

# HEALTH CARE WASTE MANAGEMENT PLAN (HCWMP)

FOR

## NIGERIA BASIC HEALTH CARE PROVISION FUND PROJECT (BHCPFP)



**DRAFT REPORT**

**March 2018**

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## LIST OF ABBREVIATIONS

BHCPF	Basic Healthcare Provision Fund
BHCPFP	Basic Healthcare Provision Fund Project
EA	Environmental Assessment
ESIA	Environmental and Social Impact Assessment
EEZ	Exclusive Economic Zone
FEPA	Federal Environmental Protection Agency
FMEEnv	Federal Ministry of Environment
FMoH	Federal Ministry of Health
GoN	Government of Nigeria
HCF	Health Care Facility
HWMP	Health Waste Management Plan
LFN	Laws of the Federation of Nigeria
MDG	Millennium Development Goals
NHIS	National Health Insurance Scheme
NHP	National Health Policy
NPHCDA	National Primary Healthcare Development Agency
NSC	National Steering Committee
NSHIP	National State Health Investment Project
MoU	Memorandum of Understanding
OOP	Out of Pocket expenses
PDO	Project Development Objectives
PHC	Primary Health Care
PHCUOR	Primary Health Care Under One Roof
PMU	Project Management Unit
PSC	Project Steering Committee
SDG	Sustainable Development Goals
SPHCDA	State Primary Healthcare Development Agency
SMoH	State Ministry of Health
SSC	State Steering Committee
SSHIS	State Social Health Insurance Schemes
TOR	Terms of Reference
UHC	Universal Health Care
UNDP	United Nations Development Program
UN	United Nations
UNICEF	United Nations Children Fund
WHO	World Health Organization

## EXECUTIVE SUMMARY

### ES 1: Background

The Nigeria health sector currently faces a huge problem. It's under 5 infant mortality ratio is high and it has one of the lowest vaccination rates in Africa. According to United Nations Children Fund, (UNICEF), 10 percent of new-born deaths in world occurred in Nigeria. There is an obvious failing access and availability of basic health care services particularly at the primary health care level in rural areas which is residence to more than 50% of Nigeria's population.

To tackle these problems, there needs to be a deliberate effort to offer financial protection and expansion of availability of service in a bid to make basic health care accessible to even the poorest families in Nigeria.

### ES 2: Project Description

The proposed project tagged Basic Healthcare Provision Fund (BHCPF) is designed to increase access to healthcare particularly in rural areas and will commence in three states namely; Abia, Niger and Osun States. The project development objective is to provide access to basic minimum package of health services to beneficiaries through a BHCPF system.

**ES 2.1: Objectives:** The project development objective (PDO) is to strengthen health system management to operationalize the Basic Health Care Provision Fund in the selected states (Abia, Niger and Osun) and entails

- Establishing a robust payment, accreditation and verification mechanism;
- Introducing Project Finance Management reforms;
- Holding providers accountable for health service delivery coverage and quality; (iv) improving coordination between the federal and state agencies; and (v) establishing a mechanism of citizen accountability.

#### **ES 2.2: The proposed BHCPF has two components:**

##### **Component 1: Strengthening service delivery through BHCPF (US\$16 million)**

- (i) Strengthening service delivery through Fee-for-Service approach (US\$ 8.4M)
- (ii) Strengthening service delivery through Decentralized Financing of Facilities (US\$ 7.6M)

##### **Component 2: Systems-strengthening to implement BHCPF (US\$4 million)**

- (i) Strengthening the BHCPF national institutions & systems (US\$1.5 million)
- (ii) Strengthening performance of state-level implementing agencies (US\$1.5 million)
- (iii) Monitoring and evaluation of BHCPF (US\$1 million)

### **ES 3: Project Activities**

The proposed Project is not envisaged to involve any major civil works, such as new construction or significant rehabilitation of existing buildings in the three participating States. It may however, involve minor repairs such as painting, plastering, replacing doors/windows, leaking roof, and done in accordance with national and local laws and procedures. Such works will be under sub component 1b *Utilization and verification of the DFF payments*.

### **ES 4: Legal and Regulatory Framework**

Nigeria has several Acts and Regulations related to HCWM in the country. In addition, the Federal Ministry of Health has three specific documents dealing with HCWM in Nigeria and these are

- National Healthcare Waste Management Policy;
- National Healthcare Waste Management Guidelines; and
- National Healthcare Waste Management Plan.

### **ES 5: Objectives and Purpose of the HCWMP**

The objective of the HCWMP is to provide processes that the implementing agencies (Federal, States, Local Government Authorities, and Healthcare Facilities Managements) will follow to ensure the protection of healthcare workers, wastes handlers, and the community from the harmful impacts of infectious hazardous healthcare wastes and to maximize project compliance with international and national environmental regulations and best practices.

This Health Care Waste Management Plan (HCWMP) is prepared in compliance with the World Bank EA requirements on projects for World Bank financing to help ensure that they are environmentally sound and sustainable. It also leverages on the National Healthcare Waste Management Policy National Healthcare Waste Management Guidelines and the National Healthcare Waste Management Plan.

### **ES 6: Current State of HCWM in Nigeria**

Major constraints with HCWM practices in Nigeria range from inadequate funding, availability of resources and inadequate infrastructure. There is also a low level of manpower training that currently exists for HCWM at all levels all across Nigeria.

