



National Healthcare Waste Management Plan

Prepared by
Healthcare Waste Management Technical Working Group

ACRONYMS

AIDS Acquired Immunodeficiency Syndrome
CHEWs Community Health Extension Workers
CHOs Community Health Officers
FBO Faith Based Organization
FCT Federal Capital Territory
FMC Federal Medical Centre
FME Federal Ministry of Environment
FMOH Federal Ministry of Health
FGN Federal Government of Nigeria
HCWM Healthcare Waste Management
HCF Healthcare Facilities
HCWMP Healthcare Waste Management Plan
HCWMO Healthcare Waste Management Officer
HCWM TWG Healthcare Waste Management Technical Working Group
HIV Human Immunodeficiency Virus
HS Health System
ICC Infection Control Committee
LACA Local Action Committee on HIV/AIDS
LGA Local Government Areas
MDGs Millennium Development Goals
NACA National Action Committee on HIV/AIDS
NAP National Action Plan
NASCP National AIDS/STD Control Program
NGO Non Governmental Organization
NHCWMP National Healthcare Waste Management Plan
NSC National Steering Committee
SEPAs State Environmental Protection Agencies
UNEP United Nations Environmental Programme
UNICEF United Nations Children's Fund
WHO World Health Organization

Executive Summary

Nigeria and its citizens are exposed to unnecessary health and environmental risks from unsafe healthcare waste management (HCWM) practices. Because healthcare waste management (HCWM) in Nigeria is well below minimum hygiene standards, healthcare workers, patients, and communities are exposed to nosocomial infections both within Healthcare Facilities (HCFs) and the surrounding communities, such as when children and scavengers investigate uncontrolled healthcare waste dumps. Furthermore, negative impacts on Nigeria's natural resources (air, soil, and water) occur when healthcare wastes are disposed of improperly.

In the first part of this document, an expert analysis by the HCWM Technical Working Group (HCWM TWG) presents the current situation affecting HCWM in Nigeria. The HCWM TWG presents in the second part concrete recommendations for how Nigeria can systematically improve HCWM to provide safe disposal of healthcare wastes. Finally, these recommendations are translated in the third part of this document into a strategic 5-year National Action Plan to progressively improve HCWM in Nigeria.

The **National Health Care Waste Management Plan** identifies several opportunities to advance safe HCWM in Nigeria:

(1) The **National Guidelines for Health-Care Waste Management**, drafted by the HCWM TWG to accompany the **National Health Care Waste Management Plan**, must be reviewed by HCWM Stakeholders. Once validated, these Guidelines must be widely distributed to all decision-makers in the Health System by the Federal Ministries of Environment (FMEnv) and Health (FMOH). These HCWM Guidelines must be applied in all HCF for standardisation of HCWM practices in Nigeria.

(2) The existing legal and regulatory HCWM framework in Nigeria does not stimulate the Management Teams at the HCFs to establish and maintain a safe HCWM system. Therefore the HCWM TWG recommends that a HCWM Bill be prepared and rapidly proposed to National Assembly for enactment into law. In addition, the TWG prepared draft **National Healthcare Waste Management Regulations** and suggests that they be modified and validated by the FMEnv. Once complete, these regulations can be the foundation for a **Healthcare Waste Management Policy**, which should also be rapidly prepared, validated, and disseminated by the Federal Ministry of Environment.

(3) The Government of Nigeria should establish a **National Healthcare Waste Steering Committee** to ensure the coordination and supervision of the HCWM Plan at the national level. Annex 5 is a list of proposed Steering Committee members, identified by the HCWM TWG.

(4) Once validated the **National Action Plan**, prepared as the third part of this National HCWM Plan, should be implemented over a five-year period to progressively upgrade the current HCWM practices. An approximate initial cost of z. The annual costs associated with the establishment of new management and disposal procedures ranges between x and y. See Annex 6, an application of the WHO Cost Assessment Tool, to see how these figures were determined. { See

attached Excel spreadsheet. Maybe you could think of a two scenarios to cost: one with pyrolytic centralized system and transport, another with decentralized – DeMontfort system.}

(5) Designate a **Healthcare Waste Management Officer (HCWMO)** in all tertiary and secondary facilities and given the responsibility and resources to operate and monitor the management of the HCW on a daily basis.

(6) Standardise segregation procedures in HCFs, as indicated in the draft **National Guidelines for Health-Care Waste Management**, implementing a three bin system associated with a colour coding and labelling system. The following bins / classes of HCW are recommended:

1. Non-Risk HCW or domestic waste;
2. Healthcare Waste - pathological and infectious waste;
3. Sharps - always collected in rigid safety boxes.

In addition, in health services where additional hazardous wastes are generated three additional bins / classes may be included:

4. Anatomical Waste
5. Highly Infectious Wastes
6. Pharmaceutical Waste

(8) Identify specific treatment/disposal methods according to the type and the location of the HCF where the waste is generated. This includes rural areas and low density urban areas as well as urban settings.

(9) Reinforce institutional capacities of the HS through specific technical training and the recruitment of additional Environmental Health Officers to support the HCFs in implementing the recommended HCWM policy.

(10) Develop on-going awareness and training programmes for existing cadre of healthcare staff and support staff. Review the curricula of medical and nursing schools, introducing critical HCWM concepts when missing.

(11) Introduce a rigorous monitoring plan that provides data to measure the implementation of the **National HCWM Guidelines** in the HCFs and enforces the proper performance of the Health System (HS) to achieve a minimum standard of HCWM.

Currently, the institutional capacities at all levels of the Health System (HS) in Nigeria are limited and cannot effectively support a minimum standard of Healthcare Waste Management (HCWM). Limitations in the capacity of healthcare institutions include under-staffing, limited and unreliable financial resources for HCWM options and supplies, weak supportive supervision, and insufficient training. This **National Healthcare Waste Management Plan**, including the 5-year **National Action Plan**, is intended to address these significant and dangerous problems and provide a road map to introduce safe HCWM practices to all HCFs in Nigeria.

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INTRODUCTION

The disposal of wastes originating from healthcare establishments (public and private) can have an effect on human health and well-being and the environment. Nevertheless, experience has proven that wastes originating from healthcare establishments, when properly managed, generally pose no greater risks than that of properly treated municipal or industrial wastes. In response to this need to safely manage hazardous healthcare waste, in August 2006 the FMEnv and FMOH instituted the *National Healthcare Waste Management Plan* (NHCWMP) Working Committee to look into the development of a NHCWMP. The committee had support from, World Bank, UNICEF, WHO, NPI, EU-PRIME and MMIS-USAID. The tasks to be achieved by the committee include:

1. Identify the composition of a HCWM Technical Work Group (TWG);
2. Plan and facilitate a three-day workshop to develop a draft NHCWMP for ratification by national stakeholders;
3. Identify the relevant constituencies to be designated as stakeholders for HCWM;
4. Develop draft National HCWM Guidelines; and
5. Facilitate a National stakeholders' workshop to be held by the FMEnv and FMOH, during which the draft documents should be reviewed and validated for further implementation.

This overall process ultimately aims at upgrading the HCWM system in the medical institutions in the country.

OBJECTIVES

The objectives of this *National Healthcare Waste Management Plan* is to provide an approach to the management of healthcare waste that is safe for HCFs, waste handlers, the public and the environment as well as being cost effective and practical. The NHCWMP objectives include:

- ⌚ Develop and implement a *National Action Plan* based on the analysis of current HCW management and disposal practices;
- ⌚ Develop standardized and simple HCWM procedures in the HCFs of the country and provide appropriate treatment and disposal technologies, taking into consideration the financial and institutional capacities of local, regional institutions;
- ⌚ Develop a strategy for the implementation of the national HCWM Plan in Nigeria.

METHODOLOGY

The preparation and implementation of the *NHCWMP* is based on the under listed sequential steps:

- ⌚ Analysis of current HCWM practices (Part 1: Situational Analysis). This is integral to the development of recommendations to guide the development of the action plan;

- ⌚ Review of International and National policy instruments for the management of HCW and analysis of existing and historical regulations, bye-laws and other policy instruments for the management of HCW;
- ⌚ The development of realistic recommendations and objectives as well as the determination of the human, material and financial resources required (Part 2: Recommendations);
- ⌚ The development of the *National Action Plan* and the set-up of a strategy for its implementation (Part 3: National Action Plan). The strategy has to take into consideration the necessity to strengthen the institutional and monitoring capacities of the different actors involved in the elaboration of the plan;
- ⌚ The elaboration and the use of monitoring and evaluation tools, with adequate indicators of achievement.

The steps above are strongly interdependent one on the preceding one. The planning process is nevertheless not linear and has to be periodically reconsidered for adjustments. Therefore, special attention has to be paid to the capacity of the National Institutions to monitor, review and adjust the plan.

DEFINITIONS

Hazardous healthcare waste is of primary concern in Nigeria and the world, due to its potential to cause disease or injury. Precise definitions of types of healthcare waste (HCW) must take into account the associated hazards and should be incorporated into Nigeria healthcare waste management (HCWM) legal, regulatory, technical, and information documents.

The hazardous nature of HCW may be due to the following properties:

- It contains infectious agents
- It contains sharps
- It is cytotoxic or genotoxic
- It contains toxic or hazardous chemicals or pharmaceuticals
- It is radioactive

Health-Care Wastes (HCW) is all waste generated by health-care establishments (human or veterinary) and including research facilities and laboratories. It can include waste generated in the course of healthcare in homes. HCW includes:

(1) Non-risk (General) healthcare waste includes all waste that has not been contaminated with infectious materials or other hazardous materials. UNEP recommendations include in this category all items such as gloves, gauze, dressings, and swabs that have been used for medical care but are visually not contaminated with blood or body fluids of the patient. This waste category is considered domestic waste and can be managed by municipal waste services.

(2) Hazardous healthcare waste

- a) **Infectious waste** comprises all healthcare waste known or clinically assessed by a medical practitioner to have the potential of transmitting infectious agents to humans or animals.

- b) **Pathological Waste** includes all organs (including recognizable body parts and placentas), tissues as well as blood and body fluids.
- c) **Chemical waste, waste with high contents of heavy metals and pressurized containers** includes gaseous, liquid and solid chemicals, waste with a high content of heavy metals such as batteries, pressurized containers, thermometers, blood-pressure gauges, photographic fixing and developing solutions, halogenated or non-halogenated solvent.
- d) **Pharmaceutical Waste** includes medicines, expired drugs, drugs, and vaccines. Not all the pharmaceutical wastes are hazardous. Because the Federal Ministry of Health has initiated specific measures to reduce the wastage of drugs, healthcare facilities should only need to dispose of small quantities of pharmaceutical waste.

(3) Highly hazardous healthcare waste

- a) **Sharps** are all objects and materials that pose a potential risk of injury and infection due to their puncture or cutting properties. Sharps are considered as one of the most hazardous categories of waste generated during medical activities and must be managed with the utmost care.
- b) **Highly infectious waste** includes all viable biological and pathological agents artificially cultivated in significant elevated numbers. Cultures and stocks, dishes and devices used to transfer, inoculate and mix cultures of infectious agents belong to this category of waste.
- c) **Radioactive Waste** includes liquids, gas and solids contaminated with radionuclides whose ionizing radiations have genotoxic effects.

