible for the proper management of the waste.

5.2.6 Polluter-pays-principle:
Waste producers are legally and financially responsible for the safe handling and environmentally sound disposal of the waste they produce.

5.2.7 Proximity principle:
Treatment and disposal of hazardous waste take place at the closest possible location to its source.
Chapter 6.0

HEALTH-CARE WASTE MANAGEMENT PLANNING

6.1 Preliminary Planning for Health Care Waste Management

Planning for health care waste management involves;

i. Setting the management objectives

ii. Defining a strategy that will facilitate careful implementation of the necessary measures and the appropriate allocation of resources according to the identified priorities. An appropriate, safe, and cost-effective strategy will be concerned principally with transport, recycling, treatment and disposal options.

iii. Conducting surveys on waste generation shall provide baseline information on the quantities and classes of waste generated. A national survey of healthcare waste will provide the relevant agency with a basis for identifying actions on a community, district, provincial, and national levels, taking into account conditions, needs, and possibilities.

iv. Setting the targets for waste minimization, reuse, recycling, and cost reduction. A sample sheet for assessment of waste generation is provided in Annex 1.

v. Proper management of health-care waste depends largely on good administration and organization

vi. Adequate legislation and financing is also required.

vii. Active participation by trained and informed staff is necessary.

6.2 Steps of a Waste Management Plan Development

On the basis of waste generation surveys and recommendations, the waste management focal person should provide estimates on the amount and type of waste generated to the WMT.

Existing practices should then be evaluated in the light of these national guidelines and recommendations made to the waste management focal person on how the guidelines can be implemented in each department. (Annex 9)

The following issues should be addressed;

6.2.1 Location and organization of collection and storage facilities

i. Drawings of the establishment showing designated bag-holder sites for every ward and department in the hospital.

ii. Each bag site shall be appropriately designated for health care waste or other waste.

iii. The drawing should show the paths which should be used during transportation of waste among other inclusions.

6.2.2 Design specifications

This should show the type of bag holder to be used, type of trolley or wheeled container to be used and sharps containers, with their specification.

6.2.3 Required material and human resources

An estimate of the financial resources for procurement of waste management commodities should be drawn. It should also include estimates of the number of personnel required for waste collection.

6.2.5 Procedures and practices

i. A flow chart showing procedure for waste minimization, segregation, storage, transportation and disposal should be drawn.
ii. The flowchart should include an outline of monitoring procedures for different waste.
iii. Emergency procedures should be clearly drawn.

6.3 Implementation of the Waste Management Plan
The overall responsibility of implementation lies with the Head of the facility. It involves the following steps:

i. Interim measures should be introduced as a precursor to complete implementation of the new waste management system should be developed by the waste management focal person in collaboration with the WMT, and be appended to the plan.
ii. A Gantt chart should be developed, showing dates of implementation of each part of the new system.
iii. Provision for future expansion of the hospital or of waste storage facilities should be made.
iv. The Head of facility should deploy personnel to the posts with responsibility for waste management.
v. The Infection Control Officer in liaison with the waste management focal person should organize and supervise training programmes for all staff on HCWM.
vi. The WMT should review the WMP annually and initiate changes necessary to upgrade the system.
vii. Design and implement Monitoring and Evaluation mechanisms for the plan.
viii. The Head of facility should prepare an annual report.

6.4 Duties and Responsibilities
6.4.1 Roles and Responsibilities for heads of institutions
The heads of health-care establishments are responsible for the safe disposal of health-care waste generated in their establishments.
They should therefore, take all reasonable measures to:

i. Prevent health-care waste from causing environmental pollution or adverse effects on human health;
ii. Ensure that health-care waste is adequately segregated and safely packed, especially in the case of sharps which should be packed in puncture-proof containers;
iii. Ensure that bags or containers of health-care waste are handled only by those officially licensed to transport and/or dispose of such waste;
iv. Ensure that a transfer note describing the waste is handed to the recipient when waste is transferred;
v. Check for proof that the driver of the collection vehicle is aware of the procedures governing transport of hazardous goods. Such proof shall include but not limited to an authorization letter or a certificate indicating form of training in transportation of health care waste.
vi. If on-site treatment is impossible or uneconomical, cooled storage facilities should be provided and there should be a regular collection by a contractor who has suitable incineration facilities.
vii. When an injection is carried out at a patient’s home, the practitioner is responsible for disposing of syringes, needles, and all other items used including incontinence pads and swabs.
viii. The patient or the care giver shall be responsible for safe disposal of health care waste in case home based treatment, for example in the case of diabetics.
ix. Ensure that ambulances are equipped with puncture-proof containers of appropriate size, mainly for infectious waste and sharps.
x. Ensure that staff is trained in the safe handling of health-care waste.
xi. Ensure that any contractual arrangement for research by workers outside the establishment should include adequate provisions for the safe handling and disposal of waste.
6.4.2 Roles and Responsibilities the facility management team
The facility management team, their roles and responsibilities are summarized on the table below:

<table>
<thead>
<tr>
<th>Person</th>
<th>Roles and responsibilities</th>
</tr>
</thead>
</table>
| Hospital Medical Superintendent | • Forming a waste management team  
                               • Allocation of adequate financial and human resource  
                               • Capacity building of staff on health care waste management                          |
| Heads of Hospital Departments   | • Liaison with the waste management focal person  
                               • Monitor waste management practices  
                               • Ensuring availability of health care waste management commodities                   |
| Infection Control Officer       | • Identify training needs on health care waste management  
                               • Organize and supervise staff training courses on safe waste management  
                               • Monitoring injuries and infection incidences related to health care waste  
                               • Ensure adherence to post exposure prophylaxis protocols                           |
| Head of Pharmacy                | • Control pharmaceutical waste generation through appropriate stocks management           |
| Radiation Officer               | • Control of radioactive waste  
                               • Liaison with radiation protection board for guidelines on procurement and disposal.  
                               • Undertake on job training to the staff on handling radioactive waste               |
| Nursing Officer in charge       | • Participate in continuous training of staff in management of health-care waste;  
                               • Supportive supervision for staff in control of health care waste                  |
| Waste Management focal person   | • Undertake baseline survey on amount and type of waste generated by facilities  
                               • Draw waste management plans  
                               • Directly supervise collection, segregation, storage, transportation, treatment and disposal of health-care waste.  
                               • Liaison with all department to raise the profile of health care waste management  
                               • Facilitate drafting of emergency procedures and dissemination to staff  
                               • Record-keeping                                                                   |

6.5 Management of Health-Care Waste from Scattered Small Sources
The scope of application in management of health care waste from scattered small sources shall include but not limited to private medical or dental practitioners, research facilities, nursing homes, home treatment, ambulance services and veterinary centres.

The options for safe collection, transportation and disposal of health-care waste from small sources, which do not treat their own waste, include the following:

i. The local authority or an authorized private contractor should collect the waste for treatment and take it to a local hospital incinerator or other treatment facility;
ii. An authorized private contractor collects and treats the waste at the contractor’s treatment facility;

6.5.1 Marking of Waste
i. All waste should be clearly marked with self-adhesive or tie-on labels indicating source and type of waste. Infectious, Pathological and Sharp waste should also be marked with the international biohazard symbol. Chemicals should also be marked with the appropriate international chemical hazard symbol. Radioactive waste must be labelled with the appropriate warning symbol as provided in Annex 3a and 3b.

ii. Any contract for collection by a private registered health-care waste carrier should identify the disposal or treatment facility to be used.

6.5.2 Dedicated vehicles
i. The carrier should use dedicated vehicles for the collection and transportation of infectious waste.

ii. Collection and transportation of health-care wastes from their source should be regular and according to schedule.

6.5.3 Storage
i. Any storage of waste before treatment or collection for off-site disposal should be in a secure location designated for the purpose.

6.5.4 Employees knowledge of policy
i. All employees should be able to understand the policy, which should contain details of the procedures to follow in case of a needle-stick injury or exposure to infected blood.
Chapter 7.0

**Waste Minimization, Recycle and Reuse**

Health care waste management and minimization are important issues that require attention due to the risk of needle stick injuries and potential acquisition of hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) and other blood borne diseases associated with inappropriate sharps management; associated increased costs of waste management; and community concern about environmental issues.

The strategies include:

- **Waste minimization** – The quantities of healthcare waste need to be reduced, and the hazardous elements minimized or eliminated.
- **Recycling** – the re-use of these materials as an alternative to disposal.
- **Resource recovery** – waste can be described as a lost resource potentially awaiting recovery. Recovery schemes should be put in place to salvage items such as paper, glass and metal.

### 7.1 Minimization of Waste

Significant reduction of the waste generated in health-care establishments and research facilities may be encouraged by the implementation of certain policies and practices, including the following:

#### 7.1.1 Source reduction

- i. Purchasing reductions, especially selection of supplies that is less wasteful or less hazardous is encouraged.
- ii. Use of physical rather than chemical cleaning methods (e.g. steam disinfection instead of chemical disinfection).
- iii. Prevention of wastage of products during use, e.g. in nursing and cleaning activities.

#### 7.1.2 Recyclable products:

- i. The facility should give preference to re-usable products
- ii. Use of materials that may be recycled, either on-site or off-site.
- iii. Encourage extended producer responsibility

#### 7.1.3 Good management and control practices:

- i. Purchasing of hazardous chemicals should be centralized.
- ii. Monitoring of chemical flows within the health facility from receipt as raw materials to disposal as hazardous wastes is essential.
- iii. Product substitution - substitute products with much waste producing with one that produces less waste.
- iv. Product changes - use better, safer, more efficient products
- v. Procedural changes – change to procedures that produce less waste
7.1.4 Waste segregation
Careful segregation (separation) of waste matter into different categories helps to minimize the quantities of hazardous waste.

7.1.5 Stock management of chemical and pharmaceutical products
i. Frequent ordering of relatively small quantities rather than large amounts at one time (applicable in particular to unstable products).
ii. Use of the oldest batch of a product first (First in, First out - FIFO).
iii. Use of the product that will expire first (First to expire, First out - FEFO)
iv. Use of all the contents of each container.
v. Checking of the manufacture and expiry date of all products at the time of delivery.

7.2 Safe Reuse and Recycling
7.2.1 Reuse and recycling
Medical and other equipment used in a health-care establishment may be reused provided that it is designed for the purpose and will withstand the sterilization process.
i. Reusable items may include certain sharps, such as scalpels, syringes, glass bottles and containers, etc. After use, these should be collected separately from non-reusable items, carefully washed and may then be sterilized by either thermal or chemical sterilization. Examples of sterilization methods for reusable items are provided in 7.2.2.
ii. Plastic syringes and catheters should not be thermally or chemically sterilized; they should be discarded.
iii. Other non infectious wastes such as paper, glass, polythene, food remains should be recycled and re-used. A recycling index is provided as Annex 7.
iv. Other types of wastes not mentioned here are not recommended for recycling or re-use.

7.2.2 Examples of sterilization methods for reusable items
a) Thermal sterilization
i. Dry sterilization - Exposure to 160 °C for 120 minutes or 170 °C for 60 minutes in an oven.
ii. Wet sterilization - Exposure to saturated steam at 121°C for 30 minutes in an autoclave.

b) Chemical sterilization
i. Ethylene oxide
Exposure to an atmosphere saturated with ethylene oxide for 3–8 hours, at 50–60°C, in a reactor tank; the so-called “gas-sterilizer” tank should be dry before injection of the ethylene oxide. Ethylene oxide is a very hazardous chemical; this process should therefore be undertaken only by highly trained and adequately protected technical personnel.

ii. Glutaraldehyde
Exposure to a glutaraldehyde solution for 30 minutes. This process is safer for the operators than the use of ethylene oxide but is microbiologically less efficient.