The major short comings in the current HCWM in Nigeria are

- Absence of HCWM plans in most medical institutions;
- Weak coordination of HCWM system at all levels;
- Poor/lack of segregation of healthcare waste at health facility levels;

- Deficient/non-existent HCW colour-coding and labelling system;
- Poor hygiene practices in collection, storage, transportation, treatment and final disposal of healthcare waste;
- Waste handlers lack Personal protective equipment (PPE);
- Indiscriminate dumping of healthcare waste into public dumpsites;
- Use of locally built low temperature incinerators without adequate protection to the environment;
- Healthcare solid wastes are either buried or burnt at low temperature in open pits;
- High risks of injury and infection to healthcare waste handlers and scavengers;
- Absence of post exposure prophylaxis (PEP) to those who sustain needle stick injury, with increased risk of HIV, HBV & HCV infections; and
- Lack of healthcare waste management information system.

## ES 7: Institutional Responsibility

Implementation arrangements for BHCPFP will be fully streamlined into the existing government structure at the Federal, State and Local Government levels. Additional technical assistance and coordination support will be provided through the project to strengthen implementation. Implementation arrangements for BHCPF involve:

- (i) **The Project Steering Committee (PSC)** responsible for overall coordination of WB funded projects at the FMOH and its agencies;
- (ii) **The Secretariat [The Secretariat of the National Steering Committee]** will serve as the PMU and oversee the day to day running of the BHCPF operations and coordinates the activities of the two gateways involved in the proposed Project. It reports to the PSC
- (iii) **The State Steering Committee (SSC)** level to provide oversight over the activities of SPHCDA and SSHIAs.

Across all these, significant coordination with line ministries and civil society will be included.

## ES 8: Capacity Building

The training needs identified based on interview of the categories of actors involved are presented below:

- State and Local Immunization Officers
- Management & administrative staff;
- Medical laboratory staff;
- Ward attendants, caretakers, ground workers and other support staff;
- Patients and visitor and scavenger ;
- Waste management facility operator;
- Waste collection and transportation staff;



- Treatment system operators; and
- Disposal managers

## ES 9: Cost of Implementing the HCWMP

The table below shows an indicative budget breakdown of the cost for implementing the HCWMP for BHCPFP. The cost is estimated at **Eighteen Thousand One Hundred and Fifty Thousand US Dollars only (\$344,850) equivalent of Five Million Four Hundred and Forty Five Thousand Naira only (₦ 5,445,000.00).**

S/N	ITEM	RESPONSIBILITY	COST ESTIMATE (USD)	COST ESTIMATE (NAIRA)
1	Resource requirements for the Implementation of HCWMP	NPHCDA, FMEnv, SPHCDA, SIO,LIO, HCWM Consultant	10,000	3,000,000
2	Monitoring	NPHCDA/SPHCDA, /LGAs World Bank, contractors and consultants.	4,000	1,200,000
3	Capacity Building	NPHCDA/SPHCDA, /LGAs World Bank, contractors and consultants.	2,500	750,000
		<b>Sub- Total</b>	<b>16,500</b>	<b>4,950,000</b>
		<b>Contingency (10%)</b>	<b>1,650</b>	<b>495,000</b>
		<b>Total</b>	<b>18,150</b>	<b>5,445,000</b>

## ES 10: Stakeholders Consultation

Consultations were done at the Federal level with

- Federal Ministry of Health (FMoH)
- National Primary Healthcare Development Agency (NPHCDA)
- National Health Insurance Scheme (NHIS)

Consultations were also done at the State level with

- State Ministries of Health (SMoH) of Abia, Niger and Osun States
  - State Primary Healthcare Development Agencies (SPHCDA) of Abia, Niger and Osun States,
  - State Social Health Insurance Schemes (SSHIS)
- All stakeholders' expressed concerns over healthcare waste management in their States. It was also suggested that the project consider a waste management plan for the purpose of dealing with health care wastes.

More details of the stakeholders' consultation are presented in Chapter Nine.

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background**

Nigeria has an estimated population of 177.5 million and is Africa's most populous nation with major opportunities and complex challenges. Consisting of 36 states and the Federal Capital Territory, the Federation is divided into six geo political zones. With more than 400 ethnolinguistic groups, it also features significant contrasts in terms of economic and social outcomes –the country has seen robust economic growth and yet modest poverty reduction; dynamic urban growth centers and isolated rural areas; and widening social and income disparities despite an abundance of natural and human resources.

The Nigerian economy experienced relatively healthy economic growth rates over the past decade, with a period of recession between 2015 and the first quarter of 2017. Despite robust economic growth in the last decade, public investments in health have been steadily declining.

Healthcare utilization is the highest at primary level and the poorest households in Nigeria are more likely to use Primary Health Centers (PHCs) rather than secondary facilities. However, 78 percent of all Government spending on health is on secondary and tertiary health facilities.

As a result of limited government financing, health spending in Nigeria is dominated by out-of-pocket (OOP) expenditures. Government spending makes up 25% of total health financing with OOP expenditures accounting for 72% – this is among the highest share in sub-Saharan Africa. High OOP in Nigeria means that 25% of Nigerians face catastrophic health expenditures exceeding 10% total consumption or income.

To tackle these problems, there needs to be a deliberate effort to offer financial protection and expansion of availability of service in a bid to make basic health care accessible to even the poorest families in Nigeria. The BHCPFP aims at achieving this.