PART 1: SITUATIONAL ANALYSIS

SECTION 1: ORGANISATION OF HEALTH SYSTEM (HS) IN NIGERIA

With a population of more than 132 million, Nigeria is the most populous country in Africa. Among the major contributors to the disease burden of the country are malaria, tuberculosis (TB), and HIV/AIDS. Unlike most of Sub-Saharan Africa, rural areas in Nigeria have a higher HIV/AIDS prevalence than urban areas (UNAIDS 2004)¹. About 25% of people live in urban and 75% in rural areas. There are wide variations in health status and access to care among the six geo-political zones of the country, with indicators generally worse in the North than in the South (MDG Report 2004)². Nigeria is divided into 36 States and the Federal Capital Territory (FCT), which have been grouped into six geopolitical zones and include 774 Local Government Areas (LGAs).

1.1 Structure of Health Services in Nigeria.

Health service provision in Nigeria includes a wide range of providers in both the public and private sectors, such as public facilities managed by federal, state, and local governments, private for-profit providers, NGOs, community-based and faith-based organizations, religious and traditional care givers (WHO 2002)³.

Nigeria is a federation with three tiers of government: federal, state, and local. Responsibility for health service provision in the public sector is based on these three tiers. The Federal Government owns and runs tertiary healthcare facilities (HCFs) across the country. Each State health system runs a programme that suits the peculiar needs of the State. Of course there is synergy and co-operation between the Federal and State institutions to meet the national needs. The levels of care in the public sector are:

Primary: Facilities at this level form the entry point of the community into the healthcare system. They include health centres and clinics, dispensaries, and health posts, providing general preventive, curative, promotive, and pre-referral care. Primary facilities are typically staffed by nurses, community health officers (CHOs), community health extension workers (CHEWs), junior CHEWs, and environmental health officers. Local Government Areas (LGAs) are mandated by the constitution to finance and manage primary healthcare.

Secondary: Secondary care facilities include general hospitals, providing general medical and laboratory services, as well as specialized health services, such as surgery, paediatrics, obstetrics and gynaecology. General hospitals are typically staffed by medical officers (who are physicians), nurses, midwives, laboratory and pharmacy specialists, and community health officers. Secondary level facilities serve as referral points for primary healthcare facilities. Each district, LGA, or zone is expected to have at least one secondary level health facility.

¹ UNAIDS/ Treat 3 by 5 (2004), Epidemiological sheets on HIV/AIDS and STIs: Update 2004.

² Federal Government of Nigeria (2004a), *Millennium Development Goals Report 2004*

³ World Health Organization (2002). *WHO Country Cooperation Strategy: Federal Republic of Nigeria. 2002 – 2007.*

Tertiary: Tertiary level facilities form the highest level of healthcare in the country and include specialist and teaching hospitals and federal medical centres (FMCs). They treat patients referred from the primary and secondary level and have special expertise and full-fledged technological capacity that enable them to serve as referral centres and resource centres for knowledge generation and diffusion.

Each state has at least one tertiary facility. Primary and secondary level of care is also provided by the largely unregulated private health sector, which includes a wide range of providers such as physician practices, clinics, and hospitals. Faith-based organizations (FBOs) also support health clinics and hospitals. Outside of the modern healthcare system, traditional herbalists are another frequently used source of care. (Reference importance percentage of services provided by HCFs).

1.2 Administrative Structure Affecting HCWM

At the federal level; the Federal Ministry of Health (FMOH) is the main ministry responsible for institutional healthcare in the country. National policies, strategies, and guidelines to address health problems related to malaria, TB, HIV/AIDS, and maternal and child health have been developed by Nigeria's Federal Ministry of Health. The FMOH is responsible for basic health issues such as:

- Policy formulation and implementation;
- supportive supervision;
- management of tertiary institutions;
- initiation and facilitation of medical and pharmaceutical research; and
- health legislation and enforcement of health related regulations.

Whilst the provision of effective and efficient healthcare (both preventive and curative) is the primary responsibility of the Federal and State Ministries of Health, HCWM and planning is primarily the responsibility of the Federal Ministry of Environment (FMEnv) and State Environmental Protection Agencies (SEPAS) with necessary inputs from the Health Ministry. It is important to note that responsibility for the development of healthcare waste management (HCWM) policy, regulations, as well as plan formulation and implementation rests primarily with the FMEnv.

The Federal Ministry of Environment, the Federal Ministry of health, the Federal Ministry of Agriculture, State Ministries of Health, and Departments of Health in Local Governments as well as SEPAS all have complimentary roles to play in promoting and improving human health and welfare (including preventive medicine), human settlements, and the environment as affected by HCWM.

State Health Management Authority is administratively accountable to the Executive Administration of the State, through the supervision of the State Ministry of Health. The State Ministry of Health is responsible for planning the Health System (HS) and the implementation of health projects, provision of infrastructural facilities, management of the HS, prevention and control of epidemics at state level and ensures training of personnel to meet the medical needs of the state and health education. The overall responsibility for the management of HCW presently rests mainly on the Ministries of Health and State waste disposal boards.

SECTION 2: LEGAL AND REGULATORY HCWM FRAMEWORKS

This section reviews the current legal provisions for HCWM in Nigeria. Legal and institutional HCWM policies on HCWM constitute the essential backbone for safe management of healthcare waste (HCW) since they will:

- Establish a National HCWM Policy compatible with the technical, institutional and financial capacities of the HCFs in Nigeria
- Support National HCWM Procedures, National HCWM Policy, and National HCWM Guidelines
- Define the duties and responsibilities of each actor involved in HCWM in Nigeria
- Set-up legal regulation of HCWM systems within the HCFs

There are a number of relevant government policies at Federal and State levels that are related to giving direction towards a safe and healthy environment which depends largely on the effective management of healthcare waste in the country. However, they are scattered and there is no particular legislation specifically dealing with healthcare waste management in Nigeria as of today.

2.1 Review of the Existing Environmental and Health Legislations

At an international level, Nigeria has ratified the *Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal* (1992). It is also party to the *Stockholm Convention on the Persistent Organic Pollutants* (2002).

Although currently there is no specific legislation, regulations or bye-laws for the management of health care waste in Nigeria, there are relevant laws and regulations pertaining to the protection of the environment and health:

- **Decree n° 58** of 1988 establishes the Federal Environmental Protection Agency with: a) the responsibility to monitor and help enforce environmental protection measures; b) the duty to co-operate with Federal and State Ministries, Local Governmental Councils and research agencies on matters and facilities relating to environmental protection; c) the powers to establish standards, inspect, search, seize and arrest offenders.
- **Decree n° 42** of 1988 Harmful Waste (Special Criminal Provisions, etc) prohibits the carrying, depositing and dumping of harmful wastes (injurious, poisonous, toxic or noxious substance) and prescribes penalties for those found guilty of improper practices.
- **Decree n° 86** of 1992 sets out the procedures and methods for environmental impact assessments on both public and private projects and states that the “construction of incineration plants” requires an environmental assessment.

Three regulations dealing with environmental issues have been identified including

- **S.I. 8 National effluent limitation** of 1991 which makes it mandatory for industrial facilities to install anti-pollution equipment and make provision for effluent treatment. It also prescribes maximum limits of effluent parameters allowed for discharge.
- **S.I. 9 National pollution abatement in industries and facilities generating wastes** of 1991 imposes restrictions on the release of toxic substances and stipulates requirements for monitoring of pollution to ensure that permissible limits are not exceeded.
- **S.I. 15 Management of Solid and Hazardous Wastes Regulation** of 1991 deals with facilities that generate solid and hazardous waste. It also covers hazardous waste treatment and disposal facilities and indicates requirements for such facilities including contingency planning, emergency procedures, and alike. Part 12 of this regulation provides for the tracking of wastes from their point of generation to the final disposal with specific details at §103 regarding HCW. Schedule 6 lists the different types of “infectious wastes.”

Nigeria’s **National Policy on Environment** was first published in 1989 and revised in 1999. It describes strategies for achieving the policy goal of sustainable development. Sanitation and waste management as well as toxic and hazardous substances are presented. No specific mention is made of HCW, although a number of points can be applied to hazardous substances. This document could eventually serve as a basis for the National HCW Policy which must be prepared regarding HCWM in Nigeria.

There are several Guidelines / Blueprints that are applicable to HCWM in Nigeria:

	Draft blueprint on municipal solid waste management in Nigeria	2000
summary	This comprehensive document presents strategies for the sustainable management of municipal waste which take into account technical, legal and financial as well as public awareness aspects. It discusses the responsibilities of the different levels of authority (local government, state and federal, pp. 14-16) and highlights a number of critical areas and hints possible solutions.	
definition	An integrated municipal solid waste management strategy is advocated. It is made up of a series of steps that comprise, source reduction, recycling, incineration and land filling.	
comment	Solid waste management is constitutionally of the responsibility of the local government councils which in many instances don’t have the means of enforcing current rules. This situation will have to be addressed by getting a better co-operation from the Nigerian Police Forces.	
suggestions	There will most certainly be the need for harmonizing laws/bylaws or existing regulations within each state and ideally at national level so as to avoid potential inter-state movements of certain wastes.	

	Blueprint: Handbook on hazardous waste management	?
summary	This document provides a number of definitions and strategies regarding hazardous waste management as well as a categorization scheme based on the Basel Convention on Control of the Trans-boundary Movements of Hazardous Waste and their Disposal, signed and ratified by Nigeria.	
definition	see handbook for details	
comment	A few examples of industries which have adopted environmentally cleaner production practices are given, demonstrating that an ecological approach can also be economically interesting.	

	Blueprint on environmental enforcement, a citizen's guide	?
summary	This document aims at defining who the enforcers are (FMENV, SEPA, LGA); how compliance, monitoring and inspections are conducted as well as types of enforcement actions and tools available. Citizens are encouraged to play an active role both by complying with environmental laws/rules at home and on the job as well as signalling any suspect activities they may notice.	
definition	No specific definitions in relation with HCWM issues provided	
comment	Suggests informing the general public about their duties and rights regarding environmental issues. To get the message across, it will nevertheless be necessary to conduct information campaigns within schools and with the use of the media.	

	Blueprint on compliance monitoring inspections	?
summary	This guide provides some basic information about the different types of inspections and how to carry them out.	
definition	No specific definitions in relation with HCWM issues provided	

2.2 Review of Hospital Healthcare Waste Regulations

The proper management of HCW depends to a large extent on strong HCF administration and organisation. HCFs should have well organized HCWM procedures with explicit HCWM rules. These resources must be made readily available as a written document to all personnel of the facility. HCWM regulations for hospitals must demand that financial and material resources are made available so that HCWM procedures can be safely and routinely practiced.

The existing legal provisions do not ensure that medical institutions, Local Government Authorities, as well as State and Federal government agencies associated with the generation and management of HCW ensure a "duty of care" and take precautionary measures to protect HC workers, waste managers, the general public and the environment from adverse effects of improper handling of HCW. This lack of provisions make it difficult for the medical institutions to set-up integrated HCWM plans and treatment and disposal facilities since there is no legal framework or codified penalties for improper conduct such as to act as guidance and tonic to take HCWM serious. Nigeria's HCWM Technical Working Group (TWG) (Annex 1), responsible for this *National Healthcare Waste Management Plan*, recommends that a detailed legal data collection relevant State laws/Regulations

and guidelines be carried out as a fundamental step to improving HCWM in Nigeria. See Annex 2 for an additional preliminary list of legal HCWM documents.