7.3 WASTE SEGREGATION AND PACKAGING
Waste segregation is separation of wastes according to types and categories.
i. Segregation should;
   a. Always be the responsibility of the waste producer,
b. Take place as close as possible to where the waste is generated, and
c. Be maintained in storage areas, during transportation, treatment and disposal.
ii. The most appropriate way of identifying the categories of health-care waste is by **separating** the waste into colour-coded plastic bags or containers. The recommended colour-coding scheme is provided in Annex 2.

iii. In addition to the colour coding of waste containers, the following practices are recommended:
   a. General (non-infectious) health-care waste can join the stream of domestic refuse for disposal if none can be salvaged.
   b. Sharps should all be collected together, regardless of whether or not they are contaminated.

iv. Sharps containers should be;
   a. Puncture-proof (usually made of cardboard or high-density plastic) and fitted with covers.
   b. Be rigid and impermeable so that they safely retain not only the sharps but also any residual liquids from syringes.
   c. To discourage abuse, containers should be tamper-proof (difficult to open or break) and needles and syringes should be rendered unusable.

v. Liner bags used should be;
   a. Highly resistant to puncturing and tearing with exceptional strength and stretch properties.
   b. They should be of a gauge not less than 150 microns.
   c. Where bins are unavailable or too costly, containers made of dense cardboard are recommended:
   d. Bags and containers for infectious waste should be marked with the international infectious substance symbol (Refer to annex 3a and 3b).

vi. Highly infectious waste should, whenever possible,
   a. Be sterilized immediately by autoclaving.
   b. It needs to be packaged in bags that are compatible with the proposed treatment process. Red bags suitable for autoclaving are recommended.

vii. Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.

viii. Cytotoxic waste, most of which is produced in major hospitals or research facilities, should be collected in strong, leak-proof containers clearly labelled “Cytotoxic wastes”.

ix. Small amounts of chemical or pharmaceutical waste may be;
   a. Collected together with infectious waste.
   b. Large quantities of obsolete or expired pharmaceuticals stored in hospital wards or departments should be returned to the pharmacy for disposal.
   c. Other pharmaceutical waste generated, such as spilled or contaminated drugs or packaging containing drug residues should not be returned because of the risk of contaminating the pharmacy; it should be deposited in the correct container at the point of generation.
   d. Large quantities of chemical waste should be packed in chemical resistant containers.
Chapter 8.0
HANDLING, LABELLING, CONTAINMENT, TRANSPORT AND STORAGE

This section explains the importance of streamlining the process of waste collection, handling and transport to ensure compliance with OH&S and environmental control requirements.

8.1 Organisation
   i. Each HCF must form a core team of waste handlers.
   ii. Waste handlers must be trained and equipped to undertake the handling, internal transportation, spill management, blood, body fluid exposure management and storage requirements of the HCF.

8.2 Internal Transportation
   i. All HCF should conduct a review to optimize the waste collection process, reduce handling and transportation, and to promote safe work practices.
   ii. Transportation routes should avoid where possible food preparation and heavily used areas.

8.3 Waste Labelling
   i. All waste liner bags and waste containers are to be colour coded (Annex 2) and inscribed with hazard marks or stickers and identified in accordance with international waste labelling symbols as provided in Annex 3a and 3b.

8.4 Health Care Waste Tracking
   i. Tracking of HCW is necessary to enable both the regulatory bodies and all other stakeholders to follow the movement of waste from generation to safe final disposal. Tracking may be as simple as a cardboard luggage label attached by string, sticky labels or as sophisticated as a self adhesive bar code. Tracking helps to rapidly identify the source of waste, facilitates segregation, provides feedback, assists in providing data for education purposes, decision making facilitates auditing and may be used to allocate resources for HCWM.
   ii. The use of tracking forms is therefore necessary and would enable both the regulatory bodies and all concerned to follow the movement of waste from generation to safe final disposal. Samples of waste tracking forms are provided in Annex 4a and 4b.
   iii. All liner bags /containers of waste must be clearly marked to identify the HCF, unit (e.g. Ward 20B) and date of collection.
   iv. The illegal dumping of healthcare waste by unscrupulous waste collectors/generators poses a great risk to public health. Tracking the movement of waste from the points of generation through transportation to the final disposal point would guard against the malpractice of illegal dumping (see Annex 4b).

8.6 Handling Waste Bags
   i. Sharps must always be placed in injection safety boxes and never be placed in waste bags.
   ii. Waste must be contained in colour coded and well labelled plastic bags.
iii. General waste should be contained in well labelled black bags.
iv. Waste bags must not be over filled (approx 2/3 of capacity).
v. The volume of a waste bag should not exceed 55 liters.
vi. Excess air should be excluded without compaction, prior to closure using a bag tie at the point of waste generation.

vii. All bags should be held away from the body by the closed top of the bag, and placed directly into a mobile garbage bin or trolley.
viii. Where waste bags are sealed and stored pending collection, they should be in a secure place with restricted access.
ix. There should be a Waste collection schedule.

8.7 Storage

8.7.1 Storage for waste

i. A storage location for health-care waste should be designated inside the health-care establishment or research facility.

ii. Unless a refrigerated storage room is available, storage times for healthcare waste (i.e. the delay between production and treatment) should not exceed the following:
   a. 48 hours during the cool season
   b. 24 hours during the hot season

iii. Cytotoxic waste should be stored separately from other health-care waste in a designated secure location.

iv. Radioactive waste should be stored in containers that prevent dispersion, behind lead shielding. Waste that is to be stored during radioactive decay should be labelled with the type of radionuclide, the date, and details of required storage conditions.

8.7.2 Storage area recommendations

The following are recommendations for transfer station/storage area and its equipment:

i. There should be a water supply for cleaning purposes.

ii. The area should be clearly demarcated & warning trespassers

iii. The storage area should have an impermeable, hard-standing floor with good drainage; it should be easy to clean and disinfect.

iv. The storage area should afford easy access for staff in charge of handling the waste.

v. It should be possible to lock the store to prevent access by unauthorized persons.

vi. Easy access for waste-collection vehicles is essential.

vii. There should be protection from the sun.

viii. The storage area should be inaccessible to animals, insects, and birds.

ix. There should be good lighting and at least passive ventilation.

x. The storage area should not be situated in the proximity of fresh food stores or food preparation areas.

xi. A supply of cleaning equipment, protective clothing, and waste bags or containers should be located conveniently close to the storage area.

xii. Clean up facilities, spills kits, appropriate drainage and banding should be provided. Where wastes are stored in bins the bin must be locked.
8.8 Spill Management

8.8.1 General spill management

HCF should manage waste spills as they occur in the facility.

i. In the case of gross spills, containment is the principal role.

ii. Procedures must specify spill management procedures and the conditions when emergency services such as the Local Municipal Council Fire Brigade section become involved.

iii. It is essential that personnel involved in spill management receive education and training in emergency procedures and handling requirements.

iv. Spill kits should be readily available throughout the hospital with their location known by all staff.

v. Spill kits that have been used should be disposed of with the type of waste that has been cleaned up, e.g. used cytotoxic spill kits should be disposed of with cytotoxic waste.

vi. All spillage should be documented per department and per facility-This will assist in among others designing training protocols.

8.8.1 Infectious waste spill kit.

Infectious waste spill kit should contain at least:

i. Broom, a pan and scraper, mop and mop bucket

ii. A large (10 liter) reusable plastic container or bucket with fitted lid, containing;

iii. 2 infectious waste bags for the disposal of clinical waste;

iv. Disinfectant containing (1%) 10,000 ppm available chlorine or equivalent;

v. Rubber gloves suitable for cleaning

vi. Detergent, sponges / disposable cloths

vii. Personal protective equipment including eye protection, an apron or long

viii. Sleeve impervious gown, a face mask, heavy duty gloves.

ix. Incident report form

x. Waste spill sign.

8.8.2 Cytotoxic spill kit

Cytotoxic spill kit should contain at least:

i. Mop and mop bucket, a pan and scraper.

ii. A large (10 litre) reusable plastic container or bucket with fitted lid, containing;

iii. 2 cytotoxic waste bags for the disposal of cytotoxic waste

iv. 2 hooded overalls, shoe covers, long heavy duty gloves, latex gloves, a face

v. Mask and eye protection

vi. Absorbent toweling / absorbent spill mat

vii. Incident report form

viii. Waste spill sign

8.8.3 Mercury spill kit

Mercury spill kit should contain at least:

i. 2 unbreakable lidded containers

ii. Spill sign

iii. Pasteur pipette, eye dropper

iv. Sodium thiosulphate

v. Face mask
8.9 Collection
i. Wastes should not be allowed to accumulate at the point of production. For this reason a routine programme for their collection should be established as part of the health-care waste management plan.

ii. Nursing and other clinical staff should ensure that waste bags are tightly closed or sealed when they are about three-quarters full.

iii. Light-gauge bags can be closed by tying the neck, but heavier-gauge bags probably require a plastic sealing tag of the self-locking type.

iv. Bags should not be closed by stapling.

v. Sealed sharps containers should be placed in a labelled, yellow infectious health-care waste bag before removal from the hospital ward or department.

vi. The following recommendations should be followed by the ancillary workers in charge of waste collection:
   a. Waste should be collected daily (or as frequently as required) and transported to the designated central storage site.
   b. No bags should be removed unless they are labelled with their point of production (hospital and ward or department) and contents.
   c. The bags or containers should be replaced immediately with new ones of the same type.
   d. A supply of fresh collection bags or containers should be readily available at all locations where waste is produced.
   e. The person in charge should ensure that adequate supplies (3 months) are available and that procurement is timely to ensure the facility does not run out of the bags.

8.10 Transportation
i. All transporters of biomedical waste must be appointed by the relevant Ministry or owner of the health facility and must obtain a transportation license from NEMA.

ii. The transporter shall collect waste from the designated area of operations or storage areas and shall deliver such waste to the designated storage site, disposal site or plant.

iii. The Ministry or owner of the facility shall ensure that:
   a. The collection and transportation of such waste is conducted in such a manner that will not cause scattering, escaping and/or flowing out of the waste;
   b. The vehicles and equipment for the transportation of waste are in such a state that shall not cause the scattering of, escaping of, or flowing out of the waste or emitting of noxious smells from the waste;
   c. The vehicles for transportation and other means of conveyance of waste shall follow the scheduled routes approved by NEMA from the point of collection to the disposal site or plant; and
   d. The generator or his agent(s) should possess at all times during transportation of the waste, a duly filled tracking document as set out in Form III of the First Schedule to the Environmental Management and Coordination (Waste Management) Regulations, 2006, and shall produce the same on demand to any law enforcement officer.

iv. Biomedical waste shall be:
   a. Transported in a specially designed vehicle or other means of conveyance so as to prevent
scattering, escaping, flowing, spillage or leakage of the waste.

b. It is recommended that the vehicle is closely lockable, covered, labelled, leak proof and corrosion proof preferably internally lined with aluminium or stainless steel.

c. Any vehicle used for transportation of waste or any other means of conveyance shall be appropriately labelled.

8.11 On-Site Transport for Collection Purposes

i. Mobile garbage bins (MGBS) and trolleys should be used when transporting waste to decrease spills, minimize collector contact with waste and minimize manual handling.

ii. Loads contained in MGBs and trolleys should be less than 55kgs.

iii. All bins must be colour coded and marked as specified in Annex 2.

iv. Health-care waste should be transported within the hospital or other facility by means of wheeled trolleys or containers that are not used for any other purpose and meet the following specifications:
   a. Easy to load and unload;
   b. No sharp edges that could damage waste bags or containers during loading and unloading;
   c. Easy to clean.

v. Trolleys and MGBs must be dedicated singularly for collecting waste and must be made of rigid material, lidded, lockable (if used for storage), leak proof and washable.

vi. These MGBs and trolleys should be labelled according to the type of wastes contained, cleaned regularly and must never be overfilled.

vii. Waste collection rounds should be performed as often as necessary to minimize housekeeping hazards.

viii. When cleaning trolleys and MGBs:
   a. Rinse with cold water then wash with warm water and a neutral detergent.
   b. Trolleys and MGBs should then be drained to sewer and left to dry.
   c. Clean trolleys and bins should be stored separately to soiled containers.
   d. Appropriate personal protective equipment should be worn when cleaning MGBs.
   e. Waste water may only be diverted to the sewer.

ix. The vehicles should be cleaned and disinfected daily with an appropriate disinfectant (Glutaraldehyde or Peracetic acid).

x. All waste-bag seals should be in place and intact at the end of transportation.

xi. Use of wheelbarrows is not recommended for transportation especially for healthcare facilities in level 4-6.