BHCPFP is based on the achievements of the National State Investment Program (NSHIP). The success of NSHIP include (i) provision of legitimate operating funds at health facility level, something they have rarely, if ever, had before; (ii) provision of a clear signal of what is important to health providers; (iii) staff rewards based on their efforts, (iv) opportunity to innovate because of substantial autonomy given to the front-line health workers, especially the PHC officer-in-charge; and (v) strengthened supervision. The implementation of PBF has also faced a few challenges that are instructive, including: (i) delays in payment have a very deleterious effect on performance; (ii) the quality of management at facility level appears to be a constraint that needs to be addressed; and

(iii) the system relies on independent and robust assessments of performance. These factors and lessons learnt are embedded in the design of the BHCPF.

All these factors and lessons learnt are embedded in the design of the BHCPFP. The BHCPFP is to support the Government's program through the development of systems for the successful implementation of the BHCPF and expanding access to a basic package of minimum health services for beneficiaries.

## **1.2 Project Description**

The aim of the proposed Basic Healthcare Provision Fund Project (BHCPFP) is to support the Government's program through the development of systems for the successful implementation of the BHCPF and expanding access to a basic package of minimum health services for beneficiaries. Ultimately, the establishment of the primary healthcare system building blocks will allow the government to better deliver a basic package of PHC services known as the Basic Minimum Package of Health Services (BMPHS) to poor and rural Nigerians more effectively and efficiently.

## **1.3 Project Development Objective**

The project development objective is to provide access to basic minimum package of health services to beneficiaries through a BHCPF system.

## **1.4 Purpose of the Health Care Waste Management Plan (HCWMP)**

Currently, improper and unsafe health care waste management (HCWM) practices put at risk healthcare workers, patients, and communities who are exposed both within Health Facilities (HFs) and the surrounding communities.

To prepare a HCWM plan in order to provide guidance on processes that the implementing agencies (Federal, States, Local Government Authorities, and Healthcare Facilities Managements), the project will

- apply the necessary safeguard requirements at primary care facility level;
- draw upon the National Healthcare Waste Management Strategic Plan and other already prepared HCWM plans of other World Bank health projects in Nigeria such as the Nigeria HIV/AIDS project and NSHPIC

This will ensure the protection of healthcare workers, wastes handlers, and the community from the harmful impacts of hazardous healthcare wastes and to maximize project compliance with international and national environmental regulations and best practices.

## 1.5 Project Components

The project will provide support for the design and implementation of the start-up phase of BHCPF. This will involve supporting the set-up of the BHCPF institutional framework and delivery systems and launching the BHCPF in three States of the Federation (Abia, Niger and Osun). The project is largely divided into two major components.

**Component 1: Strengthening service delivery through BHCPF (US\$16 million):** This component supports two distinct mechanisms of health financing for primary health care providers: (i) a Fee-For-Service (FFS) approach to purchase high-impact maternal and child health services through accredited providers; and (ii) Decentralized Financing for Facilities (DFF). This component is divided into two

**1a Strengthening service delivery through Fee-for-Service approach (US\$ 8.4M):** this will finance the Fee-for-Service payment mechanism, which pays accredited public and private primary care providers in rural areas based on the quantity of high-impact maternal and health services provided. The beneficiaries under this payment mechanism will receive the selected services for free at the accredited facilities.

**1b Strengthening service delivery through Decentralized Financing of Facilities (US\$ 7.6M):** This component pays for decentralized health financing of public primary health facilities in rural areas. The facilities are provided with lump-sum payments for **operational expenses**. These funds are not linked to performance, similar to the DFF payments under NSHIP. At least one public PHCC per ward in each rural LGA will be enrolled to be paid operational expenses through this financing mechanism.

**Component 2: Systems-strengthening to implement BHCPF (US\$4 million):** this component is to strengthen and consolidate the institutions and systems necessary for the implementation of BHCPF. This component (i) establishes a national coordinating secretariat for BHCPF; (ii) finances a rigorous system of verification that helps ensure value for money; (iii) creates robust electronic payment systems which would increase transparency and efficiency; (iv) supports and incentivizes performance by government actors at the state level; and (v) improves M&E systems and data utilization by taking a results-based approach to health financing. This component is largely divided into three major components.

**Sub Component 2a: Strengthening the BHCPF national institutions & systems (US\$1.5 million):** This sub-component will finance (i) the establishment and operationalization of the Secretariat which is the national coordinating office for BHCPF implementation; and (ii) will also provide BHCPF operational support to federal organizations overseeing the FFS and DFF financing mechanisms. It is subdivided into 3

**2a.1 Building capacity of the Secretariat:** The Secretariat of the National Steering Committee] will serve as the PMU and will oversee the day to day running of the BHCPF operations and, monitor and coordinate the activities of the two gateways. This sub-component will fund (i) operational costs of setting up and running the Secretariat; (ii) hiring of any consultants needed to support the Secretariat; (iii) capacity building activities of employees at the federal and state level; and (iv) setting up a robust payment and management information system for BHCPF. This component is under the purview of the Secretariat, will also finance a “Huwe” Card for beneficiaries of the services provided by the FFS mechanism. These cards will be available to beneficiaries upon enrolment in the FFS system, and will allow beneficiaries to access free care for key maternal and child health conditions.