2.3 Conclusions

Nigeria has recently drafted *National Healthcare Waste Management Guidelines* and *National Healthcare Waste Management Regulations* (Annex 3) to be ratified with this document by National HCWM Stakeholders in 2007. Unfortunately, neither the National Health Bill presently before the National Assembly, or the proposed National Environmental Management Bill before the National Assembly make specific and detailed provisions for Healthcare Waste Management in Nigeria and therefore do not provide the legal framework to support either document. Development of a HCWM bill would establish legal controls and permit the regulatory bodies responsible for the safe disposal of healthcare waste to apply pressure for their implementation. It is therefore recommended that a HCWM Bill be prepared as soon as possible that will specifically deal with Healthcare Waste Management and that it be rapidly proposed to National Assembly for enactment into law.

SECTION 3: CHARACTERISATION OF HCW PRODUCTION IN NIGERIA

When developing a comprehensive, sustainable, and efficient HCWM plan, it is important that decision makers in Nigeria:

- Select appropriate HCW treatment and disposal technologies;
- decide on a centralised or a decentralised system for each facility, depending on specific criteria;
- develop reliable cost estimations; and
- identify regular and sufficient funds for operation and maintenance.

Consequently, there is a need for relevant agencies such as the Federal Ministry of Environment and the Federal Ministry of Health to evaluate the current and the future levels of waste production per health facility category and region with a maximum accuracy. Characterization of the types of waste, source of waste generation, and volume of waste generated are also important considerations in the development of HCWM plans.

3.1 Types of HCW Generated

A major portion (75-90%) of HCW is non-hazardous or general in nature, comparable to domestic waste. The remaining 10-25% of HCW is regarded as hazardous. The hazardous nature of HCW may be due to the following properties:

- (a) It contains infectious agents
- (b) It is cytotoxic or genotoxic
- (c) It contains toxic or hazardous chemicals or pharmaceuticals
- (d) It is radioactive
- (e) It contains sharps

It is to safely manage hazardous waste that HCWM plans must be developed at all health sector levels as accidental exposure to hazardous or potentially hazardous HCW can induce disease or injury. Hazardous healthcare waste can be classified by the type of risk that it presents. Table 1 describes briefly the types of healthcare waste. Comprehensive definitions of healthcare waste types are available in the draft *National HCWM Guidelines*.

Table 1: Classification, description, and examples of healthcare waste classes

CLASSIFICATION AND DESCRIPTION	EXAMPLES
NON-HAZARDOUS	
<p>Class 1: NON-RISK GENERAL WASTE</p> <p>Similar to normal household municipal waste and can be managed by the municipal waste services.</p>	Paper, cardboard, plastic, kitchen waste, ash, sawdust, pieces of wood segregated from hazardous waste at the point of generation
HAZARDOUS	
<p>Class 2: INFECTIOUS WASTE</p> <p>Generated by both inpatients/out-patients or animals, this waste is known or likely to contain pathogenic micro-organisms and can be dangerous or infectious to both patients, healthcare workers and the public. It therefore requires special management both inside and outside the hospital.</p>	Laboratory waste, materials potentially infected blood, swabs, materials that have been in used in surgery or been in contact with patients.
<p>Class 4: PATHOLOGICAL / ANATOMICAL</p> <p>Includes amputations and other body tissues resulting from surgical operations, autopsy (post-mortem), or delivery. Requires special treatment for ethical and aesthetic reasons.</p>	Internal body organs, amputated limbs, placentas, foetus. Also includes urine and blood products.
<p>Class 5: CHEMICAL, PHARMACEUTICAL, GENOTOXIC WASTE</p> <p>Wastes, including expired products, generated from the pharmacy, radiology and from chemotherapy.</p>	Vials, connecting tubing, drugs, vaccines, pharmaceutical products, disinfection solutions.
HIGHLY HAZARDOUS	
<p>Class 3: SHARPS</p> <p>These are sharp-edged wastes that can cause cuts or puncture wounds (e.g. needle stick injuries). They are hazardous whether or not they are contaminated with blood. They must be segregated, packaged, and handled with specific procedures within the health facility.</p>	Needles, syringes, surgical blades, scalpels, test tubes, ampoules, glass instruments, pipettes.
<p>Class6: HIGHLY INFEDTIOUS</p> <p>These highly infectious wastes required immediate treatment by chemical disinfectants or autoclaving before joining the hazardous HCW stream.</p>	Sputum cultures of TB laboratories, contaminated blood clots and glassware, highly concentrated microbiological cultures carried out in medical analysis laboratories.
<p>Class 7: RADIOACTIVE WASTE</p> <p>Any solid, liquid, or pathological waste contaminated with radioactive isotopes of any kind</p>	Radioactive papers, gloves, cotton swabs, needles (sharps), liquid-patient excretion, spent radiation sources radium needles.

3.2 Sources of Healthcare Waste

Healthcare waste is generated from both public and private healthcare facilities. Healthcare waste facilities can be classified as major or minor sources depending on the volume of healthcare waste generated as follows:

Major sources: Teaching/Specialist, General hospitals, Big Private Laboratories, Mortuaries, and Research centres.

Small sources: Small Private Laboratories, Health Centres/Post, Dental Clinics, Pharmacies, Veterinary, Maternity Homes, bone setting centres, tattoo centres, acupuncture clinics, and tradomedic centres.

The amount and composition of healthcare waste generated by healthcare facilities depends on waste management system, type of health-care establishments, the number of patients treated on a daily basis, and the level of complexity specialization of the health care facility.

- **Tertiary/Teaching Hospitals** generate larger quantities of waste per unit than other facilities.
- **Secondary/medium sized hospitals** such as the General hospitals in the States and large private hospitals produce basically the same type of wastes with the tertiary hospitals with the exception of radioactive wastes which they do not produce. The quantities of waste produced in these facilities are on the average, about 30% of that produced by the tertiary hospitals.
- **Primary healthcare facilities** such as Health Centres and private clinics generate non-risk HCW, infectious waste and sharps, generally in small quantities.

3.3 Estimation of Healthcare Waste Quantities Generated by HCFs

Data on healthcare waste volumes generated by healthcare facilities in Nigeria is extremely limited. A semi-national inventory of HCW management in Nigeria was able to highlight certain problems in the present system (Annex 4)⁴. In 2006, a cross-sectional study was conducted in the Federal Capital Territory to characterize solid healthcare wastes in five representative facilities⁵. These results are summarized in Table 2 to assist with estimating waste volumes generated by health facilities and at a national level. National estimate of healthcare waste volumes generated in Nigeria is provided in Annex 5. (168,996,483 kg annually?)

Table 2: Estimated waste generated by facility type (kg/bed/day)

⁴ Facility	Government	Private	International Averages
Teaching Hospital	0.98 ⁴	n/d	4.1 - 8.7 ⁶
Specialist Hospital	0.18 ⁴ - 1.15 ⁵	n/d	0.5 – 1.8 ⁶
General Hospital	0.54 ⁴ - 1.57 ⁵	n/d	2.1 – 4.2 ⁶
Primary Health Centres	n/d	n/d	0.05 – 0.2 ⁶

According to the 2006 medical waste management study in FCT, approximately 26.5% of waste generated from five representative healthcare institutions is hazardous. This estimation is representative of the results of assessments in other countries which show between 10-25% of all waste generated by healthcare activities falls into the hazardous category³.

⁴ Analysis of Field Data on the National Inventory of HCWM in Nigeria (Annex x)

⁵ Aluyi, H.S. A, Benka-Coker, M.O., Basse, B.E. Characterization and Management of solid medical wastes in the Federal Capital Territory, Abuja, Nigeria. *African Health Sciences* 2006 6(1); pp 59-63.

⁶ Safe Management of Wastes from Health-Care Activities. (ed. Pruss, Giroult, Rushbrook) WHO. 1999

SECTION 4: CHARACTERISATION OF HCW PRACTICES IN NIGERIA

Management of HCW should be considered as an integral part of hospital hygiene and infection control. Infectious HCW contributes to nosocomial infections, putting the health of medical staff and patients at risk. Proper HCWM practices (described in detail in the draft *National HCWM Guidelines for Nigeria*) should therefore be strictly followed in all HCFs as part of a comprehensive and systematic approach to hospital hygiene and infection control.

The HCW generated within a HCF should always follow an appropriate and well-identified stream from their point of generation until their final disposal. This stream is composed of several steps that include: generation, segregation, collection and on-site transportation, on-site storage, offsite transportation (if needed) and finally on or off-site treatment and disposal. One of the key points of the safe management of HCW is the minimization of the HCW generated. Ensuring an efficient and reliable segregation remains the most important step. A set of protective measures should also be developed in relation with the handling and the treatment/disposal of HCW. Implementing adequate procedures to minimise the overall risks associated with HCWM should remain one of the priority objectives of the FMH. Waste management and treatment options should first protect the health-care workers and the patients and minimise impacts on the environment.

4.1 Summary of present state of HCWM practices in Nigeria

In spite of having different legal edicts and bye-laws as well as official bodies put in place for the responsibility of effective HCW management in Nigeria, safe HCWM is far from being achieved.

A recent study in FCT, assessed the management of solid medical wastes (Aluyi, 2006). Results indicated that 18% of healthcare institutions incinerate their solid wastes in locally built brick incinerators without adequate protection to the environment; 36.3% of the institutions simply disposed off their wastes into the Abuja municipal dumpsite, these wastes were found not to be treated before dumping into the dustbin at the dumpsite; 9.1% buried their solid wastes; while another 36.3% had their waste burnt off in open pits. Liquid medical wastes were disposed directly into the municipal sewer system by all the institutions surveyed. Waste segregation and microwave irradiation techniques were never employed by any of the selected healthcare institutions surveyed.

A cross-sectional survey of injection safety and HCWM practices in Nigeria (FMOH and MMIS, 2004) detected equally weak HCWM systems in healthcare facilities at all levels⁷. Safety boxes were not used in 63% of facilities and there were no sharps boxes in 69% of all injections delivery points. Only 29% of providers placed the needle and syringe in a closed container immediately after injection. After vaccinations, 63% of providers placed used injection equipment in over-flowing, pierced or open containers. Injection equipment was found in containers other than safety boxes or in open or overflowing containers in 83% of all survey sites. Used

⁷ Injection Safety Assessment in Nigeria, Federal Ministry of Health and Making Medical Injections Safer (MMIS) project, 2004.

sharps were found on the grounds of 65% of all healthcare facilities visited. Unsupervised open dumping was found in 22% of facilities; burning in a hole or enclosure was found in 14% of HCFs and; open burning on the ground was performed in 12% of HCFs visited during this assessment.