8.12 Off-Site Transportation of Waste

8.12.1 Regulation and control system

i. The health-care waste producer is responsible for safe packaging and adequate labelling of waste to be transported off-site and for authorization of its destination.

ii. The tracking form (Annex 4a or 4b) has to be signed at the point of destination and shall be kept as records by the health facility as proof of proper disposal of waste.

iii. The signed tracking form will be submitted as part of records in the annual environmental audit reports.

iv. Packaging and labelling of waste should comply with the Environmental Management and Coordination Waste Management regulations (2006) governing transportation of hazardous waste and with international agreements (such as the Basel Convention) if wastes are shipped abroad for treatment and disposal.

v. The control strategy for health-care waste should have the following components:
   a. A consignment note (Annex 4b) should accompany the waste from its place of production to...
the site of final disposal. On completion of the journey, the transporter should complete the part of the consignment note especially reserved for him and return it to the waste producer. The transporting organization should be registered with, or known to, the waste regulation authority.

b. Handling and disposal facilities should hold a permit, issued by NEMA, allowing the facilities to handle and dispose of health-care waste.

8.12.2 Routing

i. Health-care waste should be transported by the quickest possible route, which should be planned before the journey begins.

ii. After departure from the waste production point, every effort should be made to avoid further handling.

iii. If handling cannot be avoided, it should be pre-arranged and take place in adequately designed and authorized premises by the Waste Management focal person / Public Health Officer.

iv. Handling requirements can be specified in the contract established between the waste producer and the carrier.
Chapter 9.0

TREATMENT AND DISPOSAL FOR HEALTH-CARE WASTE

9.1 Treatment and Disposal Options

i. Healthcare waste should be treated prior to disposal so as to ensure protection from potential hazards posed by these wastes.

ii. To be effective, treatment must reduce or eliminate the risk present in the waste so that it no longer poses a hazard to persons who may be exposed to it.

iii. The Common method of treatment is: incineration; steam sterilization, chemical disinfection, autoclaving and microwave irradiation.

iv. Other methods that can be used include encapsulation and inertization, shredding, macerations and grinding.

v. However treatment methods should be chosen according to the national and local situation.

vi. In-case of infectious and sharp wastes, all the treatment methods are applicable (Annex 5) except inertization.

9.2 Waste Disposal Options

9.2.1 General disposal options

i. After disinfection or incineration, infectious health-care waste becomes non-risk waste and may be finally disposed of in landfill sites. The commonly used disposal method in Kenya is land disposal which include municipal disposal sites, protected ash and waste pits.

ii. However, certain types of health-care waste, such as anatomical waste, will still have an offensive visual impact after disinfection, and this is culturally unacceptable in many countries. Such wastes should therefore be made unrecognizable before disposal, for example by incineration.

iii. If this is not possible, these wastes should be placed in containers before disposal.

iv. Other methods for anatomical wastes include burial and use of placenta pits.

v. Some small quantities of non-hazardous waste may be discharged into the main sewer with permission from the local authorities and NEMA.

vi. Other methods may include the return of the wastes to the supplier/manufacturer.

vii. Aerosol containers may be collected with general health-care waste once they are completely empty, provided that the waste is not destined for incineration.

viii. Contractors for recycling the cans can be called upon.

ix. All radioactive waste (e.g. swabs, syringes for diagnostic or therapeutic use) may be collected in yellow bags or containers for infectious waste if these are destined for incineration.

x. Appropriate containers or bag holders should be placed in all locations where particular categories of waste may be generated.

xi. Instructions on waste separation and identification should be posted at each waste generation and collection point to remind staff of the procedures.

xii. Containers should be removed when they are three-quarters full.

xiii. Ideally, the containers should be made of combustible, non-halogenated plastics.

xiv. Staff should never attempt to correct errors of segregation by removing items from a bag or container after disposal or by placing one bag inside another bag of a different colour.

xv. If general and hazardous wastes are accidentally mixed, the mixture should be treated as hazardous healthcare waste.
xvi. Cultural and religious constraints in certain countries make it unacceptable for anatomical waste to be collected in the usual yellow bags; such waste should be disposed of in accordance with local custom, which commonly specifies burial.

9.2.2 Inertization

i. The process of “inertization” involves mixing waste with cement and other substances before disposal in order to minimize the risk of toxic substances contained in the waste migrating into surface water or groundwater.

ii. It is especially suitable, for pharmaceuticals and for incineration ashes with a high metal content (in this case the process is also called “stabilization”).

iii. For the inertization of pharmaceutical waste, the packaging should be removed, the pharmaceuticals ground, and a mixture of water, lime, and cement added.

iv. A homogeneous mass is formed and cubes or pellets are produced on site and then can be transported to a suitable storage site.

v. Alternatively, the homogeneous mixture can be transported in liquid state to a landfill and poured into municipal waste.

vi. The following are typical proportions for the mixture: 65% pharmaceutical waste; 15% lime; 15% cement; 5% water.

vii. The process is reasonably inexpensive and can be performed using relatively unsophisticated equipment.

viii. Other than personnel, the main requirements are a grinder or road roller to crush the pharmaceuticals, a concrete mixer, and supplies of cement, lime, and water.

ix. The main way to achieve this is to sort the healthcare waste into the various categories to minimize the need for expensive or complicated disposal methods.

9.2.3. Options of health care waste treatment and disposal as per level of care

<table>
<thead>
<tr>
<th>Type of waste</th>
<th>Facility Level</th>
<th>Level 1 &amp; 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharps</td>
<td>Incineration and/or deep burial in pits</td>
<td>Incineration and burial in deep pit</td>
<td>Incineration</td>
<td>Autoclave; microwave; incineration</td>
<td>Autoclave; microwave; incineration</td>
<td></td>
</tr>
<tr>
<td>Infectious</td>
<td>Deep burial</td>
<td>Incineration and deep burial</td>
<td>Incineration, and dispose residue in municipal landfill</td>
<td>Incineration, and dispose residue in municipal landfill</td>
<td>Incineration, and dispose residue in municipal landfill</td>
<td></td>
</tr>
<tr>
<td>Highly infectious</td>
<td>Deep burial</td>
<td>Deep burial/ incineration</td>
<td>Deep burial/ incineration</td>
<td>grind and discharge to sewer; incineration and residue to landfill</td>
<td>Pulverize and discharge to sewer; incineration and dispose residue in landfill</td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>Return to District</td>
<td>Return to District Hospital</td>
<td>Incinerate; Inertization; encapsulation; return to source or manufacturer</td>
<td>Incinerate; Inertization; encapsulation; return to source or manufacturer</td>
<td>Incinerate; Inertization; encapsulation; return to source or manufacturer</td>
<td></td>
</tr>
</tbody>
</table>
9.2.4 Open uncontrolled, non-engineered dump sites
   i. Open dumps are probably the most common land disposal method in developing countries.
   ii. Untreated waste discharged into an uncontrolled, non-engineered, open dump does not protect the local environment and should not be used. Discharging waste in open dumps either within the healthcare institutions or in the municipal facilities is insufficient solution and leads to environmental pollution.
   iii. As a last resort where other methods of disposal are not available the healthcare waste if disposed off on open dump must be covered immediately with inert material such as soil.

9.2.5 Sanitary landfill
   i. Properly constructed and operated land fill sites offer a relatively safe disposal route for municipal solid waste including healthcare wastes.
   ii. The priority is protection of the water aquifers and each day’s waste is compacted and covered with soil to maintain sanitary conditions.
   iii. Treated healthcare waste can be safely disposed off in sanitary landfill site without any problems.

9.2.6 Incineration
   i. Incineration is a high-temperature dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and result in very significant reduction of waste volume and weight.
   ii. This process is usually selected to treat waste that cannot be recycled, reused or disposed off in sanitary landfill.

9.2.7 Medium temperature incineration
   i. In many developing countries, Kenya included, there are no high temperature double chamber incinerators designed to handle, hazardous waste. Such incinerators meet strict emission control standards such as those set by the European Union.
ii. All types of incinerators if operated properly eliminate pathogens from the waste and reduce waste to ashes.

iii. However certain types of healthcare waste e.g. pharmaceutical waste or chemical waste require higher temperatures for complete destruction. Higher operating temperatures and cleaning of exhaust gases limit the atmospheric pollution and odours produced by the incineration process.

9.2.8 Crude burning
i. Burning healthcare waste at low temperatures in the open should be discouraged because this may release toxic pollutants into the air.
# Summary of Recommended Actions for Health-Care Waste Management Along the Stream

## 10.1 Infectious Waste

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and Packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Strict adherence to medical procedure</td>
<td>b. Put in colour (yellow) coded bin with a prescribed colour liner bag</td>
<td>b. Liner bags are presumed full at ¾.</td>
<td>b. Use designated trolleys to remove to transfer station</td>
<td>b. Incineration</td>
<td>b.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Avoid with other waste</td>
<td>c. Liner bag should be securely tied.</td>
<td>c. Use designated routes.</td>
<td>c. Sterilization and shredding</td>
<td>c.</td>
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</tr>
<tr>
<td>d. Avoid over use</td>
<td>d. Store in designated area under lock and key</td>
<td>d. Tracking of waste movement using dully filled and signed forms.</td>
<td>d. Tracking document to be fully signed and signed.</td>
<td>d. Tracking document to be fully signed and signed.</td>
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</tr>
<tr>
<td>e. Not to be stored more than 48 hours unless pre-treated</td>
<td>e. Not to be stored more than 48 hours unless pre-treated</td>
<td>e. Maintain segregation at all stages</td>
<td>e. Maintain segregation at all stages</td>
<td>e. Maintain segregation at all stages</td>
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</tbody>
</table>
### 10.2 Highly Infectious Waste

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Strict adherence to medical procedures</td>
<td>b. Use autoclave bags.</td>
<td>b. Liner bag should be securely tied.</td>
<td>b. Use designated trolleys to remove to transfer station</td>
<td>b. Follow transportation schedule</td>
<td>b. Incineration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Avoid mixing with other wastes</td>
<td>c. Store in designated area under lock and key</td>
<td>c. Use designated routes.</td>
<td>c. Contract between facility and licensed contractor</td>
<td>c. Sterilization and shredding</td>
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<td></td>
<td></td>
<td>d. Tracking of waste movement using dully filled and signed forms.</td>
<td>d. Tracking document to be fully signed and signed.</td>
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<td></td>
<td></td>
<td>e. Maintain segregation at all stages</td>
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</tbody>
</table>
10.3 Pathological/Anatomical Waste

This category of healthcare waste should be treated as highly infectious.

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Strict adherence to medical procedures.</td>
<td>b. Collect in biohazard bags.</td>
<td>b. Remove body parts to disposal site immediately, where not possible store in a secure refrigerated area until collection.</td>
<td>b. Use designated routes.</td>
<td>b. Sterilization and shredding</td>
<td>b. Sanitary landfill</td>
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<tr>
<td></td>
<td>c. Double pack the body part in red liner bags which has biohazard mark and label accordingly with necessary details.</td>
<td>c. Proper tracking of waste.</td>
<td>c. Tracking of waste movement.</td>
<td>c. Autoclaving/disinfection</td>
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<tr>
<td></td>
<td></td>
<td>d. Keep a record on the body parts</td>
<td>d. Tracking document to be fully signed and in triplicate.</td>
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</tr>
</tbody>
</table>
## 10.4 Sharps, Glass and Plastics

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Promote use of alternative medicine</td>
<td>b. Sharps container to be up to ¾ full.</td>
<td>b. Use designated trolleys to remove to transfer station</td>
<td>b. Follow transportation schedule</td>
<td>b. Follow transportation schedule</td>
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</tr>
<tr>
<td>c. Procure good quality injection devices</td>
<td>c. Seal filled sharps containers.</td>
<td>c. Use designated routes.</td>
<td>c. Contract between facility and licensed contractor</td>
<td>c. Contract between facility and licensed contractor</td>
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</tr>
<tr>
<td>d. Rational use of injectable drugs</td>
<td>d. Use needle cutters (remover) – put syringe into the sharps container.</td>
<td>d. Tracking of waste movement.</td>
<td>d. Tracking document to be fully filled and signed.</td>
<td>d. Tracking document to be fully filled and signed.</td>
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</tr>
<tr>
<td><em>Use needle cutter</em></td>
<td>e. Use needle destroyers</td>
<td>e. Maintain segregation at all stages</td>
<td>e. Maintain segregation at all stages</td>
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</tbody>
</table>

- a. Put in an injection safety box or approved sharps containers with Biohazard mark.
- b. Sharps container to be up to ¾ full.
- c. Seal filled sharps containers.
- d. Use needle cutters (remover) – put syringe into the sharps container.
- e. Use needle destroyers
### 10.5 Pharmaceutical Waste