**2a.2 Operational support for federal agencies implementing FFS and DFF:** This sub-component will fund operations at the NPHCDA and NHIS related to BHCPF implementation. NPHCDA is the federal implementing agency of the DFF system, which oversees and provides technical support to the state-level DFF implementing agencies and releases timely payments to them. NHIS is the federal implementing agency of the FFS system, which manages the provider accreditation process, oversees and provides technical support to state-level FFS implementing agencies, and releases timely payments to them. This subcomponent will finance (i) monitoring and supervisory visits by the NPHCDA and NHIS to facilities and state-level agencies; and (ii) capacity building activities conducted by these national agencies at the state and local level.

**2a.3 Citizen engagement:** Under the management of the Secretariat, this sub-component finances communications, citizen engagement (CE), and grievance redress/complaints-handling necessary to ensure that (i) the BHCPF program is widely known and understood; (ii) potential beneficiaries understand their rights, eligibility and services provided; and (iii) any complaints from the community, providers or state-level implementers are acknowledged and addressed promptly.

**Sub component 2b Strengthening performance of state-level implementing agencies (US\$1.5 million):** This sub-component will support the operational cost of the agencies, and use a performance framework to incentivize functions essential for verification, supportive supervision and capacity building. SSHIAs and SPHCDA are the state-level agencies responsible for the implementation of the FFS and the DFF system, respectively. SSHIAs verify the claims submitted by the facilities enrolled in the FFS system, and both SSHIAs and SPHCDA carry out routine (at least twice every quarter) ex-ante verification of quality and quantity of services delivered. It is subdivided into two

**2b1 Operational support and performance frameworks for SPHCDA:** This sub-component provides financing to SPHCDA that is partly operational support, and

party based on their performance in (1) supervising and mentoring public health facilities to receive FFS accreditation; (2) timeliness of operational funds transferred to the enrolled PHCCs; (3) timeliness of ex-ante verification of quality and quantity of services delivered by enrolled facilities; and (4) training and orientation of providers on DFF payment mechanism (NPHCDA gateway).

**2b.2 Operational support and performance frameworks for SSHIAs:** This sub-component provides financing to SSHIAs that is partly operational support, and partly based on their performance in (1) the number of facilities evaluated for the accreditation process, including of private facilities; (2) timeliness of FFS payments transferred to the enrolled health facilities; (3) timeliness of ex-ante verification of quality and quantity of services delivered by enrolled facilities; and (4) training and orientation of providers on FFS payment mechanism (NHIS gateway).

**Subcomponent 2c: Monitoring and evaluation of BHCPF (US\$1 million):** This sub-component will finance the operating costs for strengthening oversight and management of the project, and an impact evaluation including household surveys and health facility surveys. Measuring results accurately and reliably at the desired intervals is therefore particularly critical given that payments to states, local governments and enrolled facilities are contingent on the results they achieve. The Project will also build in a rigorous impact evaluation to generate evidence on the effectiveness and efficiency of BHCPF, including the value for money of investments in the public versus the private sector. This evidence will help policy makers decide on how to expand BHCPF in Nigeria. This sub-component will: (i) verify data collected through a defined internal and external verification mechanism; and (ii) monitor the progress on project performance improvements through periodic independent sample surveys for tracking changes at facility and household levels. This sub-component will be Bank-Executed.

## 1.6 Project Activities of BHCPFP and Envisaged Impacts

The proposed Project is not envisaged to involve any major civil works, such as new construction or significant rehabilitation of existing buildings in the three participating States. It may however, involve minor repairs such as painting, plastering, replacing doors/windows, leaking roof, and done in accordance with national and local laws and procedures. Such works will be under sub component 1b Utilization and verification of the DFF payments. There are also concerns over the management of healthcare waste associated with the BHCPFP as a result of immunization which will include management of medical wastes majorly swabs.

To address concerns of HCW, this Health Care Waste Management Plan (HCWMP) is prepared in compliance with the World Bank EA requirements on projects for World Bank financing to help ensure that they are environmentally sound and sustainable.

The objective of the HCWMP is to provide processes that the implementing agencies (Federal, States, Local Government Authorities, and Healthcare Facilities Managements) will follow to ensure the protection of healthcare workers, wastes handlers, and the community from the harmful impacts of infectious hazardous healthcare wastes and to maximize project compliance with international and national environmental regulations and best practices.

## **1.7 Stakeholder Consultation**

### **ES 6.7 Public Consultations**

Consultations were done at the Federal level with

- Federal Ministry of Health (FMoH)
- National Primary Healthcare Development Agency (NPHCDA)
- National Health Insurance Scheme (NHIS)

Consultations were also done at the State level with

- State Ministries of Health (SMoH) of Abia, Niger and Osun States
- State Primary Healthcare Development Agencies (SPHCDA) of Abia, Niger and Osun States,
- State Social Health Insurance Schemes (SSHIS)

Full details of all consultations are presented in Chapter Nine.