Other weaknesses include:

- Imprecise definition of what constitutes Hazardous HCW;
- No standardized segregation procedure applied in the Nigerian medical institutions;
- Deficient / non-existent HCW colour-coding and labelling system making mistakes in segregation easy to occur and the risk of a person coming accidentally into contact with hazardous waste is high.
- Hygiene measures are not applied in the wards during waste generation and collection, neither are they applied in transport and disposal;
- Waste containers are not lined with adequate bags and are not regularly disinfected. The lids are manipulated with no specific precaution;
- Most medical institutions lack adequate water supply and so cannot ensure regular cleaning and high sanitary standards. There is a proliferation of pest vectors such as rats and cockroaches. The absence of a regular pest control programme within the hospitals, an insufficient supply of water and the lack of fundamental hygienic measures obviously result in an increase of the risks of transmitting nosocomial infections;
- Risk of spillage of medical waste and sharps during transportation due to the use of inappropriate containers and vehicles, the loss of syringes and needles from overfilled cardboard boxes, the failure in restricting access to the storage points, the lack of protection from scavenging animals or the disposal of HCW in dump sites without prior treatment increase the risks that HCW may be dispersed in the HCF compound and get in contact with the general public.
- Low temperature burning practices (300° to 400°C) release air pollutants that constitute environmental health threats.
- Disposal of medical waste with the domestic waste in dumpsites and the absence of control procedures increase the risk for scavengers.

4.2 Risks from current HCWM practices

The poor segregation, handling, and disposal practices of many hospitals, clinics and health centres in Abuja are likely representative of practices throughout Nigeria and pose serious health hazards to people living in the vicinity of healthcare institutions. Almost all the healthcare institutions dispose of all wastes to municipal dumpsites without pre-treatment, leading to an unhealthy and hazardous environment around the health institutions, affecting patients, staff, and the community.

Untreated injection equipment in particular poses a transmission risk for bloodborne infections. Unsafe injections practices are the responsible for transmission of several blood borne infections like HIV/AIDS, Hepatitis B and C. Worldwide, injections cause an estimated 8 – 16 million cases of Hepatitis B virus (HBV) infection, 2.4 – 4.5 million cases of Hepatitis C (HCV) virus infection, and 80,000 to 160,000 cases of HIV infections (Kane et al, BULL WHO 1999, 77: 801-7.) WHO estimates that annually 12,000 million injections are given, with an annual mean of 4 injections per person per year. In low-income countries, most of the injections are unnecessary and unsafe, increasing the burden of infectious diseases like HIV, Hepatitis B and C.

In developing countries, the estimated proportion of injections administered with injection equipment reuse in the absence of sterilization ranges from 15% to 50% (Simonsen L et al, BULL WHO 1999; 77:789 – 800.) The risks of infections after a needle stick injury are:

HIV	0.3%
Hepatitis B	33%
Hepatitis C	3%

[http:// www.sharpsinjury.com/hiv.htm](http://www.sharpsinjury.com/hiv.htm)

Without a proper segregation system for sharps waste, the FCT HCW study (Aluyi, 2006) shows that scavengers who collect waste from dustbins are at risk of injury from sharp instruments and direct contact with infectious materials. Adjacent to the main gate at the Wuse General Hospital is an open dump, creating an eye sore to the inhabitants of the fairly-densely populated commercial area and who are exposed to adverse effects from this action. At the Garki General Hospital, cleaners collect wastes produced in each ward in plastic buckets and dump them behind the hospital. The wastes are burnt without regards to the effect of the action on the environment.

The FMOH and MMIS assessment of injection and HCWM practices in Nigeria (2004) revealed that the healthcare personnel of Nigeria are at risk of unnecessary occupational exposure to HIV and other bloodborne infections. Two-handed recapping was observed after 76% of therapeutic injections and 77% of immunization injections. Eight-eight percent of providers were not fully vaccinated against hepatitis B and 45% of providers interviewed had at least one needle-prick injury during the previous 12 months. If the injection provider had at least one needle-prick injury within the previous 12 months, HIV-PEP was not offered to the injured provider in 94% of the incidents. These risks potentially affect not only the health personnel resources but the capacity of the entire health system of Nigeria. These unnecessary risks can be significantly reduced with safe healthcare waste management practices, including proper disposal of used injection equipment.

SECTION 5: APPRAISAL OF THE INSTITUTIONAL CAPACITIES OF THE HEALTH SYSTEM

The institutional capacity to handle HCW within the HS is currently inadequate. These weaknesses include but are not limited to:

- Inadequate legislative and enforcement tools
- Poor financial base of most HC institutions in the country
- Inadequate human resource base especially in key technical areas
- Poor maintenance habits in the country
- Poor administrative and management capabilities.

5.1 Management and Planning Capacities

a) Federal Level

The Federal Ministries of Environment and Health play major roles in the day-to-day management of the environmental and Public Health issues affecting the nation. These roles include but are not limited to the following:

- Policy formulation
- Development of guidelines and standards
- Monitoring and evaluation
- Training and capacity development
- Public awareness creation
- Mechanism for data gathering and management

Capacity still remains limited and overstretched. Statistical data sharing across sectors and also across different services in the same organizations remains a challenge. The project approach and the implementation of vertical programmes lead to fragmented planning and implementation arrangements with many parallel systems co-existing with a serious lack of horizontal coordination.

b) State and Local Government Levels

Ministries of Environment and Health and their agencies are responsible for planning, operation monitoring and maintenance. Their institutional capacities remain severely constrained by inadequate human, logistic and financial resources. There is also a lack of political will to enforce existing laws.

c) Health-Care Facility Level

The major problems facing this sub-sector include:

- Gross under-funding for HCWM
- Endemic corruption
- Weak management structures
- Poor infrastructural development
- Lack of basic work equipment.
- Lack of adequately trained staffed.

5.2 Financial Resources

Funding for HCWM is poor or almost non-existent. This is due to the following:

- Low priority for HCWM

- High administrative cost
- Poor accounting procedures
- Corruption at all levels

~~Funds may come from private or public sources. A private company or HCF may finance, develop and operate its own waste management facility. It may recover part of its costs by treating wastes from other facilities at a fee. Government may also build a public HCWM facility for individual tertiary institutions (which should then assist smaller HCFs in its area of operation in managing their wastes at a minimal fee) or build a centralized facility for the use of all HCFs in a specified zone.~~ {Is this true today? It is a recommendation more than current practice and honestly, I don't think you can simply say that you are going to privatize HCWM and expect it to happen. There are market forces and you must create demand by creating policy and perhaps you must grow the industry with some government support in the first 2-4 years. I thought Ossai had some fantastic ideas and was surprised no one listened to him at the HCWM TWG workshop.}

5.3 Monitoring and Control Capacities

Monitoring and control capacities are an integral part of an effective HCWM plan. However, this is not the current case in the HS and the reasons include:

- Inadequate expertise
- Poor technical capacity
- Limited financial resources;
- Inadequate legal and regulatory provisions
- Understaffing of Health and Environmental Management Authorities

5.4 Operation and Maintenance

There is a lack of preventive maintenance of facilities in the country. The trend has always been to buy new equipment (often times very sophisticated ones with no plans on their maintenance). Over the years, the country has thus become a dumping ground for equipments which the purchasing facilities do not have the technical capacity or the will to maintain. Problems supporting proper operation and maintenance of HCWM systems and technologies include:

- Poor procurement habits
- Inadequate planning and logistics
- Poor maintenance culture

5.5 Training and capacity building

Low level of training of manpower currently exists for HCWM at all levels in the country. This is because of the low priority accorded HCWM. There is also a low level of awareness of the need to ensure proper HCWM practices. There is also little or nonexistent capacity across the entire sector in the country for HCWM.

PART 2: RECOMMENDATIONS

RECOMMENDATIONS FOR HCWM

Effective HCWM practice in Nigeria is achievable. There is a need for widespread strengthening of all segments of HCWM in Nigeria as described in the Situational Analysis. The actions needed in the implementation of an effective healthcare waste management plan require multi-sectoral cooperation, collaboration and interactions amongst all stakeholders.

Policies and monitoring mechanisms should be generated and coordinated at the Federal and State levels and implemented at the LGA and HCFs levels. Establishment of a national policy and a legal framework, training of personnel, and raising of public awareness are essential elements towards a successful HCWM programme in the nation.

A more comprehensive approach to HCWM should be adopted to ensure the success of the National HCWM Plan. There is need for strengthening the institutional capacities of all relevant agencies and institutions in the Environmental and Healthcare Delivery Systems. This can be achieved by adopting the under listed recommendations:

Federal Level Recommendations:

- (1) Establish a National HCWM Steering Committee as the coordinating agency for HCWM in Nigeria. See Annex 5 for a list of proposed Steering Committee members prepared by the HCWM TWG.
- (2) Set-up guidelines and policies for the management of HCW in Nigeria and set up a monitoring and enforcement (inspectorate) division whose main responsibility is to control the quality and audit the practices of the private HCWM providers. Draft *National HCWM Guidelines* have been prepared by the HCWM TWG.
- (3) Set up an appropriate information gathering system. An annual stakeholders/environmental managers' forum should be instituted which should be organized by the National Steering Committee.
- (4) Provide the enabling environment for private sector participation in HCWM by providing all necessary backing (legislative, financial, monitoring, and regulatory, etc.) and drawing up appropriate guidelines for establishing private HCWM institutions. These should include the requirement for setting up these institutions.
- (5) The National Steering Committee, with guidance from FMEnv and FMOH, should develop technical standards for all waste disposal equipment (from collection through to final disposal).
- (6) Establish guidelines for the control of nosocomial infections including enforcement of usage of PPE at hospital, facility and waste disposal levels.
- (7) There should be proper coordination among the various stakeholders.

- (8) Identify a national coordinator who would be the Chief Executive Officer to work closely with the NSC and the various stakeholders (FMOH, FMEnv, Association of General & Private Medical Practitioners, etc). Military and paramilitary HCFs must be included as stakeholders.
- (9) The NSC should develop training guidelines.
- (10) Awareness and public enlightenment campaigns including IEC should be developed by the NSC.
- (11) NSC should liaise with the appropriate government agency for the proposed funding.

Recommendations at State Level:

- (1) A state coordinator and SSC that would liaise with the NSC and implements through the Local Governments.
- (2) States should develop appropriate guidelines and by-laws with the national guidelines as framework modified to suit the peculiar state needs and demands.
- (3) Collection and analysis of HCWM data
- (4) Organisation of HCWM control procedures.
- (5) Monitoring and auditing activities on the implementation of the HCWMP
- (6) Review of Hospitals HCWM Plans
- (7) Trainings on HCWM for HCF workers and waste handlers.
- (8) Preparation of Hospital Inspection Plans
- (9) Preparation of an adequate budget

Recommendations at LGAs:

- (1) Each LGA should have a designated HCWM Officer whose major responsibilities are coordination of all HCFs, training and distribution and retrieval of safety boxes.

Recommendations at HCFs Level:

- (1) HCFs must have a designated HCWM Officer with adequate budgetary provision for HCWM which includes PPEs, storage facilities like cold rooms, etc and appropriate laundry facilities. Regular and periodic training for handlers and staff must be instituted.
- (2) Each HCF should be financially liable for the safe management of any waste it generates.
- (3) All HCFs should establish accounting procedures to document the costs they incur in managing their HC wastes.