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Adhere to procurement procedures.</td>
<td>a. Segregate pharmaceutical products according to type, physical properties and chemical composition.</td>
<td>a. Put in a clearly labelled hazardous waste container.</td>
<td>a. Public facilities - Involve board of survey (BOS), b. Private facilities - follow institutional guidelines.</td>
<td>a. Follow pharmaceutical and poisons guidelines</td>
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</tr>
<tr>
<td>b. Follow strict commodity guidelines procedures.</td>
<td></td>
<td>b. Loose medicines are repackaged and labelled.</td>
<td>c. Use designated / approved means of transport</td>
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</tr>
<tr>
<td>c. Do not accept donations with short remaining shelf life as determined by the facility.</td>
<td>c. Store in a under lock and key.</td>
<td>d. Follow pharmaceutical and poisons guidelines</td>
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</tr>
<tr>
<td>d. Do not accept donations you don’t need</td>
<td>d. Keep a record of expired drugs</td>
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<tr>
<td>e. Do not accept more quantities than you need.</td>
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<tr>
<td>f. <strong>Stock management of chemical and pharmaceutical products</strong></td>
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<tr>
<td>i. Frequent ordering of relatively small quantities rather than large amounts at one time (applicable in particular to unstable products).</td>
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<tr>
<td>ii. Use of the oldest batch of a product first.</td>
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<td>iii. Use of all the contents of each container. Checking of the manufacture and expiry dates of all products at the time of delivery. Avoid mixing with other wastes</td>
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<tr>
<td>Use (First Expire First Out) FEFO and Encourage PULL system</td>
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</tbody>
</table>
### 10.6 Chemical Waste

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
</table>
| a. Put in standard brown colour coded bins & liners  
b. Segregate chemical products according to type, physical properties and chemical composition. (Refer safety data sheets/ Material Safety Data Sheets) | a. Store in a restricted designated sheltered area/stance  
b. Loose chemicals are repackaged and labelled.  
c. Store in a under lock and key.  
d. Keep a record of expired drugs | a. Follow Material Safety Data Sheets guidelines. | a. Use designated / approved means of transport  
b. Use holding containers not exceeding 20Kg  
c. Follow Material Safety Data Sheets guidelines.  
d. use licensed vehicle  
e. Follow designated route/ waste transporter to declare the route they use.  
f. Waste transporter to always carry the tracking documents dully filled in triplicate.  
g. Emergency procedures in case of an accident | a. Incineration  
b. Follow Material Safety Data Sheets guidelines  
c. Neutralization  
d. Detoxification | a. Follow Material Safety Data Sheets guidelines  
b. Dilution for expired disinfectants & dispose to sewer/septic tank | a. Follow WHO guidelines for reshipping back to supplier.  
b. Encapsulation |
### 10.7 Radio Active

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
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<tbody>
<tr>
<td>Refer to Radiation Protection Board</td>
<td>Refer to Radiation Protection Board</td>
<td>Refer to Radiation Protection Board</td>
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</table>

### 10.8 Gynotoxic/Cytotoxic

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Adhere to procurement procedures.</td>
<td>a. Segregate and put into appropriate colour code.</td>
<td>a. Loose medicines are repackaged and labelled.</td>
<td>a. Follow pharmaceutical and poisons guidelines</td>
<td>a. Follow pharmaceutical and poisons guidelines</td>
<td>a. Follow pharmaceutical and poisons guidelines</td>
<td>a. Follow pharmaceutical and poisons guidelines</td>
<td>a. Follow pharmaceutical and poisons guidelines</td>
</tr>
<tr>
<td>b. Follow strict commodity guidelines procedure</td>
<td>b. store in a under lock and key.</td>
<td>Follow pharmaceutical and poisons guidelines</td>
<td>Follow pharmaceutical and poisons guidelines</td>
<td>Follow pharmaceutical and poisons guidelines</td>
<td>Follow pharmaceutical and poisons guidelines</td>
<td>Follow pharmaceutical and poisons guidelines</td>
<td>Follow pharmaceutical and poisons guidelines</td>
</tr>
<tr>
<td>c. Do not accept donations with short remaining shelf life as determined by the facility.</td>
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<tr>
<td>d. Do not accept donations you don’t need.</td>
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<tr>
<td>e. Do not accept more quantities than you need.</td>
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<tr>
<td>a. Segregate</td>
<td></td>
<td>Follow pharmaceutical and poisons guidelines</td>
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<tr>
<td>b. store in a</td>
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<td>under lock and key.</td>
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</table>

Refer to Radiation Protection Board.
### 10.9 Electronic & Electrical Wastes (E& E Wastes)

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Do not procure what you do not need</td>
<td>Put in a clearly labelled waste leak proof container</td>
<td>Store in a restricted room/area</td>
<td>Use a designated means of transport</td>
<td>Use a designated means of transport</td>
<td>Follow E- waste guidelines</td>
<td>Follow E- waste guidelines</td>
<td>Follow E- waste guidelines</td>
</tr>
<tr>
<td>b. Procure latest version of the desired electronic or electrical equipment</td>
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</tbody>
</table>

### 10.10 General Waste

<table>
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<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Frequent ordering of relatively small quantities rather than large amounts at one time (applicable in particular to unstable products).</td>
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<td>• Use of the oldest batch of a product first.</td>
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<td>• Use of all the contents of each container.</td>
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<td>• Checking of the expiry date of all products at the time of delivery.</td>
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<td>b. Adhere to procurement procedures.</td>
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<tr>
<td>c. Avoid mixing with other waste</td>
<td>Put in standard black colour coded bins &amp; liners</td>
<td>Store in a restricted room/area</td>
<td>a. Develop collection schedule</td>
<td>a. Develop collection schedule</td>
<td>Sterilization</td>
<td>Composting</td>
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<td></td>
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<td></td>
<td>b. Use designated trolleys/transportation to remove to transfer station</td>
<td>b. Use designated trolleys/transportation to remove to transfer station</td>
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<td>c. Use designated routes.</td>
<td>c. Use designated routes.</td>
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<td>d. Tracking of waste movement.</td>
<td>d. Tracking of waste movement.</td>
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</tbody>
</table>
### 10.11 Non-Infectious Waste: (Paper, Glass, Polythene, Food Remains)

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Strict adherence to medical procedures.</td>
<td>b. Separate recyclable and re-useable wastes and put in colour (black) coded bin and liner.</td>
<td>b. Liner bag should be securely tied.</td>
<td>b. Use designated trolleys to transport to transfer station</td>
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<td>c. Store in designated area (secure dry place) under lock and key.</td>
<td>c. Store in designated area (secure dry place) under lock and key.</td>
<td>c. Use designated routes.</td>
<td>c. Use designated routes.</td>
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### 10.12 Pressurized Containers

<table>
<thead>
<tr>
<th>Minimization</th>
<th>Segregation and packaging</th>
<th>Temporary Storage</th>
<th>Onsite Transportation</th>
<th>Offsite Transportation</th>
<th>Pre-treatment</th>
<th>Onsite disposal</th>
<th>Offsite disposal</th>
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<tbody>
<tr>
<td>a. Do not procure what you don’t need at the time</td>
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<td>b. Re-use what can be re-used/ re-filled.</td>
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Chapter 11.0

REQUIREMENT FOR OCCUPATIONAL SAFETY AND HEALTH PRACTICES

Each Health Care Facility (HCF) in Kenya is responsible for providing a safe, healthy workplace and safe systems of work for all. The management of waste presents a number of potential hazards to employees requiring the appropriate measure of risk identification, risk assessment, and risk control. Health care workers have an obligation to follow instructions regarding safe work practices. This section explains their responsibilities and obligations.

11.1 Occupational Safety and Health Provisions

i. Health-care waste management policies or plans should include provision for the continuous monitoring of workers’ health and safety to ensure that correct handling during segregation, storage, collection, transportation, treatment and disposal procedures of waste are being followed.

ii. Essential occupational health and safety measures include the following:
   a. Training of workers on infection transmission.
   b. Provision of personal protective equipment;
   c. Establishment of an effective occupational health programme that includes immunization, post-exposure prophylactic treatment, and medical surveillance.

iii. Training in health and safety should ensure that workers know of and understand the potential risks associated with health-care waste, the value of immunization against viral hepatitis B among other diseases, and the importance of consistent use of personal protection equipment.

11.2 Employer Responsibilities

i. HCF management is responsible under the Occupational Safety and Health Act, 2007 to provide appropriate information, education, training and ensuring that safe systems of work are developed and maintained.

ii. Key among the responsibilities is to provide information on hepatitis B vaccination among other required vaccinations and a register of vaccinated personnel maintained.

iii. Approved work practices from all technical areas in health care should be documented and promoted.

iv. Multilingual translations should be provided to workers where necessary.

v. Standard Operating procedures should:
   a. Specify accepted waste management practices, waste segregation procedures and approved waste handling procedures;
   b. Detail appropriate steps required for waste generators, and handlers;
   c. Specify personal protective equipment required for waste handling tasks;
   d. Detail spill management strategies and designate trained personnel for spill management on-site;
   e. Identify first aid resources and needle stick injury treatment protocol; and
   f. Specify how to operate the information, education, training and safe working systems.

11.3 Personal Protective Equipment (PPE)

i. Managers and all workers are encouraged to assess risks and provide suitable PPE for the nature and degree of the hazard they are likely to be exposed to.

ii. PPE must be worn when required.
iii. PPE is the last option in the hierarchy of hazard controls and should only be used if elimination, engineering controls and or changes to work practices do not adequately remove / reduce the risks.

iv. Waste collectors should be made aware of their obligations/responsibilities under the OS&H Act 2007 Laws of Kenya.

v. Waste collectors are under a statutory obligation to wear appropriate PPE. The risk of spills or splash exposures necessitates the wearing of face and eye protection. Protection of the legs is also required.

vi. Carrying of HCW bags is to be minimized and where it cannot be avoided, the waste collector should wear protective garments and apron to minimize the risk of injury.

vii. Protective garments should be worn whenever collecting waste, even if the process involves wheeling a securely covered waste trolley to the holding area.

viii. The type of protective clothing used will depend on the risk associated with the health-care waste, but the following should be made available to all personnel who collect or handle health-care waste:
   a. Helmets, with or without visors-depending on the operation.
   b. Face masks-depending on operation.
   c. Eye protectors (safety goggles)-depending on operation.
   d. Overalls (coveralls)-obligatory.
   e. Industrial aprons-obligatory.
   f. Leg protectors and/or industrial boots-obligatory.
   g. Disposable gloves (medical staff) or heavy-duty gloves (waste workers) -obligatory.

ix. Operators of manually loaded incinerators should wear protective face visors and helmets.

x. During ash and slag removal and other operations that create dust, dust masks should be provided for operators.

xi. Employees should comply with health care waste management policies, procedures and instructions given on correct use of safety and protective equipment for the protection of their own health and safety and the health and safety of others.

11.4 Workers’ Protection

a. The individuals responsible for management of health-care waste should ensure that all risks are identified and that suitable protection from those risks is provided.

b. A comprehensive risk assessment of all activities involved in health-care waste management, carried out during preparation of the waste management plan, will allow the identification of necessary protection measures.

c. Once the assessment is completed, personnel should receive suitable training.

d. Measures should be designed to prevent exposure to hazardous materials or other risks, or at least to keep exposure within safe limits.

11.5 Occupational Safety & Health Committee

i. The occupational safety and health committee at the workplace has responsibilities under the law (Occupational Safety and Health Act, 2007) to review:
   a. the provision and installation of facilities and protective equipment;
   b. work practices;
   c. incidents and accidents;
   d. provision and status of information, education and training;
   e. relevant records;

ii. An effective management tool is to provide a link between the Occupational Safety and Health committee and the Waste Management committee by reporting on all items which affect both committees.
11.6 Monitoring Performance of Occupational Safety and Health Committees

i. Incident and accident reporting and recording is an essential management information system for identifying causative factors of injuries relating to waste handling.

ii. Incident and accident reporting and recording should facilitate costing of associated financial loss and enable management to make injury prevention investment decisions based upon accurate data.

iii. Waste treatment, operating and disposal costs should be reviewed periodically to evaluate any fluctuations.

11.6.1 Hygiene

i. Regular washing and maintenance of equipment used to contain and transport waste should be done by providing hand-washing facilities (with warm running water and soap) for employees.

ii. It is important for health care facilities to promote regular hygiene procedures that comply with the Infection Prevention and Control Policy. This is of particular importance at storage and incineration facilities.

iii. It may be useful also to designate specific areas for equipment maintenance in hygienic workplaces that are properly equipped with emergency shower rooms and drainage to sewers or septic tanks.

iv. Emergency shower rooms should be provided in all health care facilities.