## CHAPTER TWO: BASELINE DATA OF STUDY AREA

### 2.1 Description

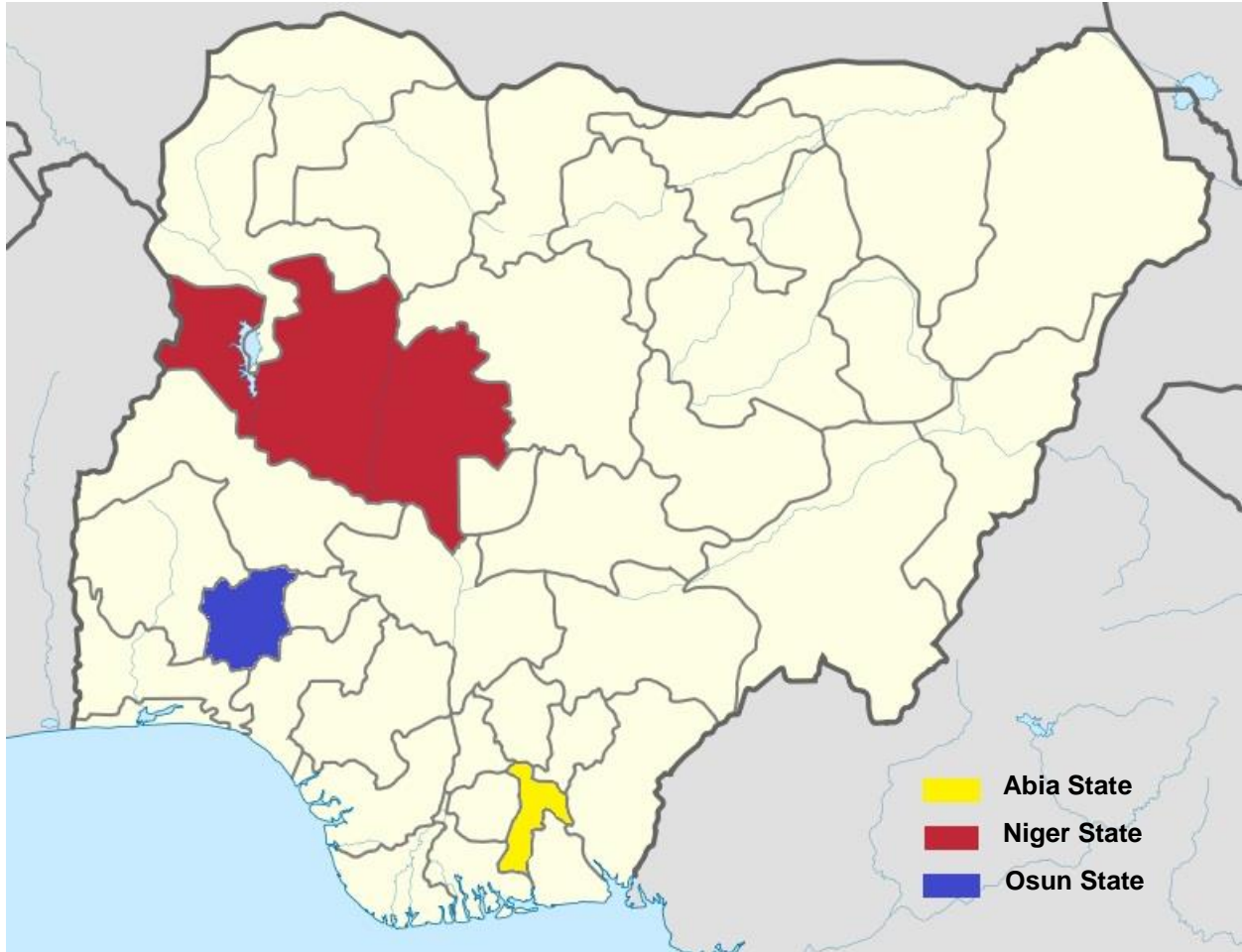


Figure 1.0: Map of Nigeria showing the three Participating States of Abia, Niger and Osun States

Nigeria is situated in the western portion of Africa between latitude 9°4'N and longitude 7°29'E. It is bordered by the Republic of Benin in the west, Chad and Cameroon in the east, Niger in the north and the Atlantic Ocean in the south. It covers a geographical area of 923,768 square kilometres of which 13,000 square kilometres is covered by water.

Nigeria accounts for 47 percent of West Africa's population, and has one of the largest population of youths in the world. Its population is estimated to be 177.5 million inhabitants making it the most populous country in Africa and most populous black country in the world. By 2100, the UN has estimated that the Nigerian population will be between 505 million and 1.03 billion people.). Population is distributed between rural and urban centres



at 51.7% and 48.3% respectively. However it has an average population density of 167.5 people per square kilometre.

The country gained independence on October 1st, 1960 and was subsequently declared a federal republic in 1963. 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).

## 2.2 Nigeria Health Sector

The provision of basic health care service in the Nigerian health sector is far from desirable and there are several evidence to show this is actually the case. For instance, infant and under-5 mortality rates have plateaued, the total fertility rate (TFR) has not changed in 25 years, and the nutritional status of poor children has worsened over the last 13 years. Only 10% of poor Nigerian children are immunized (Penta3) compared to 28% in Chad and 52% in Niger. These results implicate the performance of Nigeria's primary health care (PHC) system. Nigeria has one of the lowest levels of government spending on health in the world, and the existing resources are grossly misallocated to secondary and tertiary care resulting in dysfunctional or non-functional PHC facilities and high out-of-pocket expenditures by poor Nigerians. Not only is funding insufficient, but accountability is weak and there has been little focus on tangible results. The potential of private sector, which provides 60% of care in the country, has been ignored by the government.

Health outcomes and health service delivery may have actually deteriorated over the last few years and Nigeria did not come close to achieving MDG4, with no discernable progress made on maternal mortality ratio at 576 per 100,000 live births or malnutrition at 44% of children stunted (low height for age) (Table 1).