Recommendations to Strengthen Institutional Capacity:

- (1) Management and planning capacities of healthcare institutions should be strengthened by devolution of responsibilities horizontally and vertically. There is need to attract skilled manpower to the HCWM sector.
- (2) There is a need to have a sustainable financial mechanism. Funds should be allocated for HCWM from an existing tax on medical equipment and supplies and pharmaceutical products or government should impose a 1% surcharge on all medical supplies and equipment and pharmaceutical products. This should be managed by the NSC on agreed terms by stakeholders.
- (3) Regular monitoring of HCWM practices in HCFs should be carried out. A strong mechanism should be put in place for periodic monitoring and evaluation of plan implementation.
- (4) There is a need to adopt the best available appropriate technological options for HCWM. The supervisory capacities of the Federal, State and Local Government agencies, statutorily overseeing healthcare delivery and environmental management should be strengthened. Governments at all levels should encourage development of appropriate indigenous technology for HCWM.
- (5) To improve the quality of HCWM in Nigeria, training is required. Workshops and seminars for healthcare practitioners and hospital waste handlers should be organized regularly to update and develop a continuing sensitization programme. Drastically improving the technical and management capacities of all relevant personnel of the Federal, State and LGA HS Authorities as well as in the HCFs is essential. Training and Awareness Programmes should be an integral part of the HCWM plan throughout the country.
- (6) There is need for appropriate legislations for HCWM. These legislations must be enforced at all levels of governance. A proper regulatory framework should be put in place.

PART 3: NATIONAL ACTION PLAN

NATIONAL HCWM ACTION PLAN

Strategy

The GON must develop a step-by-step strategy to improve the management of HCW in the HCFs of the country and reduce significantly the occupational risks associated with the current practices. The strategy should show clearly the medium- and long-term objectives to be achieved and reflect the integrated effort that is necessary to set-up safe and environmentally sound HCWM practices. Whenever possible, it should underline the institutional and individual responsibilities as well as define the monitoring and administrative procedures.

There are four objectives contained in the National HCWM Plan, namely:

- 🕒 **Objective 1: Develop the Administrative Framework for the Implementation of the National Action Plan**
- 🕒 **Objective 2: Develop HCWM Legal and Regulatory Framework**
- 🕒 **Objective 3: Standardize Healthcare Waste Management Practices**
- 🕒 **Objective 4: Strengthen Institutional Capacities of HCWM Stakeholders**

Implementation

A three-step approach is proposed for implementation of the *National Action Plan*:

- 🕒 **Step 1: Organize a National Workshop to validate the National HCWM Plan and the strategy that is proposed.**

The National workshop should focus on amending and validating the National HCWM Plan and National HCWM Guidelines. The implementation of the HCWM plan will require a regular commitment and monitoring. Thus participative decisions should be taken during the workshop to ensure a good cooperation between all the stakeholders for the future implementation of the plan. The following institutions should participate in the workshop: (see annex.....)

- 🕒 **Step 2: Establish the institutional framework to initiate the HCWM plan: recruit a Project Coordinator and form a National Steering Committee for HCWM**

There wasn't any text to put here on (how to) establishing institutional framework (what is institutional framework anyway?)

The National Steering Committee for HCWM (NSCHCWM) should supervise and monitor the overall implementation of the HCWM plan. (see schematic for **Institutional scheme**), The Steering Committee should meet on a regular basis (every three months minimum). They should be divided into specific Work Groups aiming at implementing specific portions of the NHCWM plan.

It is recommended that the Federal Ministries of Health and Environment seek external support that would aim at backstopping the NSCHCWM in its initial organization. The tasks of the National Steering Committee should be the following:

- 🕒 Nominate a project coordinator and compose the work groups;
- 🕒 Establish the criteria for the monitoring of the HCWM plan during its implementation;

- ⌚ Designate the administrative authorities in charge of the implementation of the HCWM plan at state and LGA levels;
- ⌚ Select HCFs and states where the National HCWM plan could be tested in a first step;
- ⌚ Set-up intermediary and final evaluations of the implementation of the HCWM plan.

A Project Coordinator (PC) should be assigned a full time position during the overall duration of the implementation of the plan (approx. five years). He/she should have excellent organizing, managing and communication skills. It is recommended that the PC should receive periodic external support.

⌚ **Step 3. Launch the National Action Plan.**

The implementation of the four objectives contained in the *National HCWM Plan* requires the development of specific actions. They are included in the *National Action Plan* (NAP) presented hereafter. The plan should be periodically monitored and reviewed. As mentioned previously, a typical timeframe for a NAP is around 5 years.

For each objective, there is a table to summaries the strategy and actions that must be taken to achieve this objective. For each action, the institution responsible for its implementation and its coordination are designated. Indicators of achievement that should help in the regular monitoring of the plan are listed. The initial and the annual costs in relation with this action are presented.

It is strongly recommended to clearly identify at all levels supervision and coordination bodies:

- ⌚ At National level, the NSCHCWM is in charge of the monitoring and supervision of the National HCWM Plan. The PC is in charge of its implementation and supervises the activities of the Work Groups;
- ⌚ At State level, the SSCHCWM is in charge of the monitoring and supervision of the HCWM plan. They nominate a state Coordinator who is responsible for the smooth implementation of the HCWM plans at state level. He/she reports to the PC and the SSC;
- ⌚ At Facility level, Hospital Management are administratively responsible for the implementation of a HCWM plan within the institution. The Hospital Management nominates the HCWMO, who has the entire responsibility with the HCWMC/IPC&C to set-up Hospital HCWM Plans.

(what about a plan or argument for the need to leverage / identify funds?)

NATIONAL ACTION PLAN

Objective 1: Develop the Administrative Framework for the Implementation of the National Action Plan								
Strategies	Activities	Levels of implementation	Who is responsible	Objectively verifiable Indicators	Means of verification	Time (yr./qtr.)	Funding Source	Risk / Assumptions
1.1 Develop National HCWM Stakeholder Support	1.1.1 Organise national workshop to modify and validate the NAP and set-up specific task groups	Federal, State	FMEEnv	NAP modified and validated	Report of the workshop	2Q 2007	FMEEnv	<i>Elections and availability of funds</i>
1.2 Identify coordination	1.2.1 Set-up a National Steering Committee on HCWM	Federal	HCWM Stakeholders	Membership list, stipulation of objectives, scheduling of regular meetings	Minutes of meetings held	2Q 2007	FMEEnv	
	1.2.2 Designate of a National Coordinator	Federal	FMEEnv, Stakeholders	Job description with clear listing of tasks	Name of coordinator	3Q 2007		<i>Funds required – tax fund on devices and pharmaceuticals application</i>
1.3 Develop national and state evaluation and reporting system	1.3.1 Establish evaluation criteria for NAP	Federal and State	National Coordinator	Established indicators	Reports of indicators	4Q 2007		
	1.3.2 Establishment of State Steering Committees	State	NSC/NC	Membership list, stipulation of objectives, scheduling of regular meetings	Minutes of meetings held	1Q 2008	SMOE	
1.4 Identify implementing agents	1.4.1 Designate of HCWM Officers at LGAs	LGA	SSC	Job description with clear listing of tasks	Identifiable LGA HCWM Officer	1Q 2008	LGA Dept of Health	
2.1 Strengthen HCWM legal framework	2.1.1 Integrate the proposed HCWM Regulation	Federal	FMs of Env, Health & Justice	Submission of draft national legal framework	Ratified HCWM Regulation	4Q 2007		<i>The regulatory documents should clearly define roles, responsibilities, duties and penalties</i>

Objective 2: Develop HCWM Legal and Regulatory Framework								
2.2 Provide National HCWM Guidance	2.2.1 Ratify National guidelines for HCWM	Federal	FMs of Env, Health & Justice	Submission of draft National Guidelines for HCWM	Finalized HCWM Guidelines distributed	4Q 2007		<i>Prepare and disseminate guidelines rapidly</i>
2.3 Introduce new HCWM legislation	2.3.1 Collation and harmonization of existing relevant environmental and health laws into HCWM Bill	Federal	FMs of Env, Health & Justice	Submission of harmonized existing relevant environmental and health laws	HCWM Bill ratified in National Assembly	1Q 2008		
	2.3.2 Develop HCWM Policy	Federal	FMOEvir, FMOH, SSC	Submission of draft national policy on HCWM	Policy Document distributed	1Q 2008		

Objective 3: Standardize Health Care Waste Management Practices

3.1 Support standard HCWM supplies and availability	3.1.1 Elaborate a National Catalogue of Equipment for segregation, packaging, collection and disposal of the HCW in the Medical Institutions materials	Federal	FMEnv and HCWM TWG	Catalogue of equipment and supplies	Availability of HCWM equipment and supplies in facilities	4Q 2008		
	3.1.2 Produce standard cost effective colour coded containers for HCW .	Federal ministries of Health and environment, SON	Steering committee, Federal ministries of environment, health and industries	Standard Colour coded containers for HCW available	Facilities utilizing standard containers for HCW	1Q-3Q 2008		
	3.1.3 Enforce the use of colour coded containers for specific HCW at all facilities	National coordinator, state coordinator and Local environmental health officers.	Steering committee, Federal ministries environment and health, Law enforcement agencies,	Job description with clear listing of tasks	Relevant agency report on activities on HCW enforcement	January to December 2008		
	3.1.4 Organize national , state and local level workshop for stake holders on HCWM practices	Steering committee, FMEnv & FMOH	Steering Committee National coordinator	National, state & LGA workshop on HCWM conducted	Participants list	1Q 2008		
3.2 Encourage adherence to HCWM Guidelines in all HCFs	3.2.1 Establish the HCWM plans in the medical institutions, include these plans in the Annual Action Plan of each HCF	State, LGA, and health care facilities	SMOH and SMOH	Health facilities with HCWM plans	Minutes of HCWM committees in facilities	4Q 2007		
	3.2.2 Develop 3R concept in the facility, Reduce, Reuse, and							

	Recycle before disposal							
	3.2.3 Progressive replacement of materials containing toxic or hazardous components which have potential of emitting undesired gases or fumes							
3.3 Support information and monitoring for effective HCWM	3.3.1 Carry out national inventory of existing HCW equipments and methods of waste disposal at all facilities	Steering committee, Federal ministries of Environment and Health	Steering committee federal Ministries of Environment and Health	Job description with clear listing of tasks	Inventory of existing HCW equipments and methods of waste disposal	April – September 2008, Annually		
	3.3.2 Routine monitoring and evaluation of HCWM practices in all facilities at all levels	National coordinator, state and LGA representatives	National Coordinator, Federal ministry of Health and environment	Established indicators	Report of M&E visits	April-September, Twice a year		
	3.3.3 Introduce data collection devices for HCWM and proper record keeping							
3.4 Provide HCWM treatment and disposal options for HCFs	3.4.1 Build and maintain standard sanitary landfill for HCWM	State and LGA	Federal ministries of environment and Health	Standard sanitary landfill available	States with standard sanitary landfills for HCW	September 2008 -June 2009 (yearly)		
	3.4.2 Build and maintain cost effective standard incinerators in each state	State and LGA	State ministries of Environment and Health	Standard incinerators available	HCF/States with standard incinerators	September 2008 -June 2009 (yearly)		
	3.4.3 DeMontfort incinerators with ash Pits	LGA	State ministries of Environment and Health/ LGA health department	DeMontfort incinerators available	LGAs/HCF with DeMontfort incinerators	September 2008 -June 2009 (yearly)		
	3.4.4 Dig burn and bury pits	LGA	State ministries of Environment and Health/ LGA	Burn and bury pits available	HCFs with burn and bury pits	September 2008 -June 2009 (yearly)		

			health department					
	3.4.5 Construct placenta pits	State and LGA	State ministries of Environment and Health/ LGA health department	Placenta pits available	HCFs with placenta pits	September 2008 -June 2009 (yearly)		
	3.4.6 Supply HCFs with segregation supplies and PPE	Federal , State and LGA		Available segregation and PPE supplies	Facilities with supplied segregation and PPE supplies	Continuous		
3.5 Support privatization of HCWM treatment and disposal in some settings	3.5.1 Create awareness on HCWM activities (WM summit)	Federal and state	FMOEvir, FMOH, NSC			Q3 2007		<i>Cannot be legislated. Conditions need to be established that utilize standard economic- market principals</i>
	3.5.2 Identify relevant stakeholders for PPP	Federal and State	FMOEvir, FMOH, NSC	List of Licensed operators for HCW	List of licensed operators, participating in HCWM	Q4 2007		
	3.5.3 Develop regulations for the privatisation of HCW	Federal and state	FmoEvir , FMOH, NSC	Draft regulations for HCW private participation	Bill supporting privatisation of HCWM activities	Q1 2008		
Objective 4: Strengthen Institutional Capacities of HCWM Stakeholders								
4.1 Strengthen Institutional Management and Planning Capacities of stakeholders	4.1.1							
4.2 Ensure availability of Financial Resources / Funding to drive the programme	4.2.1 Establishing and management of a HCWM tax fund		NSC	Passage of the enabling act by the National Assembly	Available funds for implementation	Mar 2007 to Mar 2009		
	4.2.2 Adoption and utilization of best available indigenous		Federal and States Ministries of Env & Health	Number of facilities using indigenous	Number of functional incinerators in use	On-going		