11.6.2 Immunization

i. Viral hepatitis B and Tetanus immunizations should be provided for health-care personnel and waste handlers.

ii. Each HCF is encouraged to conduct pre-employment screening programme and also put in place employee vaccination arrangements.

iii. The HCF should also maintain and keep long term records of vaccinations to ensure that booster doses are given as required.

11.7 Precautions for Sharps, Blood and Body Substance Exposures

Precautions must be implemented to protect against exposure to sharps, blood and body fluids. These precautions include:

i. Providing a purposely designed sharps container as close as practicable to the point of generation of the sharps;

ii. Providing appropriate PPE for potential blood and body substance exposures;

iii. conducting compliance checks to confirm that people wear protective clothing;

iv. Investigating all incidents to identify causes of exposures

v. Take remedial action to eliminate risks;

vi. OS&H Committees or an appropriate forum must review incident reports and confirm appropriate action taken;

vii. Train staff in first aid and injury management procedures for sharps injury and body substance exposure;

viii. Reinforce the need for staff to report all incidents and injuries;

ix. Analyze statistics to identify any risk exposure trends for necessary interventions.

11.8 Response to Injury and Exposure

All personnel who handle health-care waste should be trained to deal with injuries and exposures.

i. The programme should include the following elements:

   a. Immediate first-aid measures, such as cleansing of wounds and skin, and irrigation (splashing) of eyes with clean water;

   b. An immediate report of the incident to a designated responsible person;

   c. Retention, if possible, of the item involved in the incident;

   d. Details of its source for identification of possible infection;
e. Additional medical attention in an accident and emergency
f. Alerting occupational health committee, as soon as possible;
g. Medical surveillance;
h. Blood or other tests if indicated;
i. Recording of the incident;
j. Investigation of the incident; identification and implementation of remedial action.

ii. Waste handlers are particularly at risk from the waste. In all stages they require:-
   a. PPE
   b. Hold waste containers at the handle or at the top of liner bag
c. Avoid any waste falling on the floor during collection and transportation
d. Non-complying waste (in terms of segregation) should not be sorted by hand
e. Waste storage/chamber should be well ventilated and compartmentalized.
f. Cloak rooms for changing and showering
g. Waste handlers should also receive post exposure prophylaxis for HIV/AIDS
12.1 Technical Training and Deployment
   i. Only technically trained persons shall be deployed in health care waste management. Management should facilitate education and training in the following levels-
      a. Health care facility Managers training
      b. Operational training
      c. Waste handlers training (generators, handlers, collectors, transporters)
      d. Public awareness and behaviour change communication (BCC).
   ii. The Health Ministries should develop training manuals to facilitate this process.

12.2 Continuing Education
   i. Continuous Medical Education and Professional Development should be organized to address the performance gaps. (By use of tools e.g. supervisory check list).
   ii. Health Facility Management Team (HFMT) shall facilitate refresher training on a critical review of existing waste management practices, i.e. segregation, storage, collection, transport, treatment and disposal.
   iii. The HFMT should also develop/adopt and disseminate guidelines on Standard Operating Procedures to HCWs, waste handlers and community.
Chapter 13.0
COMMUNITY HEALTH OUTREACH

Community Health offer a range of services based on Community Health outreach or at external locations such as patients’ homes and school dental clinics.

13.1. Clinical Waste Generated at Community Health Outreach
   i. It should be the policy of all health facility management committee to ensure clinical wastes are returned to the health care facility for appropriate disposal (in circumstances where applicable).
   ii. Waste must be transported in a designated vehicle supplied with a spill kit.

13.2 Sharps Containers
   i. Safety boxes should be supplied at all sites that generate sharps.

13.3 Waste Transportation
   The following points should be observed:
   i. Lids shall be securely fitted to the containers to ensure that the wastes are prevented from spilling;
   ii. Containers should be thoroughly cleansed and disinfected before re-use;
   iii. Containers used for the transportation of clinical wastes shall be clearly marked;
   iv. During transportation, containers holding the wastes shall be securely held inside the vehicle to prevent movement of the containers and spillage of wastes; and
   v. The transporter shall ensure that vehicles being used for the transportation of clinical wastes shall be securely locked when left unattended.
Chapter 14.0
CONTINGENCY AND EMERGENCY PLANNING

14.1 Contingency Planning
All Health Facilities should develop a contingency plan.
   i. Adequate financial and human resources should be availed for easy mobilization in time of need.
   ii. The healthcare waste plan should also include contingency plan for emergency situations.
   iii. The plan should include, but not be limited to;
   iv. Operational procedures to be followed when situations like the following arise:
      a. Spill of liquid infectious waste – clean up procedures, protection of the personnel, and disposal of spill residue.
      b. Rupture of plastic bags (or other loss of containment) – clean up procedures, protection of personnel, repackaging of waste.
      c. Equipment failure-alternative arrangements for waste storage and treatment (e.g. off-site treatment)
      d. Natural disasters such as fire, floods, earthquake.
      e. Biohazard risks
      f. Accidental exposure management and post-exposure decontamination
      g. Emergency medical treatment of exposed and injured persons
      h. Medical surveillance of exposed persons
      i. Clinical management of exposed persons
      j. Epidemiological investigations
      k. Identification of high risk organisms

14.2 Planning for Emergencies Situation
Emergency situations to be planned for include;
   i. Identification of at risk personnel and populations
   ii. Mapping high risk areas e.g. laboratories, storage areas.
   iii. Identification of responsible personnel and their duties e.g. bio-safety officer, local health authority, clinicians, police and fire officers.
   iv. List of clinical treatment and isolation facilities that can receive infected and exposed persons.
   v. List of sources of immune serum, vaccines, drugs and special equipment and supplies.
   vi. Provisions of emergency equipment e.g. decontamination equipment.

14.3 Emergency Equipment
The following emergency equipment should be made available in every facility: -
   i. First aid kit, including universal and special antidotes
   ii. Full protective clothing (one-piece coveralls, gloves and head covering for highly infectious microorganisms)
   iii. Full-face respirators with appropriate chemical and particulate filter canisters
   iv. Room disinfection apparatus e.g. sprays and formaldehyde vaporizers
   v. Tools e.g. hammers, axes, spanners, ladders and ropes
   vi. Hazardous area demarcation equipment and notices
14.4 Management of Spillages

i. Accidental spillage of materials can be a serious hazard to health according to the circumstances and nature of the substances involved.

ii. Spillage can be chemical or biological. An example of general procedure of dealing with spillages’ is provided for in Annex 6.

14.4.1 Biological spillage

All biological specimens/body fluids should be considered potentially infectious. The main aim should be to contain, neutralize and dispose of the material safely.

i. **Agents used to neutralize spillages**

   I) Sodium hypochlorite
   
   i. Rapidly effective against a wide range of microorganisms including the blood–borne viruses, mycobacterium and bacterial spores.
   
   ii. Used at a high concentration 3.5% apply 1 in 6 parts for 5 minutes of available chlorine. Can be used at a lower concentration of available chlorine if the spill is removed and the surface cleaned first.
   
   iii. Corrosive to metal surfaces and can damage rubber and other materials
   
   iv. Inactivated by organic material and so needs to be at high concentrations
   
   v. Diluting the agent with hot water or mixing with urine may result in the rapid release of chlorine, which can irritate the eyes and respiratory mucosa.

   II) Clear soluble phenolics
   
   i. Many phenolics contain a detergent base, which allows them to clean as well as disinfect.
   
   ii. Used in concentrations of 0.6% to 2%
   
   iii. Highly effective against mycobacterium and non-sporing bacteria but poor against viruses.
   
   iv. An irritant, taint food and damage plastic surfaces.
   
   v. Not generally recommended for blood spills.

   III) Per-oxygen and quaternary ammonia compounds and iodophores
   
   i. These agents are used where chlorine –releasing agents are not practical.
   
   ii. They are good cleaning agents and more user and environment friendly than sodium hypochlorite or clear soluble phenolics.
   
   iii. Their activity against mycobacterium, spores and non-enveloped viruses is less effective.
   
   iv. Staff members dealing with spillages should consult the organization’s policies and procedures and /or seek advice from local health authority (Department of Public Health).
   
   v. Inexperienced staff and staff with fresh or open cuts or active dermatitis of the hand and arms should be discouraged from cleaning up biological spillages.

ii) Procedure for dealing with biological spillage

i. Seal-off the immediate area to avoid others becoming involved or contaminated by the spillage.

ii. If hypochlorite is used in a confined area, ensure good ventilation.

iii. Put on plastic apron, gloves face protection/ mask if required and overshoes/boots. (Solutions used to neutralize the spillage will depend on the nature of the substance and local advice should be sought)

iv. Limit the spread of fluid by absorbent disposable towelling. Discard the towels carefully into yellow plastic bags for incineration.

v. Take care to avoid injury if broken glass is present

vi. Dispose of sharp items into a sharps container

vii. After the necessary disinfectant contact period, collect the absorbed spillage and discard into a
viii. Remove and discard disposable protective clothing, together with any other contaminated non-sharp disposable materials. Wash and dry hands.

ix. Notify the Public Health Officer in charge.

14.4.2 Chemical spillage

a) Storage of chemicals
   i) Bulk stock should be kept in specially designated rooms or buildings, which should have concrete floors with sills at the doorways to retain spills.
   ii) Flammable substances should be stored separately in buildings that are some distance from others.
   iii) To avoid ignition of flammable and explosive vapours by sparking of electrical contacts;
       a. Light switches for stores should be on the outside of the building
       b. Lights (bulbs, tubes) should be in bulkheads.
   iv) Chemicals should not be stored in alphabetical order. Otherwise incompatible chemicals may be in close proximity and some hazardous chemicals may be on high shelves.
   v) All large bottles and all bottles containing strong acids and alkalis;
      a. Should be at floor level
      b. In drip trays.
   vi) Bottle carriers and siphoning devices for filling bottles from bulk containers should be provided.
   vii) Stepladder should be provided where there are high shelves.

b) Neutralize spillage
   i. Soda ash or sodium bicarbonate, sand should be used to neutralize acids and corrosive chemicals.
   ii. Dry sand should be used to cover alkalis.

c) Dealing with spillage of a dangerous chemical
   i. Secure the affected area
   ii. Take appropriate precaution (your safety first)
   iii. Notify the Waste Management Officer/Public Health Officer in-charge or any other designated officer responsible for safety
   iv. Evacuate non-essential personnel from the area.
   v. Attend to persons who may have been contaminated (see emergency response).
   vi. If the spilled material is flammable;
      a. extinguish all naked flames,
      b. turn off gas in the room and adjacent areas
      c. switch off all electrical equipment
   vii. Activate exhaust ventilation system if it is safe to do so.
   viii. Secure the necessary items to clean up the spillage.

14.4.3 Clean-up equipment and materials
   i. Protective clothing, e.g. heavy-duty rubber gloves, safety boots, or rubber boots.
   ii. Scoops and dustpans (recommended to be part of the kit)
   iii. Forceps for picking up broken glass
   iv. Mops, cloths and paper towels
   v. Buckets
   vi. Non-flammable detergent

14.5 Contingency Planning
   i. Draw management plan for each class of incidents (SOP)
   ii. HFMT shall ensure the existence of;
       a. Safety measures (e.g. PPEs) and
b. Emergency response (e.g. in case of spills, occupational injuries)

iii. HMT to avail and display information on safety practices, evacuation plans and emergency response in case of incidents or accidents associated with HCWM (e.g. Occupational injuries, spillage of hazardous waste, exposure to cytotoxics)

iv. In case of disease outbreaks (e.g. cholera) or during close down for planned maintenance (e.g. safe procedures for handling laboratory wastes in case of breakdown of the autoclave).

v. HFMT shall maintain an accident/occurrence log book

vi. HMT to ensure Health surveillance and control is conducted (e.g. immunization against HBV, typhim and tetanus) and provision of information on rapid access to Post Exposure Prophylaxis (PEP).

vii. HMT to ensure periodic review of the contingency & Emergency plans;
   a. In case of a breakdown of HCW treatment units or
   b. During close down for planned maintenance (e.g. safe procedures for handling laboratory wastes in case of breakdown of the autoclave).