Furthermore, the country is nowhere close to being on track to meet SDG3. Improvements seen in under-five mortality in previous years have slowed considerably, and remains unacceptably high at 120 per 1000 live births in 2016 while infant mortality rate is at 70 per 1,000 live births. There has been no progress in services such as family planning, antenatal care, and skilled birth attendance, and these services are at levels lower than that of both poorer and smaller countries. The proportion of births with skilled birth attendants has shown little improvement from 38.1% in 2013 to 43% in 2016 and facility-based deliveries has not improved either at 37.5%. Nigeria has a low modern contraceptive prevalence rate (mCPR) of 13% which is below the Sub Saharan Africa (SSA) average of 24%.

Outcome Indicators	Nigeria				SSA
	2003	2008	2013	2016	2016
Under 5 mortality rate per 1000 births	201	157	128	120	78
Infant mortality rate per 1000 births	100	75	69	70	53
Maternal mortality ratio per 100,000 live births		545	576	576	547
Total Fertility Rate (Children per woman)	5.7	5.7	5.5	5.8	4.9

Stunting, Height for age (<-2SD) %	42	41	37	44	34
Low weight for age (<-2SD) %	24	23	29	32	19
Wasting, Weight for height (<-2SD)	11	14	18	11	8

*Source: Nigeria Demographic and Health Surveys 2003-2013 and MICS 2016-17. Sub-Saharan Africa data is from World Development Indicators and is for 2015-2016. The data are not strictly comparable and SSA data is just illustrative.*

There has been limited progress in delivery of basic health services in Nigeria in the last two decades—the coverage of key health interventions in the country has stagnated at low levels. The recently released UHC Service Coverage Index scores Nigeria at a low index of 39 with countries such as Yemen, Eritrea and Burkina Faso.

In addition, PHCs in Nigeria lack operational budget which affects their supply-side readiness. LGAs are supposed to provide primary health care (PHC) services and charged with the responsibility of funding the operating costs of the PHC system. However, LGAs rarely prioritize the financing of PHC services to the extent that almost no financial resources are directly managed at the primary health facility level, except in some states where Drug Revolving Funds (DRFs) have been established or where user charges are collected. The 2016 National Health Facility Survey revealed that only a third of facilities received any form of cash grants to meet their operational costs. Consequently, even for services that are meant to be free, unreliable flow of funds encourages these facilities to charge user fees, contributing to high out-of-pocket spending or forgone care.

In response to these crisis in the health sector, the Government of Nigeria has enacted a potentially transformative National Health Act, operationalized through the Basic Health Care Provision Fund (BHCPF). The BHCPF, if implemented as envisioned in the Act, will mobilize N50 billion (\$150 million) in new money per year for PHC. In addition, to more funding for PHC, the BHCPF employs proven, results-based and decentralized approaches and thus represents “more money and smarter money.”

### **2.3 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).

Nigeria is a federation with three tiers of Government; Federal, State and Local, and the responsibility for health service provision in the public sector is based on these three tiers.

Each State health system runs a program that suits the peculiar needs of the State. 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 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.

**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 specialist doctors, medical officers, nurses, midwives, medical laboratory scientists, pharmacists, community health officers etc. Secondary level facilities serve as referral points for primary healthcare facilities. Each LGA is expected to have at least one secondary healthcare facility.

**Tertiary:** Tertiary level facilities form the highest level of healthcare in the country and include Specialist Hospitals, Teaching Hospitals and Federal Medical Centres (FMCs). They provide specialist care for patients referred from the secondary level as well as from the primary level. Other functions include teaching and research.

By institutional arrangement and constitution, the Federal Government is responsible for managing all tertiary hospitals; the State caters for secondary healthcare facilities while the Local Government is expected to cater and funds the primary healthcare facilities.

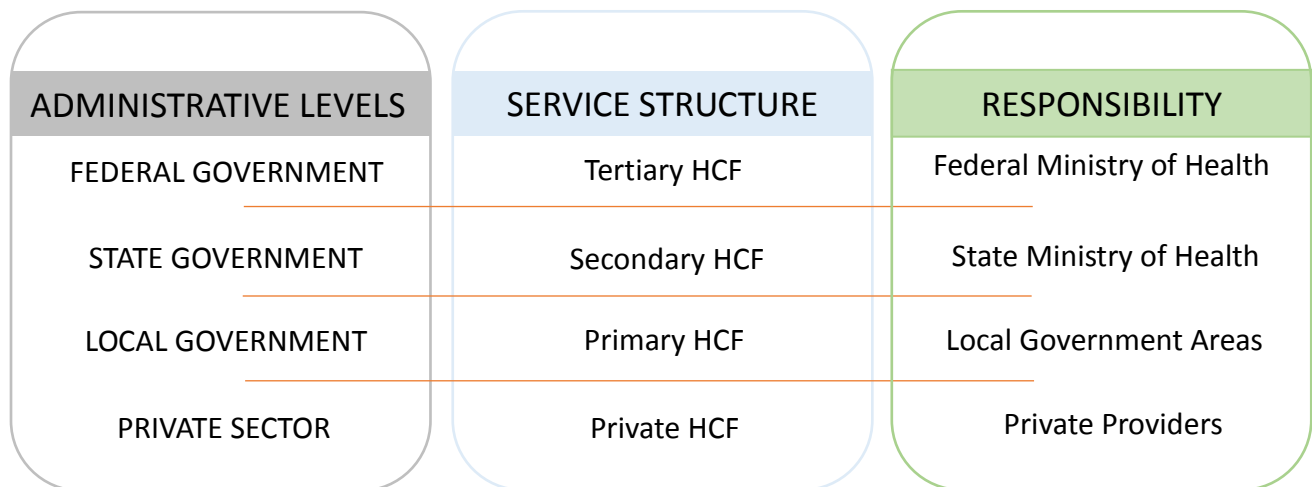


Figure 3.1 Organizational Structure of Nigeria Health Services

## CHAPTER THREE: HEALTHCARE WASTE AND LEGAL PROVISIONS

### 3.1 Definition

Health Care wastes are by-products of health care that includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices and radioactive materials. Poor handling of HCW including those emanating during operation of the BHCPFP exposes health care workers, waste handlers and the community to disease and injuries.