	<i>technology for HCWM</i>			<i>incinerators</i>				
4.3 Training and capacity building on HCWM practices for all relevant stakeholders	4.3.1 Devolution of responsibilities (vertical and horizontal)		Federal Ministries of Env & Health	Directives to all federal & state Ministries of Health & Env	Participants list	Jan to Mar 2008		
	4.3.2 Attract appropriate technical manpower through direct employment, secondment and in-service training		Federal Ministries of Env & Health	Improved job mobility to Waste Mgt sector		Jan to Dec 2008		
	4.3.3 Develop guidelines for training		FME nv	Approved training guidelines available	Training guidelines in use	Sept to Dec 2007		
	4.3.4 Develop appropriate curricula for HCWM in medical and schools of Nursing, Midwifery, Health Technology, etc.		Federal Ministries of Env, Educ & Health	All curricula of medical and paramedical institutions contain training aspect on HCWM	Appropriate curricula for HCWM in medical and schools of Nursing, Midwifery, Health Technology, etc. in use	Sept 2007 to Mar 2008		
	4.3.5 Provide technical training for the federal and state Environmental health officers and set up in-service training programmes for medical, paramedical and technical staff		Federal and States Ministries of Env & Health	List of all categories of staff trained and working as HCWM personnel	Participants list	On-going		
	4.3.6 Provide specific technical training on HCW disposal technologies for federal, state and LGA engineers and private contractors for		Federal and States Ministries of Env & Health	Number of indigenous incinerators produced by these trained personnel.	Participants list	On-going		

	construction of incinerators.							
4.4 Improvement of Operations and maintenance	4.4.1 Aggressive public enlightenment		Federal and States Ministries of Env & Health	Percentage of respondents that are aware of HCWM practices	Number of slots airing	On-going		
	4.4.2 Advocacy to policy makers and other relevant stakeholders		Federal and States Ministries of Env & Health	Number of advocacy visits made in a given time frame	Good maintenance records	On-going		

Estimations of Cost for NHCWMP

Safe and responsible HCWM is expensive. However, the direct management costs of good HCWM must be weighted against the indirect costs associated with mismanagement practices.

The initial costs cover the implementation period of five years of the plan. It has been assumed that:

- The National Action Plan is implemented over a period of five years;
- (NEED to identify STRATEGIES that are articulated (in Table 3) and given a cost (in Table 4) under objective 3) such as X number of pyrolytic incinerators in x states or y tertiary hospitals; DeMontfort incinerators in y secondary facilities in z States or in rural settings or other conditions decided upon; In Lagos State centralized treatment will be conducted and transportations costs by (who/what) are calculated by (how).

The total implementation costs of the plan ranges between x Naira and y Naira while the annual costs associated with the new HCWM procedures would range between a Naira and b Naira. The overall initial and annual costs for the implementation of the plan and the standardisation of the HCWM practices are presented in table 4. See Annex 10 for some costing calculations.

Table 4: Cost Estimates of National HCWM Action Plan

	Actions	Initial Cost (Naira)	Annual Cost (Naira)
Objective 1: Develop Administrative System for NHCWMP Implementation			
1.1.1	Organise national workshop to modify and validate the NAP and set-up specific task groups		
1.2.1	Set-up a National Steering Committee on HCWM		
1.2.2	Designate of a National Coordinator		
1.3.1	Establish evaluation criteria for NAP		
1.3.2	Establishment of State Steering Committees		
1.4.1	Designate of HCWM Officers at LGAs		
Objective 2: Develop HCWM Legal and Regulatory Framework			
2.1.1	Integrate the proposed HCWM Regulation		
2.2.1	Ratify National guidelines for HCWM		
2.3.1	<i>Collation and harmonization of existing relevant environmental and health laws into HCWM Bill</i>		
2.3.2	<i>Develop HCWM Policy</i>		
Objective 3: Standardise HCWM Practices			
3.1.1	Elaborate a National Catalogue of Equipment for segregation, packaging, collection and disposal of the HCW in the Medical Institutions materials		
3.1.2	<i>Produce standard cost effective</i>		

	<i>colour coded containers for HCW .</i>		
3.1.3	<i>Enforce the use of colour coded containers for specific HCW at all facilities</i>		
3.1.4	Organize national , state and local level workshop for stake holders on HCWM practices		
3.2.1	Establish the HCWM plans in the medical institutions, include these plans in the Annual Action Plan of each HCF		
3.2.2	Develop 3R concept in the facility, Reduce, Reuse, and Recycle before disposal		
3.2.3	Progressive replacement of materials containing toxic or hazardous components which have potential of emitting undesired gases or fumes		
3.3.1	Carry out national inventory of existing HCW equipments and methods of waste disposal at all facilities		
3.3.2	Routine monitoring and evaluation of HCWM practices in all facilities at all levels		
3.3.3	Introduce data collection devices for HCWM and proper record keeping		
3.4.1	Build and maintain standard sanitary landfill for HCWM		
3.4.2	Build and maintain cost effective standard incinerators in each state		
3.4.3	DeMontfort incinerators with ash Pits		
3.4.4	Dig burn and bury pits		
3.4.5	Construct placenta pits		
3.4.6	Supply HCFs with segregation supplies and PPE		
3.5.1	Create awareness on HCWM activities (WM summit)		
3.5.2	Identify relevant stakeholders for PPP		
3.5.3	Develop regulations for the privatisation of HCW		
Objective 4: Strengthen Institutional Capacities of HCWM Stakeholders			
4.1.1			
4.2.1	Establishing and management of a HCWM tax fund		
4.2.2	Adoption and utilization of best available indigenous technology for HCWM		
4.3.1	Devolution of responsibilities (vertical		

	and horizontal)		
4.3.2	Attract appropriate technical manpower through direct employment, secondment and in-service training		
4.3.3	Develop guidelines for training		
4.3.4	Develop appropriate curricula for HCWM in medical and schools of Nursing, Midwifery, Health Technology, etc.		
4.3.5	Provide technical training for the federal and state Environmental health officers and set up in-service training programmes for medical, paramedical and technical staff		
4.3.6	Provide specific technical training on HCW disposal technologies for federal, state and LGA engineers and private contractors for construction of incinerators.		
4.4.1	Aggressive public enlightenment		
4.4.2	Advocacy to policy makers and other relevant stakeholders		

Five-year Calendar of Activities

Objective	Action	Year 1				Year 2				Year 3				Year 4				Year 5			
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q

Annex 1: HCWM Technical Working Group Members

Members' Name	Name of Organization	Designation
Onowenerhi Ejaeta	LAWMA	Clinical Waste Officer
Adogame Leslie	Nig. Environmental Society	Executive Secretary
Dr Bolanle Wahab	University of Ibadan	Senior Lecturer
Prof. Charles A. Okuofu	Ahmadu Bello University	Professor Envir Engineering
Fred S Willis	UNICEF	Vaccine Security Officer
Dr O. A. Anyadiegwu	Hospitalia Consultaire Ltd	Consultant
Dr E.M.O Kalu	Hospitalia Consultaire Ltd	Consultant
Iwueze Rose	Envir Mgt & Occup Health	Consultant
O.F Adegoke	NASCP, FMOH	Deputy Director
Dr Lola Okwuosa	Global Env Hlth Solutions	Director
Dr L.N Nwankwo	FMENV	Snr Environmental Scientist
Samuel Adeyemi	FMENV	Environmental Scientist
Abba Kachala	FMENV	Environmental Scientist
A.G Mohammed	WHO	Vaccine Security Officer
A.A Shoetan (Mrs)	FMENV	Legal Adviser
Dolapo Ogundehin	MMIS-Nigeria	BCC Adviser
Dr Patrick T Adegun	Care Specialist Hosp Minna	NMA Representative
Hamisu Hassan	MMIS-Nigeria	Logistics Adviser
Dr (Mrs) A.I Erinle	FMOH (Hosp Services)	Deputy Director
Alex Ogundipe	NACA	Director Policy
Paul Ogbu ESQ	FMOH	Legal Adviser
Ebisike M.C	FMOH (Public Health)	Environmental Officer
Dr Kalada Green	USAID	Senior Program Manager
Tessie Kuhe	USAID	Program Assistant
Dr Abimbola Sowande	MMIS-Nigeria	Country Director
Ossai I.R	WAMASON	President
Adesanya S.O	FMENV	Deputy Director
Onyena D.A	FMENV	Assistant Director
A.A Jijoho-Ogun	LAWMA	AGM- Commercial
George Ayua	NANNM	National Secretary
Dr B.E Ogunnowo	LUTH	Physician (Public Health)
Sunusi Datti	AKTH	Head Envir Department
Stella Mojekwu (Mrs)	FMENV	Chief Evir Scientist
Omoha Ijeoma (Mrs)	NPI	
Isa Iyortim	MMIS-Nigeria	Waste Management Adviser

Annex 2: Preliminary list of HCWM legal documents

	FEDERAL LEGISLATIONS	AREAS COVERED
1	Constitution of the Federal Republic of Nigeria 1999	Good governance and welfare of all persons in Nigeria
2	National Policy on Environment	Environmental conservation and restoration in cases where degradation has occurred
3	National Master plan for Public awareness (PA) on Environment and Natural Resources conservation in Nigeria	Geared towards ensuring sustainable development through proper environmental management
4	Federal Environmental Protection Agency Act	The agency is the predecessor of the Federal Ministry of Environment
5.	Appendix 2. Federal Environmental Protection Agency Decree No 58 of 30 th Dec. 1988	Protection of Environment within Nigeria borders
6.	Harmful Waste (Special Criminal Provisions Decree)	Penalties for deposition of harmful wastes
7.	Environmental Impact Assessment Act (Decree No. 86) 1992	Solid waste, effluent discharge and atmospheric emission
8.	Workmen compensation Act 1987 (Laws of the Federation of Nigeria, 1990)	Occupational health and safety
9.	Nigerian Urban and Regional Planning Decree No 88 of 1992	Planned development of urban areas (to include and manage waste sites)
	STATE LEGISLATIONS (These are common to most states of the Federation)	AREAS COVERED
1	Environmental Sanitation edicts, laws and enforcement agencies	General environmental health and sanitation. Enforcing necessary laws
2.	Public Health Law	Covering public health matters
3.	State waste management laws (Lagos State, Bayelsa state etc)	Ensure proper disposal of waste and clearing of wastes
4.	Private hospitals registration edicts	Ensures proper record keeping of available private health establishments
5.	Building line laws	To ensure proper building plans within stipulated areas.
6	Prohibition of indiscriminate dumping of refuse acts	To prevent indiscriminate dumping
7.	Environmental pollution control and compensation laws and edicts	Control pollution and ensure compensation as necessary
8.	State Waste Disposal Edicts	To ensure proper disposal of waste

Annex 3: DRAFT NATIONAL HEALTH CARE WASTE MANAGEMENT REGULATIONS

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DRAFT NATIONAL HEALTH CARE WASTE MANAGEMENT REGULATIONS

It is hereby notified that the Minister in charge of Environment has in compliance with the provisions of Section.... of the National Environmental Management Act made the following regulations.