14.6 Reporting Accidents and Incidents

i. All waste management staff should be trained in emergency response and made aware of the correct procedure for prompt reporting.

ii. Accidents or incidents, including near-misses, spillages, damaged containers, inappropriate segregation, and any incidents involving sharps should be reported to the Waste Management Officer (if waste is involved) or to another designated person.

iii. The report should include details of:
   a. The nature and cause of the accident or incident;
   b. The place and time of the accident or incident;
   c. The staff who were directly involved;
   d. Any other relevant circumstances.
   e. Action to prevent recurrence.
   f. Accident documentation
Chapter 15.0
ENVIRONMENTAL AUDIT AND MONITORING PROCESS FOR HEALTH CARE FACILITIES

15.1 Introduction
i. Environmental auditing is a management tool comprising of a systematic, periodic and objective evaluation of how effective environmental management is performing in safeguarding the environment.
ii. The audit is undertaken for operational facilities only.
iii. All new or proposed facilities will have to carry out an Environmental Impact Assessment (EIA) at planning level and propose adequate mitigation measures for the facility. In this case an initial environmental audit will be carried out in the first year of operation.
iv. The audit assesses actual environmental impact, the accuracy of prediction, the effectiveness of environmental impact mitigation and enhancement measures, and the functioning of monitoring mechanisms.
v. The Environmental Impact Assessment/Environmental Audit Regulation requires all health care facilities to carry out an initial audit once operations commence and thereafter annual self audits.
vi. National Environment Management Authority (NEMA) will periodically carry out control audits of these facilities to ascertain the information contained in the annual audit reports.
vii. It is notable that health care facilities are classified as high risk due to the hazardous nature of the waste generated.

15.2 Objectives of Auditing:
Environmental auditing is used to:
   i. Facilitate management and control of environmental practices;
   ii. Assess compliance with relevant statutory and regulatory requirements
   iii. Raise awareness of and commitment to environmental policy by project staff, the community and other concerned parties;
   iv. Maintain environmental health and safety standards, while continuously exploring opportunities for improvement.

15.3 Auditing Process
i. Environmental Auditing is based on baseline information generated during the EIA process.
ii. Existing projects that have not been subjected to EIA are to be audited on the basis of information to be generated over a period of time.
iii. The Environmental Audit process entails the steps outlined below:
   a. Examining the effectiveness of EIA as a decision-making tool
   b. Ensuring that conditions set in the environmental management plan have been complied with.
   c. Examining the performance of agencies concerned with management of projects
   d. Examining environmental impacts arising from project implementation
   e. Examining the accuracy of predictions by comparing actual against predicted environmental impacts.

15.3.1 Role of ministries in charge of health facilities
The responsibilities and activities of the proponent include:
   i. Informing the employees about the objectives and scope of the audit
ii. Provision of facilities needed by the audit team to ensure an efficient and effective audit process.
iii. Conducting self-audit
iv. Implementing recommendations in audit reports and instructions and orders by the NEMA

15.3.2 Role of environmental auditors
i. Self-audits will be carried out by both internal and external auditors commissioned by the Ministries of Medical Services and Public Health and Sanitation depending on the level of the facility.
ii. The auditors must have been registered by the NEMA.
iii. In health care facilities, public health officers in charge of sanitation will carry out annual audits of the facilities.

15.3.3 Role of NEMA
The Authority is responsible for:
   i. Determining the need for and time of audit;
   ii. Defining objectives of the audit;
   iii. Approving the environmental audit criteria;
   iv. Approving the audit plan and scope.
   v. Receiving and reviewing the audit reports.
   vi. Ensuring follow-up actions on recommendations of the audit reports.
   vii. Where necessary require a lead agency to undertake audit.

15.4 Conducting the Environmental Audit
Environmental audit will be conducted in accordance with audit plans prepared by proponents in consultation with the Authority. An audit plan should include the following:
   i. The audit objectives and scope;
   ii. The audit criteria;
   iii. Identification of proponent’s organizational and functional units to be audited;
   iv. Identification of the functions and/or individuals within the proponent’s organization and their responsibilities
   v. Time frame for audit activities
   vi. Report content and format

15.4.1 Environmental Audit Methodology
The audit methodology should include the following:
   i. Establishing an Audit Protocol and tools
   ii. Reviewing existing baseline information
   iii. Assembling and assign responsibilities to the audit team carrying out audit activities

15.4.2 Content of the Environmental Audit Report
The audit report should contain all audit findings and a summary, including the following:
   i. The proponents name and address
   ii. Project title
   iii. Objective, scope and criteria of the audit;
   iv. The audit team members;
   v. An executive summary of the audit process including any problems encountered during the process
   vi. Project site
   vii. Project description;
   viii. Review of all relevant environmental law and regulatory frameworks on health, safety, environmental standards and sustainable use of natural resources;
ix. Verification of the level of compliance by the proponent with the conditions of the environmental management plan;

x. Evaluation of the proponent’s knowledge and awareness of and responsibility for the application of relevant legislation;

xi. Review of all project documentation related to infrastructural facilities and designs;

xii. Examination of monitoring programmes, parameters, and procedures for control and corrective actions in case of emergencies;

xiii. Examination of records of incidents and accidents and the likelihood of future occurrence of the incidents and accidents; amounts of waste generated and disposed, records of maintenance of equipment;

xiv. Inspection of all buildings, premises and yards in which collection and storage, testing, transportation takes place within and without the project area, as well as areas where shortage and disposal of goods is carried out, and give a record of all significant environmental risks associated with such activities;

xv. Examination of public views on health and safety issues, especially from potentially affected communities as well as occupational health and safety issues for project employees; and

xvi. List of health and environmental concerns of past and on-going activities.

15.4.3 Audit Report format
The format of the audit report should include:

i. An executive summary

ii. Introduction and background to audit

iii. Description of audit approach and methodology

iv. Audit findings

v. Conclusion and recommendations

15.5 Development of Audit Action Plan
In formulating an Audit Action Plan for effective performance and environmental improvement, it is important to provide clear guidelines specifying the following:-

i. What should be done - activities

ii. Who must do it - Responsibilities

iii. Time frame

iv. Budget

v. Implementation programme

vi. Reporting

vii. Monitoring

15.6 Monitoring
15.6.1 Introduction

i. Monitoring is an activity undertaken to provide specific information on the characteristics and functioning of environmental and social variables in space and time.

ii. Environmental monitoring compares impacts predicted in an EIA with those which actually occur during and after implementation, in order to assess whether the impact prediction process performs satisfactorily.

iii. Environmental monitoring is essential for:
   a. Ensuring that impacts do not exceed legal standards
   b. Checking the implementation of mitigation measures in the manner described in the EIA report
   c. Providing early warning of potential environmental damage.

iv. The frequency of monitoring will vary from project to project, depending on the nature of the project and the severity of the environmental impacts.
15.6.2 Principles of monitoring
i. The EIA monitoring process is intended to generate meaningful information and improve implementation of mitigation measures.
ii. Monitoring must accomplish the following:-
   a. Carefully determine the indicators to be used in monitoring activities
   b. Collect meaningful and relevant information
   c. Apply measurable criteria in relation to chosen indicators
   d. Pass objective judgments on the information collected
   e. Draw tangible conclusions based on the processing of information and objective judgments
   f. Facilitate rational decision-making based on the conclusions drawn.

15.6.3 Objectives of monitoring
Monitoring is put in place to achieve the following:
i. Verify impact predictions;
ii. Check success of mitigation measures (progress of actions undertaken);
iii. Adherence to approved plan of action;
iv. Compliance with conditions of approval;
v. Success of management plan to meet environmental health and safety needs and standards;
vi. Enable corrective action to be taken promptly if there is a major unpredicted environmental impact.

15.6.4 Types of monitoring
Monitoring activities include the following types:
i. Baseline Monitoring: A survey should be conducted of basic environmental parameters in the area surrounding the proposed project before operation begins, so that subsequent monitoring can assess changes in those parameters over time against the baseline.
ii. Impact Monitoring: The ecological, health and socio-economic parameters within the project area must be measured during the project construction and operational phases in order to detect environmental changes which may have occurred as a result of project implementation.
iii. Compliance Monitoring: Employs a periodic sampling method, or continuous recording of specific environmental quality indicators or pollution levels to ensure project compliance with recommended environmental protection standards.

15.6.5 Selection of impact indicators
i. Impact monitoring should not be limited to a few programme components.
ii. Appropriate environmental indicators need to be selected so that monitoring covers all programme components.
iii. Emphasis should be given to monitoring potentially significant indicators for components in causing adverse environmental impacts.

15.6.6 Monitoring report content and format
The Ministry shall make a monitoring report for all facilities and will include the following:
i. Name and address of facility indicating owner/operator
ii. Project Title
iii. Date of Implementation
iv. Date of the last report with a summary of findings, actions undertaken and results of these actions
v. Details of environmental parameters to be monitored
vi. Result of the actual monitoring exercise
Chapter 16.0
Waste Audit

i. Since healthcare waste management is a rapidly changing and complex field, any tool that can help an institution manage these activities is very helpful.

ii. A medical waste audit is such a tool.

iii. The audit collects information on current practices and subsequently allows them to be judged against alternatives that may reduce risk and/or cost.

iv. As such it is a procedure rather than a hard-and-fast list of factors to be examined, including;
   a. The identification of waste and the activities that generate them
   b. Their safe collection and interim storage
   c. The treatment of selected waste
   d. The transportation of treated and untreated waste
   e. Final disposal

v. Three general questions that must be asked during an audit are:
   a. Are genuine efforts being made to adequately treat waste in light of state of the art procedures and legal requirement (e.g. EMCA 1999)?
   b. Is training being provided to all responsible personnel?
   c. Are adequate records from both a legal and cost analysis perspective being kept?

vi. A series of well-conducted audits can point to potential cost saving and can be a catalyst for institutions to find new solutions to healthcare waste problem.
i. Currently we do not have situations where healthcare waste is either exported from or imported into the country for the purpose of destruction.

ii. However healthcare wastes being hazardous in nature are regulated and subject to the Basel Convention on trans-boundary movement of hazardous waste.

iii. This involves prescribed procedures to obtain permission to cross international borders along a transit route. These procedures can take several months.

iv. A sample tag for shipment of such waste is provided in Annex 8.
Chapter 18.0

COLLECTION AND DISPOSAL OF WASTE FROM HEALTH CARE ESTABLISHMENTS

18.1 Characteristics and Hazards of Wastewater from Health-Care Establishments

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

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

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

iv. It may also contain various potentially hazardous components, such as microbiological pathogens, hazardous chemicals, pharmaceuticals and radioactive materials which are discussed below:-
   a. Small amounts of chemicals from cleaning and disinfection operations are regularly discharged into sewers.
   b. Small quantities of pharmaceuticals are usually discharged to the sewers from hospital pharmacies and from the various wards.
   c. Radioactive isotopes should be discharged into holding tanks by oncology departments.
   d. The toxic effects of any chemical pollutants contained in wastewater on the active bacteria of the sewage purification process may give rise to additional hazards.

18.2 Waste Water Management

i. The basic principle underlying effective wastewater management is a strict limit on the discharge of hazardous liquids to sewers.

ii. Only in an outbreak of acute diarrhoeal diseases should excreta from patients be collected separately and disinfected.

iii. Where water use is commonly high, sewage is usually diluted.

iv. For effluents treated in treatment plants, no significant health risks should be expected, even without further specific treatment of these effluents.

18.3 Connection to a Municipal Sewage Treatment Plant

It is acceptable to discharge the sewage of health-care establishments to sewers without pre-treatment, provided that the following requirements are met:

i. The municipal sewers are connected to efficiently operated sewage treatment plants that ensure at least 95% removal of bacteria;

ii. The sludge resulting from sewage treatment is subjected to anaerobic digestion, leaving no more than one helminth egg per litre in the digested sludge;

iii. The waste management system of the health-care establishment maintains high standards, ensuring the absence of significant quantities of toxic chemicals, pharmaceuticals, radionuclides, cytotoxic drugs, and antibiotics in the discharged sewage;

iv. Excreta from patients being treated with cytotoxic drugs may be collected separately and adequately treated (as for other cytotoxic waste).

v. In normal circumstances, the usual secondary bacteriological treatment of sewage, properly applied, complemented by anaerobic digestion of sludge, can be considered as sufficient.
vi. During outbreaks of communicable diseases, effluent disinfection by chlorine dioxide (chlorine powder) or by any other efficient process is recommended.

vii. If the final effluent is discharged into coastal waters close to shell fish habitats, disinfection of the effluent will be required throughout the year.