The activities of the BHCPFP is expected to generate wastes and by-products that are hazardous to both human health and the environment. Wastes emanating from HCW will include expired vaccines and sharps.

### 3.2 Legal and Regulatory Framework

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

- Establish a National Health Care Waste Management Policy compatible with the technical, institutional and financial capacities of the HCFs in Nigeria.
- Support the National Health Care Waste Management Plan, National Health Care Waste Management Policy, and National Health Care Waste Management 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 HCW in the country. However, they are scattered and there is no particular legislation specifically dealing with HCWM in Nigeria as of today.

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.

#### 3.2.1 Acts Relevant to HCW in Nigeria

**Table 3.1: Relevant Nigerian Acts**

S/N	ACTS	OBJECTIVES
1	Federal Environmental Protection Agency (FEPA) [Decree 58 of 1988 and 59 (amended) of 1992]	<ul style="list-style-type: none"> <li>▪ 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</li> </ul>

		and facilities relating to environmental protection; c) the powers to establish standards, inspect, search, seize and arrest offenders.
2	Harmful Waste (Special Criminal Provisions, etc.) Act 1988	<ul style="list-style-type: none"> <li>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.</li> </ul>
3	Environmental Impact Assessment Act - CAP. E12 L.F.N. 2004	<ul style="list-style-type: none"> <li>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.</li> </ul>

### 3.2.2 Regulations Relevant to HCW in Nigeria

**Table 3.2: Relevant Nigerian Regulations**

S/N	REGULATION	DESCRIPTION
1	National Environmental (Sanitation and Wastes Control) Regulations, 2009	The purpose of this Regulation is to provide the legal framework for the adoption of sustainable and environment friendly practices in environmental sanitation and waste management to minimize pollution.
2	National Effluent Limitation Regulations, 1991	This Regulation requires that every industry shall install anti-pollution equipment for the detoxification of effluent and chemical discharges emanating from the industry and specify selected waste water parameters for the industries in the First Schedule to these Regulations. The anti-pollution equipment shall be based on the Best Available Technology (BAT), the Best Practical Technology (BPT) or the Uniform Effluent Standard.
3	National Environment Protection (Pollution Abatement in Industries and Facilities Producing Waste) Regulations, 1991	By this regulation, no industry or facility shall release hazardous or toxic substances into the air, water or land of Nigeria's ecosystems beyond limits approved by the Federal Environmental Protection Agency. It imposes restrictions on the release of toxic substances and stipulates requirements for monitoring of pollution to ensure that permissible limits are not exceeded.
4	National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations 1991	This Regulation regulates the handling and management of solid, radioactive and (infectious) hazardous waste. It defines objectives of the management of solid and hazardous waste, the functions of appropriate Governmental agencies and the obligations of industries/facilities that generate the wastes. It also classifies waste, makes provision for contingency plans, emergency procedures, groundwater protection, ground water monitoring requirements. Part 12 of this regulation provides for the tracking of wastes from their point of generation to the final disposal with specific details regarding HCW.

### 3.3 National Healthcare Waste Management Policy, National Healthcare Waste Management Guidelines (NHCWMG) and National Healthcare Waste Management Plan (NHCWMP)

Nigeria has developed a trio of documents to tackle, regulate and provide guidelines for HCWM in the country. These three documents are

- National Healthcare Waste Management Policy (See Table 2.3)
- National Healthcare Waste Management Guidelines (See Table 2.4)
- National Healthcare Waste Management Plan (See Table 2.5)

**Table 3.3 Summary of the National Healthcare Waste Management Policy**

NATIONAL HEALTH-CARE WASTE MANAGEMENT POLICY 2013	
Summary	This document presents the national policy on waste management in Nigeria taking into account three (3) sections-(i) General consideration and institutional mechanism in policy implementation at national level, (ii) Requirements for management of HCW in the medical institutions including regulation and definition of institutional Health Care Waste Management Plans.
Definition	The policy stipulates that HCW generated by both public and private medical institutions in Nigeria must be safely handled and disposed of by these medical institutions.
Comments	This document contains specific formulated policies presently been used as well as a laid down framework of lines of responsibilities for all parties involved.
Suggestions	There would certainly be the need for these policies to be formulated in the context of the present situation thus giving for a realistic implementation and adherence by all medical institutions involved to obtain effective results.