Title and Date of Operation

1. These regulations may be cited as the Public Health (Healthcare Waste Management) Regulations, S. I..... of 2003. These regulations shall come into operation on the 1st day.....2003

Application

2. These regulations shall apply to all healthcare wastes generated in Nigeria.

3.

Definitions

Health care wastes (HCW) include all the wastes generated by medical activities (human or veterinary waste of whatever form or level, biological research facilities (laboratories). It includes wastes arising from the delivery of support services, vaccinations, diagnosis, treatment, monitoring or alleviation of handicap in humans and animals, drug compounding centres, chemist shops, funeral homes (mortuaries and as a result of informal healthcare.

Medical waste: all wastes generated from healthcare facilities resulting from diagnosis, vaccination, treatment and examination.

Non-medical waste

All wastes generated from healthcare facilities not resulting from diagnosis, vaccination and examination.

Healthcare Facilities – these include all facilities involved in:

- a) diagnosis treatment or immunization of human beings or animals
- b) research pertaining to the activities specified in (a) ABOVE
- c) production or testing of medical preparations made from living organisms and their products including but not limited to sera, vaccines, antigens or antitoxins
- d) attending to the sick including ambulance services

Genotoxic waste – all waste which is teratogenic, mutagenic and carcinogenic including faeces, urine, vomitus from clients treated with cytostatic drugs, chemicals or radioactive material.

Infectious waste – waste containing pathogens

Pathological waste – human or animal tissues or fluid

Radioactive waste – solid, liquid or gaseous material contaminated with radio-nuclides

Sharps – means any device having acute rigid corners, edges or protuberances capable of cutting or piercing, including but not limited to all of the following:

- a) hypodermic needles, hypodermic needles with syringes, blades, scalpels, needles with attached tubing, acupuncture needles or root canal files
- b) broken glass items including but not limited to Pasteur pipettes or blood vials.

Chemical waste – discarded solid, liquid and gaseous chemicals resulting from diagnosis, treatment experimental work and disinfecting procedures including expired chemicals.

Pharmaceutical wastes: expired drugs, banned drugs contaminated or recovered spilled drug including expired vaccines.

Waste treatment – any method, technique or process designed to change the biological, physical or chemical character of any healthcare waste so as to eliminate its potential for causing disease or environmental pollution.

Autoclave – process of heating infectious waste by steam under pressure.

Biological treatment – natural treatment of waste by microorganisms.

Landfill – a waste disposal site (which may be engineered) where waste is composed and covered at the end of each working day.

Incineration – the controlled burning of solid, liquid or gaseous waste to produce gases and residues containing little or no combustible material.

Inertization – mixing waste with substances before disposal to reduce the risk of toxic substances in the waste migrating into the environment.

Neutralization – mixing chemical waste with an appropriate substance that alters the chemical properties of the waste to produce a neutral product that can be safely disposed of.

Dilution – adding water to a liquid to reduce its potency.

Disinfection – treatment aimed at reducing the number of microorganisms to safe levels.

Dissolution – adding a solvent to a solid or gas to dissolve it.

Encapsulation- the fixing of waste using immobilization material or container to render the disposal of such waste safe.

Disposal – intentional burial, deposits, discharge, dumping, placing or release of any waste material into any air, land or water.

Consignment Note: A triplicate manifest containing the name and location of generation, waste description/quantity, date of dispatch and potential receiver.

Authorized officer – an officer from the National Environmental Standards and regulations Enforcement Agency

Authorized Officer - An officer from the Ministry or agency in charge of healthcare waste management

Assignment of responsibilities

4. It shall be the duty of the head of any healthcare facility to ensure that all healthcare waste generated within the facility is managed in accordance with the provisions of these regulations.

Waste Management Plan

5. (1) (a) Each healthcare facility shall have a comprehensive waste management Plan
(b) There shall be a designated individual and/or a committee responsible for implementation of the waste management plan

- (c) In developing such a waste management plan the individual and/or committee shall:
- i) take account of the need for ensuring a high standard of client care and workers safety
 - ii) conduct a comprehensive healthcare waste baseline audit with follow up monitoring
 - iii) consider the minimization of waste
 - iv) examine the procedure for waste segregation
 - v) consider the options of recycling and reuse
 - vi) note the waste storage requirement
 - vii) evaluate the disposal options
 - viii) comply with waste transport requirement
 - ix) establish procedures and staff training programs for effective waste management
 - x) develop strategies for promoting the waste management plan within the healthcare facility
 - xi) ensure its annual update

(2) It shall be the duty of the head of a healthcare facility to keep and make available a copy of the healthcare waste management plan when requested by an authorized officer.

Failure to make available a healthcare waste management plan

6 Any head of a healthcare facility who fails to produce a healthcare waste management plan shall be guilty of an offence and liable to a fine of N100, 000 or 3 months imprisonment or both such fine and imprisonment

Power of Entry

7. Any authorized officer shall enter any healthcare facility at any reasonable time for the purposes of monitoring compliance with the provisions of these regulations.

Obstruction of Duty

8 Any person who refuses or hinders an authorized officer entrance into such healthcare facility shall be guilty of an offence and liable to a fine not exceeding N200,000 10,000.00 or 6 months imprisonment or both such a fine and imprisonment.

Handling of Healthcare Waste

9 (1) Healthcare waste shall be segregated at the point of generation, put in appropriate containers and the containers labeled as in Schedule 1

(2) Segregated waste shall be stored inside the healthcare facility in an approved designed area.

(3) Infectious and pathological healthcare waste shall not be at each waste collection point

- (4) Instructions on waste segregation and identification shall be posted at each waste collection point.

Storage of Healthcare Waste

- 10 If in the opinion of the authorized officer the quantity of healthcare waste generated at any health facility require storage before disposal such storage area shall:
- a) have an impermeable hard standing floor with good drainage rendering it easy to clean and disinfect
 - b) be adequately provided with water supply for cleaning purposes
 - c) afford easy access for staff in charge of handling of waste
 - d) be lockable to prevent access by unauthorized persons
 - e) be easily accessed by waste collection vehicles
 - f) be protected from sun, rain and wind
 - g) be inaccessible to animals and birds
 - h) have passive ventilation
 - i) not be situated in the proximity of fresh food store or food preparation areas
 - j) be adequately supplied with cleaning equipment and waste containers.

Improper handling and storage of healthcare waste

- 11 Any person who contravenes the provisions of sections 9 and 10 shall be guilty of an offence and liable to a fine of N100,000 or 3 months imprisonment or both such a fine and imprisonment.

Transportation

12. (1) The transportation of healthcare wastes shall be such that medical wastes are separated from non-medical waste

- (2) On site transport:

- a) Health care waste shall be transported on site by means of purpose made trolleys or hand carts which will not be used for any other purpose
- b) Such trolley or hand cart shall have a solid base and bunding to contain spills
- c) It shall be designed to prevent leakage and be easily cleanable

- (3) Off site transport

- a) Where there is need to transport healthcare waste from the point of generation to an off site treatment/disposal place such waste shall be accompanied by a duly signed waste consignment note
- b) The vehicle used shall conform with the standard waste collection vehicle

Waste treatment

- 13 (1) It shall be the responsibility of the Head of any healthcare facility to ensure that:
- a) an adequate waste treatment facility is available at his facility

- b) such waste treatment facilities shall be maintained in good working order
- (2) Where it is not possible to treat healthcare waste on site, the head of a healthcare facility shall enter into a written contract with another facility which is capable of treating his healthcare waste.
- (3) Health care waste shall be treated to render it safe before final disposal. Any such treatment option shall:
 - i) render sharps incapable of causing penetration injury
 - ii) render the waste unrecognizable
 - iii) result in residues being suitable for landfill disposal
 - iv) meet occupational and health safety standards
 - v) result in minimal levels of hazardous or toxic by-products
- (4) Any healthcare waste treatment facility shall be used and maintained in such a manner as not to cause dust, obnoxious smoke, odour or any other nuisance

Disposal of Healthcare Wastes Generated in the Healthcare Facility

14 Health care waste shall be disposed of in a way that will not be detrimental to public health and as specified in *Schedule 2*

Disposal of healthcare waste generated in the home

- 15. (1) The sharps generated through home healthcare must be disposed of in such a way that injury to the family and the general public is prevented
- (2) Any sharps or other devices used to penetrate the skin shall not be disposed of through domestic waste stream.
- (3) Health care providers that make sharps available for use in the home shall be responsible for making an adequate method of disposal available.
- (4) Client who use sharps not provided by a healthcare facility must ensure that they are disposed of in rigid, puncture resistant and sealable containers or an approved sharps container and the container shall be taken to an official disposal point.

Failure to dispose of waste in prescribed manner

16. Any person who fails to comply with the provisions of sections 12, 13, 14 and 15 shall be guilty of an offence and liable to a fine not exceeding N200,000 or 6 months imprisonment or both such fine and imprisonment

Training of workers

17. (1) It shall be the duty of the head of healthcare facility to ensure that all workers in his facility receive adequate training in health and safety with respect to healthcare waste management

(2) Records of such training shall be kept and made available when called for by an authorized officer.

Failure to produce training records

18 Any head of a healthcare facility who fails to train and produce records of such trainings when needed shall be guilty of an offence and liable to a fine not exceeding N100, 000 or 3 months imprisonment

Safety of workers

19 (1) It shall be the duty of the head of the healthcare waste facility to ensure that all workers involved in the management of healthcare wastes are provided with and use adequate/appropriate protective clothing and safety devices for personal protection.

(2) The following shall be made available to all personnel who collect or handle healthcare wastes depending on the risk associated with the healthcare wastes

- a) Helmets with or without visors – depending on the operation
- b) Face, nose masks – depending on operation
- c) Eye protectors (safety goggles) depending on operation
- d) Overalls (obligatory)
- e) Industrial aprons – obligatory
- f) Boots – obligatory
- g) Heavy duty gloves (waste workers) – obligatory

Failure to provide protective clothing

20 Any head of a health facility or head of a healthcare waste facility who fails to ensure that personnel, collecting or treating healthcare waste are provided with and use appropriate protective clothing shall be guilty of an offence and liable to a fine of N200, 000 or imprisonment for 6 months or both.