18.4 On-Site Treatment or Pre-Treatment of Waste Water

i. Health care establishments in particular those that are not connected to any municipal treatment plant, should have their own sewage treatment plants e.g. septic tanks.

ii. Efficient on-site treatment of sewage should include the following operations:
   a. Primary treatment
   b. Secondary biological purification. Most helminths will settle in the sludge resulting from secondary purification, together with 90-95% of bacteria and a significant percentage of viruses; the secondary effluent will thus be almost free of helminths, but will still include infective Concentrations of bacteria and viruses.
   c. Tertiary treatment. The secondary effluent will probably contain at least 20 mg/litre suspended organic matter, which is too high for efficient chlorine disinfection. It should therefore be subjected to a tertiary treatment, such as lagooning. If no space is available for creating a lagoon, rapid sand filtration may be substituted to produce a tertiary effluent with a much reduced content of suspended organic matter (<10mg/litre).
   d. Chlorine disinfection. To achieve pathogen concentrations comparable to those found in natural waters, the tertiary effluent will be subjected to chlorine disinfection to the breakpoint. This may be done with chlorine dioxide (which is the most efficient), sodium hypochlorite, or chlorine gas, chlorine powder.
   e. Another option is ultraviolet light disinfection.

iii. Disinfection of the effluents is particularly important if they are discharged into coastal waters close to shell fish habitats, especially if local people are in the habit of eating raw shell fish.

18.5 Sludge Treatment

i. The sludge from the sewage treatment plant requires anaerobic digestion to ensure thermal elimination of most pathogens.

ii. Alternatively, it may be dried in natural drying beds and then incinerated together with solid infectious health-care waste.

iii. On-site treatment of hospital sewage will produce a sludge that contains high concentrations of helminths and other pathogens.

18.6 Reuse of Wastewater and Sludge in Agriculture and Aquaculture

i. According to WHO guidelines, the treated wastewater should contain no more than one helminth egg per litre and no more than 1000 faecal coliforms per 100 ml if it is to be used for unrestricted irrigation.

ii. It is essential that the treated sludge contains no more than one helminth egg per kilogram and no more than 1000 faecal coliforms per 100g.

iii. The sludge should be applied to fields in trenches and then covered with soil.

18.7 Options for Establishments that apply Minimal Waste Management Programmes

i. Lagooning
   a. In a region or an individual health-care establishment that cannot afford sewage treatment plants, a lagooning system is the minimal requirement for treatment of wastewater.
   b. The system should comprise two successive lagoons to achieve an acceptable level of purification
of hospital sewage.

c. Lagooning may be followed by infiltration of the effluent into the land, benefiting from the filtering capacity of the soil.
d. There is no safe solution for the disposal of sewage from a hospital that cannot afford a compact sewage treatment plant and that has no space available to build a lagooning system.

18.8 Minimal Safety Requirements For Sewerage Treatment
For health-care establishments that apply minimal programmes and are unable to afford any sewage treatment, the following measures should be implemented to minimize health risks:

i. Patients with enteric diseases should be isolated in wards where their excreta can be collected in buckets for chemical disinfection; this is of utmost importance in case of cholera outbreaks, and strong disinfectants will be needed.

ii. No chemicals or pharmaceuticals should be discharged into the sewer.

iii. Sludge from hospital cesspools should be dehydrated on natural drying beds and disinfected chemically (e.g. with sodium hypochlorite, chlorine gas, or preferably chlorine dioxide).

iv. Sewage from health-care establishments should never be used for agricultural or aquaculture purposes.

v. Hospital sewage should not be discharged into natural water bodies that are used to irrigate fruit or vegetable crops, to produce drinking water, or for recreational purposes.

vi. Small-scale rural health-care establishments that apply minimal waste management programmes may discharge their wastewater to the environment.

vii. An acceptable solution would be natural filtration of the sewage through porous soils, but this must take place outside the catchment area of aquifers used to produce drinking-water or to supply water to the health-care establishment.

18.9 Sanitation

i. Human excreta are the principal vehicle for the transmission and spread of a wide range of communicable diseases, and excreta from hospital patients may be expected to contain far higher concentrations of pathogens, and therefore to be far more infectious, than excreta from households.

ii. Adequate sanitation in every health-care establishment should be provided.

iii. The faecal-oral transmission route and other routes such as penetration of the skin must be interrupted to prevent continuous infection and re-infection of the population.

18.10 Safe Management of Wastes from Health-Care Activities
The health-care establishment should ideally be connected to a sewerage system.

i. Where there are no sewerage systems, technically sound on-site sanitation such as the simple pit latrine, ventilated pit latrine, and pour-flush latrine, and the more advanced septic tank with soak-away or the aqua-privy should be provided.

ii. In temporary field hospitals during outbreaks of communicable diseases, other options such as chemical toilets may also be considered.

iii. In addition, convenient washing facilities (with warm water and soap available) should be available for patients, personnel, and visitors in order to limit the spread of infectious diseases within the health-care establishment.
ANNEXES

Annex 1: Sample Sheet for Assessment of Waste Generation

Name of the health-care facility: .......... Week: .......................... Date: ............. Month: ................................

<table>
<thead>
<tr>
<th>Waste collection point: department/location</th>
<th>Waste category (specify)</th>
<th>Quantity of waste generated per day (weight and volume)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Monday</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kg</td>
</tr>
</tbody>
</table>
## Annex 2: Colour Code for Biomedical Waste

<table>
<thead>
<tr>
<th>NO</th>
<th>TYPE OF WASTE</th>
<th>COLOUR OF CONTAINER AND MARKINGS</th>
<th>TYPE OF CONTAINER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Infectious</td>
<td>Yellow with biohazard sign</td>
<td>Strong leak proof-plastic bag with biohazard symbol</td>
</tr>
<tr>
<td>2</td>
<td>Pathological/anatomical</td>
<td>Red with biohazard sign</td>
<td>Strong leak proof-plastic bag with biohazard symbol</td>
</tr>
<tr>
<td>3</td>
<td>Sharps</td>
<td>Yellow – (marked sharps)</td>
<td>Puncture proof</td>
</tr>
<tr>
<td>4</td>
<td>Chemicals</td>
<td>Brown (marked chemicals)</td>
<td>Plastic bag or container</td>
</tr>
<tr>
<td>5</td>
<td>Pharmaceutical</td>
<td>Brown</td>
<td>Plastic bag or container</td>
</tr>
<tr>
<td>6</td>
<td>General waste/Non-infectious/non hazardous (Non-clinical)</td>
<td>Black</td>
<td>Plastic bag or container</td>
</tr>
<tr>
<td>7</td>
<td>Radioactive waste</td>
<td>Symbol for radioactive waste</td>
<td>Lead box, labelled with radioactive symbol</td>
</tr>
<tr>
<td>8</td>
<td>Genotoxic/ Cytotoxic waste</td>
<td>Purple</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>e-Waste</td>
<td>Refer to e-waste guidelines</td>
<td></td>
</tr>
</tbody>
</table>

**SOURCE:** WHO COLOUR CODE° (NEMA) EIGHTH SCHEDULE, PART I (REGULATION 39)
### Annex 3A: International Waste Labelling Symbols

<table>
<thead>
<tr>
<th>Category</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potentially explosive waste</td>
<td><img src="image" alt="Explosives Symbol" /></td>
</tr>
<tr>
<td>Radioactive waste</td>
<td><img src="image" alt="Radioactive Symbol" /></td>
</tr>
<tr>
<td>Potentially corrosive waste</td>
<td><img src="image" alt="Corrosive Symbol" /></td>
</tr>
<tr>
<td>Infectious waste</td>
<td><img src="image" alt="Biohazard Symbol" /></td>
</tr>
<tr>
<td>Waste containing flammable material</td>
<td><img src="image" alt="Flammable Symbol" /></td>
</tr>
<tr>
<td>Label for waste containing oxidizing chemicals</td>
<td><img src="image" alt="Oxidizer Symbol" /></td>
</tr>
<tr>
<td>Waste containing toxic materials</td>
<td><img src="image" alt="Toxic Symbol" /></td>
</tr>
<tr>
<td>Highly infectious/sharps waste</td>
<td><img src="image" alt="Dangerous Symbol" /></td>
</tr>
</tbody>
</table>
Annex 3b: Alternative Labels for Hazardous Wastes

HAZARDOUS WASTE

CYTOSTATIC

Institution/Hospital: -------------------------------
Department/ward: -------------------------------
Signature of i/c. -------------------------------
Signature of O i/c -------------------------------

HAZARDOUS WASTE

“SHARPS: INFECTIOUS”

Institution/Hospital: -------------------------------
Department/ward: -------------------------------
Signature of i/c. -------------------------------
Signature of O i/c -------------------------------

HAZARDOUS WASTE

BIOLOGICAL

Institution/Hospital: -------------------------------
Department/ward: -------------------------------
Signature of i/c. -------------------------------
Signature of O i/c -------------------------------

HAZARDOUS WASTE

CHEMICALS

Institution/Hospital: -------------------------------
Department/ward: -------------------------------
Signature of i/c. -------------------------------
Signature of O i/c -------------------------------

HAZARDOUS WASTE

INFECTIOUS

Institution/Hospital: -------------------------------
Department/ward: -------------------------------
Signature of i/c. -------------------------------
Signature of O i/c -------------------------------

HAZARDOUS WASTE

PHARMACEUTICAL

Institution/Hospital: -------------------------------
Department/ward: -------------------------------
Signature of i/c. -------------------------------
Signature of O i/c -------------------------------
Annex 4A: Health Care Waste Tracking Form

**HEALTH CARE WASTE TRACKING FORM**

Date of shipment 00/00/0000

Source (Name of HCF/Hospital/Clinic)………………………………………………

Physical address ..........................First Aid Avenue,

                Generation Point: Plot No: 0000..........

Postal address - Box 000 Any town

                Tel:0000000

                Email............................................

TRANSPORTER:

NAME -WE-HAUL HEALTHCARE WASTE

Physical address – 123 HAULA WAY

TOWTOWN, Any PROVINCE Postal address - Box 000 Any town

                Tel:0000000

                Email............................................

Postal address - Box 000 Any town Tel: 000000

HEALTHCARE WASTE
### CONSIGNMENT NOTE FOR THE CARRIAGE AND DISPOSAL OF HAZARDOUS WASTE

<table>
<thead>
<tr>
<th>[Name, Address and telephone number of waste regulatory authority]</th>
<th>Serial no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Originator’s reference</td>
</tr>
</tbody>
</table>

#### A. Producer’s Certificate

1. The material described in B below is to be collected from (location) and taken to (location):
2. Name…………………………………….Signed……………………………………...
3. On behalf of ……………………………
4. Designation………………………………
5. Address …………………………………….Tel. no…………………………………..
6. Date ………………………………………Time of collection…………..

#### B. Description of the waste

1. General description and physical nature of waste……………………………….
2. Relevant chemical and biological components and maximum concentrations…………
3. Quantity of waste and size, type and number of containers…………………………
4. Process(es) from which waste originated…………………………………………..