Records and Other Documentation

21 Any person sending healthcare wastes off-site shall keep records of the Consignment Notes.

(2) All persons operating healthcare waste treatment plant shall maintain records of:

- i) Consignment Notes
- ii) treatment/disposal method
- iii) copies of contract for all waste it receives for treatment from off-site generators of healthcare waste
- iv) disposal of residual waste where applicable

Failure to keep and show records

22. Any person who, when required fails to show the records to an authorized officer shall be guilty of an offence and be liable to a fine of N100,000 or 3 months in prison or both such fine and imprisonment.

Use of consultancy services

23 Nothing in this or any other regulation contained shall be construed as precluding any head of a healthcare facility from using experts outside his/her origination in the drawing up of a waste management plan, doing a waste management audit, training or managing the healthcare wastes of his/her facility

Power of the authorized officer to give order

24 (1) Where an authorized officer is of the opinion that provisions of these regulations are being violated the authorized officer can make and serve an order on the head of the healthcare facility calling for the rectification of the anomaly and such order shall specify the time frame within which corrections are to be effected.

Failure to comply with order

25 Any person who fails to comply with an order issued under these regulations shall be guilty of an offence and be liable to a fine not exceeding N300, 000 or imprisonment for 12 months or both

SCHEDULE 1

CATEGORIES AND LABELING OF MEDICAL WASTE (will be completed in the final report)

Waste type	Label	Sign	C.Code	Bin Type
a) Infectious waste	BIOHAZARD			YELLOW
b) Pathological waste				
c) Sharps				
d) Pharmaceutical waste	POISON			RED
e) Genotoxic waste				
f) Chemical waste				
g) Radioactive waste	RADIOACTIVE			YELLOW
h) Pressurized containers	EXPLOSIVE			
i) Non-medical wastes				BLACK

**Schedule II DISPOSAL AND TREATMENT METHODS SUITABLE FOR
DIFFERENT CATEGORIES OF MEDICAL WASTE**

TECH.	INFECTIOUS	ANATOMICAL	SHARPS	PHAR	GENOTOXIC	CHEM	RADI
Rotary kiln	Yes	Yes	Yes	Yes	Yes	Yes	L/L
Pyrolytic incinerator	Yes	Yes	Yes	Yes	S.qty	S.qty	L/I
Single-CB incinerator	Yes	Yes	Yes	No	No	No	L/L
Drum or brick incinerator	Yes	Yes	Yes	No	No	No	No
Chemical disinfection	Yes	No	Yes	No	No	No	No
Wet thermal treatment	Yes	No	Yes	No	No	No	No
Microwave irradiation	Yes	No	Yes	No	No	No	No
Encapsulation	No	No	Yes	Yes	S.qty	S.qty	No
Safe burial in hospital premises	Yes	Yes	Yes	S.qty	No	S.qty	No
Sanitary landfill	Yes	No	No	S.qty	No	No	No
Discharge to sewer	No	No	No	S.qty	No	No	L/I

Key

Phar - Pharmaceutical waste

Radi - Radioactive waste

S.qty – Small quantity

L/L - Low level

Annex 4 (more reference information on source? Year?)
ANALYSIS OF FIELD DATA ON THE NATIONAL INVENTORY OF HCW IN NIGERIA

There were figures available for 48 out of the 53 hospitals visited.

Table 1 shows the zonal breakdown of hospitals visited.

TABLE 1: NUMBER AND TYPES OF HOSPITALS VISITED IN EACH ZONE

ZONE	FEDERAL HOSPITALS	TEACHING HOSPITALS	SPECIALIST HOSPITALS	STATE/GEN. HOSPITAL	PRIVATE	TOTAL
North National	3	3	1	2	1	10
North East	3	1	-	-	1	5
South South	1	3	2	4	-	10
South East	2	-	1	3	3	9
South West	-	1	2	1	3	7
North West	1	1	1	4	-	7
Total	10	9	7	14	8	48

The 48 hospitals yielded a total of 14,495 beds.

The analysis is as shown in Table 2

TABLE 2: NUMBER OF BEDS PER ZONE AND PER HOSPITAL TYPE

ZONE	FEDERAL HOSPITALS	TEACHING HOSPITALS	SPECIALIST HOSPITALS	STATE/GEN. HOSPITAL	PRIVATE	TOTAL
North National	595	1561	300	256	34	2746
North East	2010	560	-	-	60	2630
South South	65	1491	243	800	-	2599
South East	575	-	220	748	60	1603
South West	-	1117	700	187	262	2266
North West	1363	300	268	720	-	2651
Total	4,608	5,029	1,731	2,711	416	14,495

The average waste generated per bed in kg/bed/day is shown in Table 3

TABLE 3. AVERAGE WASTE (KG) GENERATED PER BED/DAY

ZONE	FED. HOSP.	TEACH. HOSP.	SPECIAL. HOSP.	STATE/ GEN. HOSP.	PRIVATE	TOTAL	AVERAGE
North National	0.39	0.55	0.15	1.46	0.42	2.97	0.59
North East	0.62	2.87	-	-	0.08	3.57	0.71
South South	1.23	0.08	0.11	0.19	-	1.61	0.32
South East	0.50	-	0.49	0.57	0.57	2.13	0.43
South West	-	1.8	0.04	0.00	0.03	1.87	0.37
North West	0.99	0.58	0.28	0.56	-	2.41	0.48
TOTAL AVERAGE	3.73	5.88	1.07	2.78	1.10		
	0.62	0.98	0.18	0.46	0.18		

The teaching hospitals had the highest amount of waster per bed – 0.98kg/bed/day. This may be a reflection of the level of care. The Federal Hospitals followed with 0.62kg/bed/day, also probably for the same reason.

The low rate of 0.18kg/bed/day recorded by private hospitals may be a reflection of inadequate records or a lack of awareness.

No further analysis was carried out on the figures because the units of measurement in some cases were not uniform, and other figures were not entered at all. This analysis therefore was just a rough guideline.

Table 4. Number of Hospital Beds in Nigeria

Description	2000	2001	2002	2003	2004
Medical Institutions					
Number of Hospitals	23,596	23,601	23,607	23,618	23,622
Number of Health Centers & Dispensaries	20,273	20,570	20,580	20,610	20,653
Number of Hospital Beds	71,520	71,930	72,600	73,230	73,680

Source: Federal Ministry of Health, State statistical Agencies, Federal Office of Statistics

Source Document: The Nigerian Statistical Fact Sheets on Economic & Social Development, National Bureau of Statistics, 2005.

Annex 5: Estimated national volumes of HCWM (See WHO Cost Assessment Tool Excel spreadsheet to work on more precise estimates and look at different scenarios)

Calculated:			
total amount of HCW produced per year (kg)		168,996,483	
total number of medical staff (doctors, nurses...)		175,898	
total number of beds in all HCFs		91,346	
total number of small HCFs		20,653	
total number of medium HCFs		23,622	
total number of large HCFs		24	
Values averaged from 1994 Nigeria data:			
1 small HCF has on average		1.6	beds
1 medium HCF has on average		14.8	beds
1 large HCF has on average		389.3	beds
Results from sub-calculations on tools B1-B4			
Small HCFs (B1)	total annual recurrent costs per small HCF	222	
	total annual recurrent costs for all small HCFs at national level	4,579,803	
	total annual costs per small HCF	812	
	total annual costs for all small HCFs at national level	16,776,225	
	total cost per kilo of HCW treated in small HCFs	3.30	
Medium HCFs (B2)	total annual recurrent costs per medium-size HCF	1,550	
	total annual recurrent costs for all medium-size HCFs at national level	36,620,006	
	total annual costs per medium-size HCF	2,635	
	total annual costs for all medium-size HCFs at national level	62,233,589	
	total cost per kilo of HCW treated in medium-size HCFs	1.20	
Large HCFs (B3)	total annual recurrent costs per large HCF	13,027	
	total annual recurrent costs for all large HCFs at national level	312,654	
	total annual costs per large HCF	18,876	
	total annual costs for all large HCFs at national level	453,030	
	total cost per kilo of HCW treated in large HCFs	0.3	
Total Calculated Costs at National Level (B4)			
	total annual recurrent costs per HCF	31,731	
	total annual recurrent costs for all small HCFs at national level	4,579,803	
	total annual recurrent costs for all medium-size HCFs at national level	36,620,006	
	total annual recurrent costs for all large HCFs at national level	312,654	
	Grand total annual recurrent costs at national level	41,544,194	
	Grand total costs at national level	80,257,028	
	Grand total cost per kilo of HCW treated at national level	1.4	

Annex 6: LIST OF PROPOSED STEERING COMMITTEE MEMBERS

S/N	Organization
1	Federal Ministry of Environment
2	Federal Ministry of Health
3	Federal Ministry of Agriculture
4	Federal Ministry of Justice
5	NANNM
6	Pharmaceutical Society of Nigeria
7	AGPMPN
8	Nigeria Veterinary Medicine Association
9	Traditional Healthcare Givers
10	Association of Medical Laboratory Scientist of Nigeria
11	Defense & Paramilitary Medical Services
12	Radiographers & Nuclear Medicine Practitioners
13	NAFDAC
14	SON
15	National Environmental Standards Enforcement Agency
16	Nigeria Nuclear Regulatory Agency
17	Rep Senate House Committee on Health
18	Rep Senate House Committee on Environment
19	Rep House Committee on Health
20	Rep House Committee on Environment
21	Waste Management Society of Nigeria
22	Manufacturers Association of Nigeria
23	Nigerian Institute of Town Planners
24	Nigerian Environmental Society
25	PATHS
26	Ecological Funds
27	Prof. Charles Okufo
28	Dr O. A. Anyadiegwu
29	Isa Iyortim (MMIS)
30	NMA
31	Chairman of CEO of Federal Tertiary Institutions

**Annex 7: CONSTITUENCIES FOR NATIONAL STAKEHOLDERS MEETING
NHCWMP**

s/n	Constituency	Total Number	Number to Invite
1	Federal Ministries of health	1	
2	Federal ministries of Environment	1	
3	State Ministries of Health	37	18 + FCT
4	State Ministries of Environment	37	18 + FCT
5	Teaching Hospitals	16	16
6	Federal Medical centers	23	23
7	Development partners		10
8	NGOs		2
9	Private sector stakeholders		6
10	State Waste Management Authority		6
11	Orthopedic Hospitals	3	3
12	Eye and Ear Hospital	1	1
13	Federal Ministries of agriculture		
14	Federal Ministries of Justice		
15	State Ministries of Agriculture		
16	Development Partners		
17	Sate Waste Management Authority		
18	AGPMPN		
19	NANNM		
20	NMA		
21	Oil Companies		
22	Nigerian Telecoms		
23	Accademia		
24	Pharmaceutical Companies		
25	Patent Medicine dealers		
26	Research Institutes		
27			

Note that all members of the Steering committee are also to be included in this list.

Annex 8: COST ESTIMATES FOR NCHWM OBJECTIVES