#### C. Carriers Collection Certificate

I certify that I collected the consignment of waste and the information given in A (1) and (2) and B (1) and (3) is correct, subject to any amendment listed in this space

1. I collected this consignment on…………………………….. at……………….Time
2. Signed ………………………. Name ………………………….. Date …………………
3. On behalf of ………………………………………. Vehicle reg. No. ………...
4. Address …………………………………………………Tel. No. …………………
### Annex 4b continued

<table>
<thead>
<tr>
<th>D. Producer's Collection Certificate</th>
<th>I certify that the information given in B and C is correct and the carrier was advised of appropriate precautionary measures.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Signed ……………………… Name ………………………………………………………………………………………………………..</td>
</tr>
<tr>
<td></td>
<td>Date……………………………………. Tel. no. …………………………………..</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E. Disposer's Certificate</th>
<th>I certify that Waste Disposal Licence No………….., issued by ……………………[name of issuing body], authorizes the treatment/disposal at this facility of the waste described in B (and as amended where necessary at C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Name and address of facility………………………………………………………………………………………………….</td>
</tr>
<tr>
<td></td>
<td>……………………………………………………………………………………………………………………………………………..</td>
</tr>
<tr>
<td></td>
<td>This waste was delivered in vehicle …………[reg. No.] at …………………….</td>
</tr>
<tr>
<td></td>
<td>Time ………………….. [date] and the carrier gave his name as …………………….. on behalf of ………………………………Proper instructions were given that the waste should be taken to ……………………………………………………………………………………</td>
</tr>
<tr>
<td></td>
<td>Signed ………………….. Name ……………………………… Position …………..</td>
</tr>
<tr>
<td></td>
<td>Date ………………………………………… on behalf of ………………………………………………………………</td>
</tr>
</tbody>
</table>

| F. For use by Producer/Carrier/Dispose | |
## Annex 5: Waste Treatment Methods

<table>
<thead>
<tr>
<th>Waste category</th>
<th>Treatment method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infectious Wastes</strong></td>
<td></td>
</tr>
<tr>
<td>Cultures and stock</td>
<td>Steam sterilization/microwave</td>
</tr>
<tr>
<td>Contaminated bedding/patient care waste</td>
<td>Steam sterilization or Incineration</td>
</tr>
<tr>
<td>Contaminated small equipment</td>
<td>Steam sterilization or Incineration</td>
</tr>
<tr>
<td>Contaminated large equipment</td>
<td>Formaldehyde decontamination</td>
</tr>
<tr>
<td>Biological Waste</td>
<td>Steam sterilization or Incineration/ microwave</td>
</tr>
<tr>
<td>Contaminated laboratory waste</td>
<td>Steam sterilization/microwave</td>
</tr>
<tr>
<td>Dialysis unit waste</td>
<td>Steam sterilization</td>
</tr>
<tr>
<td><strong>Pathological waste</strong></td>
<td></td>
</tr>
<tr>
<td>Anatomical wastes</td>
<td>Steam sterilization or Incineration/Grinding</td>
</tr>
<tr>
<td>Surgery waste</td>
<td>Steam sterilization or Incineration</td>
</tr>
<tr>
<td>Human blood and blood products</td>
<td>Steam sterilization or Incineration</td>
</tr>
<tr>
<td>Contaminated animal carcasses</td>
<td>Incineration</td>
</tr>
<tr>
<td>Autopsy waste</td>
<td>Incineration</td>
</tr>
<tr>
<td><strong>Sharps</strong></td>
<td></td>
</tr>
<tr>
<td>Contaminated and unused sharps</td>
<td>Steam sterilization and Incineration/grinding</td>
</tr>
<tr>
<td><strong>Pharmaceutical Wastes</strong></td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical waste</td>
<td>See separate Pharmaceutical waste guidelines, microwave</td>
</tr>
<tr>
<td>Anti-neoplastic drug waste</td>
<td>Incineration</td>
</tr>
<tr>
<td>Low level Radioactive waste</td>
<td>Consult Radiation protection board</td>
</tr>
</tbody>
</table>
Annex 6: Management of Spillages
(Example of General Procedure for Dealing with Spillages’)

i. Evacuate the contaminated area.
ii. Decontaminate the eyes and skin of exposed personnel immediately.
iii. Inform the designated person (usually the Waste Management Officer), who should coordinate the necessary actions.
iv. Determine the nature of the spill.
v. Evacuate all the people not involved in cleaning up if the spillage involves a particularly hazardous substance.
vi. Provide first aid and medical care to injured individuals.

vii. Secure the area to prevent exposure of additional individuals.

viii. Provide adequate protective clothing to personnel involved in cleaning-up.
ix. Limit the spread of the spill.

x. Neutralize or disinfect the spilled or contaminated material if indicated.

xi. Collect all spilled and contaminated material. [Sharps should never be picked up by hand; brushes and pans or other suitable tools should be used.] Spilled material and disposable contaminated items used for cleaning should be placed in the appropriate waste bags or containers.

xii. Decontaminate or disinfect the area, wiping up with absorbent cloth. The cloth (or other absorbent material) should never be turned during this process, because this will spread the contamination. The decontamination should be carried out by working from the least to the most contaminated part, with a change of cloth at each stage. Dry cloths should be used in the case of liquid spillage; for spillages of solids, cloth impregnated with water (acidic, basic, or neutral as appropriate) should be used.

xiii. Rinse the area, and wipe dry with absorbent cloth.
xiv. Decontaminate or disinfect any tools that were used.

xv. Remove protective clothing and decontaminate or disinfect it if necessary.

xvi. Seek medical attention if exposure to hazardous material has occurred during the operation.
### Annex 7: Recycling Index

**Uncontaminated Paper and Cardboard**

<table>
<thead>
<tr>
<th>Category</th>
<th>Action</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard</td>
<td>Flatten &amp; Bundle</td>
<td>Recycled Cartons</td>
</tr>
<tr>
<td>Confidential documents</td>
<td>Shred</td>
<td>Recycled Paper</td>
</tr>
<tr>
<td>Office Paper</td>
<td>Separate &amp; Bundle</td>
<td>Recycled Paper</td>
</tr>
</tbody>
</table>

**Metals**

<table>
<thead>
<tr>
<th>Category</th>
<th>Action</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>Contact a scrap merchant</td>
<td>Reprocessed Cans</td>
</tr>
<tr>
<td>Dental Amalgam</td>
<td>Contact a silver recovery</td>
<td>Recovered Silver</td>
</tr>
<tr>
<td>Mercury</td>
<td>Contact a recovery Contractor</td>
<td>Recovered Mercury</td>
</tr>
<tr>
<td>Scrap Steel.</td>
<td>Contact a scrap merchant</td>
<td>Reprocessed Steel</td>
</tr>
<tr>
<td>Silver X-Ray Films and Processors</td>
<td>Contact a silver recovery Contractor</td>
<td>Recovered Silver</td>
</tr>
</tbody>
</table>

**Glass**

<table>
<thead>
<tr>
<th>Category</th>
<th>Action</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottles &amp; Jars Clear, Brown and Green</td>
<td>Separate, re-use and contact a Recycler</td>
<td>Reused item or reprocessed glass</td>
</tr>
<tr>
<td>Broken glass</td>
<td>Separate, store in rigid containers and contact a recycler</td>
<td>Reprocessed glass</td>
</tr>
</tbody>
</table>

**OILS**

<table>
<thead>
<tr>
<th>Category</th>
<th>Action</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste Oil</td>
<td>Separate and contact a recycler</td>
<td>Refined or used as fuels</td>
</tr>
</tbody>
</table>

**Food remains/leftovers and Green Waste**

<table>
<thead>
<tr>
<th>Category</th>
<th>Action</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food remains/leftovers Grass cuttings, tree/shrub prunings. Dead leaves</td>
<td>Mulching, firewood,</td>
<td>Garden Compost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Garden Compost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Pig swill</td>
</tr>
</tbody>
</table>

**Plastics**

<table>
<thead>
<tr>
<th>Category</th>
<th>Action</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>High and low Density Polyethylene</td>
<td>Return to Supplier</td>
<td>Reprocessed</td>
</tr>
<tr>
<td>PET Polyethylene Terephthalate Soft Drink Bottles</td>
<td>Separate and arrange collection</td>
<td>Recycled Bottles</td>
</tr>
<tr>
<td>PP Polypropylene Car Battery Casings</td>
<td>Separate and arrange collection</td>
<td>Reprocessed</td>
</tr>
<tr>
<td>PPVC Plasticised Polyvinyl Chloride Plastic Tubing</td>
<td>Separate and arrange collection</td>
<td>Reprocessed</td>
</tr>
<tr>
<td>PS Polystyrene Foam cups and Packaging</td>
<td>Separate and arrange collection</td>
<td>Reprocessed or reused</td>
</tr>
<tr>
<td>UPVC Unplasticised Polyvinyl Chloride</td>
<td>Separate and arrange collection</td>
<td>Reprocessed</td>
</tr>
</tbody>
</table>
### Annex 8: A Sample Tag for Shipment

<table>
<thead>
<tr>
<th><strong>HEALTHCARE WASTE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERATOR</strong></td>
</tr>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>Physical address -</td>
</tr>
<tr>
<td>Postal address -</td>
</tr>
<tr>
<td>Date of shipment 00/00/0000</td>
</tr>
<tr>
<td>GENERAL HOSPITAL</td>
</tr>
<tr>
<td>First Aid Avenue</td>
</tr>
<tr>
<td>Box 000 Any town Tel:0000000</td>
</tr>
<tr>
<td>Generation house Plot:0000</td>
</tr>
<tr>
<td><strong>TRANSPORTER:</strong></td>
</tr>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>Physical address –</td>
</tr>
<tr>
<td>Postal address -</td>
</tr>
<tr>
<td>WE-HAUL HEALTHCARE WASTE</td>
</tr>
<tr>
<td>123 HAULA WAY</td>
</tr>
<tr>
<td>Box 000 Any town Tel:0000000</td>
</tr>
<tr>
<td>TOWTOWN, Any PROVINCE</td>
</tr>
</tbody>
</table>

**HEALTHCARE WASTE**
Annex 9 - Facility Healthcare Waste Management Plan

Name of Facility:                                                                         Date:

Define Staff Roles

Who is responsible overall for supervising HCWM at your facility?

Attach supervision structure organogram of your facility.

Who is responsible for performing waste disposal for each area of your facility?

Attach job descriptions for all cadres of staff at your facility.

Outline Current HCWM Status at Facility

Define type and amounts of waste generated.

<table>
<thead>
<tr>
<th>Type</th>
<th>Amount (per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-infectious waste</td>
<td></td>
</tr>
<tr>
<td>Infectious waste</td>
<td></td>
</tr>
<tr>
<td>Highly infectious waste</td>
<td></td>
</tr>
<tr>
<td>Sharps waste</td>
<td></td>
</tr>
</tbody>
</table>

List number of staff and their designations at your facility

<table>
<thead>
<tr>
<th>Designation</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Outline HCWM practices used currently.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Current Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is waste classified and segregated into different coloured waste bins?</td>
<td>Describe how.</td>
</tr>
<tr>
<td>How are sharps (needles) disposed?</td>
<td></td>
</tr>
<tr>
<td>How are safety boxes used?</td>
<td></td>
</tr>
<tr>
<td>Are full safety boxes recorded?</td>
<td></td>
</tr>
<tr>
<td>Where are they stored?</td>
<td></td>
</tr>
<tr>
<td>How are they transported to their final disposal location?</td>
<td></td>
</tr>
<tr>
<td>Where are different categories of waste disposed?</td>
<td></td>
</tr>
<tr>
<td>Describe the disposal process.</td>
<td></td>
</tr>
</tbody>
</table>

### Outline Ideal Practices: Establishing Standards

<table>
<thead>
<tr>
<th>Concept</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segregating waste (different types, corresponding colours of waste liners)</td>
<td></td>
</tr>
<tr>
<td>Prioritising sharps (use of safety boxes or needle removers, if applicable)</td>
<td></td>
</tr>
<tr>
<td>Recording, handling and transport of safety boxes</td>
<td></td>
</tr>
<tr>
<td>Final waste disposal for each category of waste (including sharps barrel, if applicable)</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B and tetanus toxoid immunization for all cadres of staff</td>
<td></td>
</tr>
</tbody>
</table>
**List Improvements Needed**

What capital improvements are needed at your facility?

<table>
<thead>
<tr>
<th>Item</th>
<th>Date for Introduction</th>
<th>Total Cost</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What supplies needed for the next 6 months? (Protective clothing, cleaning supplies, waste bin, liners, safety boxes)

<table>
<thead>
<tr>
<th>Supplies</th>
<th>Quantity</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What training is needed at your facility for each cadre of staff?

<table>
<thead>
<tr>
<th>Cadre of Staff</th>
<th>Training Topics</th>
<th>Date for completion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outline Monitoring Schedule

List the person responsible to perform the monitoring for each cadre of staff and the frequency with which they will be monitored.

<table>
<thead>
<tr>
<th>Cadre of Staff</th>
<th>Supervisor</th>
<th>Frequency to be monitored</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

List the person responsible to perform the monitoring for each cadre of staff and the frequency with which they will be monitored.

<table>
<thead>
<tr>
<th>Form</th>
<th>Frequency to be monitored</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Date for introduction of this plan:

National Guidelines for Safe Management of Health Care Waste

The Ministry of Medical Services and the Ministry of Public Health and Sanitation acknowledges the funding and support of World Health Organization in the preparation and production of this document.

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Nairobi, Kenya

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