**Table 3.4 Summary of the National Healthcare Waste Management Guidelines**

NATIONAL HEALTH-CARE WASTE MANAGEMENT GUIDELINES 2013	
Summary	This comprehensive document presents guidelines and strategies for the sustainable management of HCW taking into account waste generation, waste types and waste treatment technologies. Also highlighting a number of critical areas and possible solutions.
Definition	Hazardous HCW is of primary concern in Nigeria, due to its potential to cause diseases and/or injuries. Hazards associated with HCW should be incorporated into Nigeria's HCWM legal, regulatory, technical and informational documents.
Comments	HCWM is constitutionally the responsibility of the FMEnv and SEPAs, with necessary input and support from the health ministries. Formulation and implementation of HCWM policies and regulations rest with the FMEnv in collaboration with FMoH.
Suggestion	There is certainly the need for HCWM planning, formulating and implementing bodies to take into consideration the challenges procuring pragmatic and affordable HCWM disposal technologies.

**Table 3.5 Summary of the National Healthcare Waste Management Plan**

<b>NATIONAL HEALTH-CARE WASTE MANAGEMENT PLAN 2013</b>	
Summary	This document presents strategies for the management of HCW taking into account the technical, financial and legal aspects, as well as public awareness, discussing also responsibility of the different levels of government (Local, State and Federal ) and furthermore highlighting critical areas and possible solutions.
Definition	A NHCWM plan looks at practical steps to ensure that hazardous and non-hazardous medical wastes are managed properly to protect humans and the environment against the adverse effects which may occur as a result of indiscriminate handling of such wastes.
Comments	This document provide basic information about the development and implementation of HCWM plans as well as HCW types, treatment and disposal methods, also thus defining duties and responsibilities of staffs for different categories of HCFs in Nigeria.

### 3.4 Review of Hospital Health Care Waste Regulations

The proper management of HCW depends to a large extent on strong HCFs administration and organisation. HCFs should have well organized HCWM procedures with clear HCWM rules. These resources must be made readily available as a written document to all personnel of the HCF. HCWM regulations for hospitals must demand that financial and material resources are made available so that HCWM procedures can be safely and routinely practiced. Nigeria now has a National Waste Management Plan. In addition, the National healthcare Waste Management Guidelines will serve as a guide in developing a project-specific Healthcare Waste Management Plan (HCWMP) for the BHCPFP.

### 3.5 Need for Regulation and Plan for Handling of Wastes from BHCPFP

Although a well-defined Environmental Assessment legal system (EIA Act, Cap EI2LFN2004) for safeguarding the environmental aspect of the project exists as well as the recently approved National Strategic Healthcare Waste Management Policy, including National Strategic Healthcare Waste Management Plan and Guideline for 2013 -2017 by the GoN, the operators, especially at facility levels do not seem to be aware of these hence inadequate health care waste management and thus poor implementation or utilization of the instruments.



## **CHAPTER FOUR: CURRENT STATE OF HEALTHCARE WASTE MANAGEMENT IN NIGERIA**

### **4.1 Definitions of Health Care Waste in Nigeria**

Hazardous healthcare waste is of primary concern, due to its potential to cause infections, 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.

**Healthcare Waste (HCW)** in Nigeria can be defined as “all waste generated by health-care establishments (human or veterinary), including research facilities and laboratories. It can include waste generated in the course of healthcare in homes.”

### **4.2 Medical Waste Composition**

The average distribution on types of medical waste for purposes of waste management planning is approximately as follows:

- 80% general domestic waste;
- 15% infectious and biological (or pathological) waste;
- 3% chemical or pharmaceutical waste;
- 1% sharps; and
- Less than 1% special waste, such as radioactive, cytotoxic, photographic wastes, pressurized containers, broken thermometers, used batteries, etc.

The quantity of these wastes generated varies greatly between the different categories and location of HCFs. Variations in the composition of waste raises serious issues at the local level which require different approaches with respect to necessary medical waste management procedures to be applied in order to achieve sustainability. The variations may be due to several factors among which are differences in HCF specialization, numbers of qualified health care personnel available, medical waste management practices prevailing as well as recycling and reuse.

### **4.3 Classification of Healthcare Waste in Nigeria**

The Nigeria Healthcare Waste Management Guideline 2013 categorises HCW in Nigeria into three broad streams/ classes. These are

- Non Hazardous and general waste
- Hazardous healthcare waste which is subdivided into 5 (Infectious waste, Pathological/ Anatomical Waste, Chemical wastes, Genotoxic, Mercury wastes)
- Highly Hazardous waste which is subdivided into 3 (Sharps, Highly infectious waste, Radioactive waste)

See Table 4.1 healthcare waste classification in Nigeria with examples



**Table 4.1: Healthcare Waste Categories, Examples and Classes**

S/N	CATEGORY OF WASTE	SUB CATEGORY OF WASTE TYPE	DESCRIPTION AND EXMAPLES	EXAMPLES OF WASTE	CLASS
A	<b>Non-hazardous and general wastes</b>		Waste that has not been contaminated with infectious materials or other hazardous materials.	Paper, cardboard, plastic, kitchen waste, ash, sawdust, pieces of wood segregated from hazardous waste	1
B	<b>Hazardous Healthcare Waste</b>	<b>Infectious waste</b>	Generated by both inpatients/out-patients or animals. It's likely to contain pathogenic micro-organisms and can be dangerous or infectious to both patients, health care workers and the public.	Laboratory waste, materials potentially infected blood, swabs, materials that have been in used in surgery or been in contact with patients	2
		<b>Pathological/ Anatomical Waste</b>	Amputations and other body tissues resulting from surgical operations, autopsy (post-mortem), or delivery. Requires special treatment for ethical and aesthetic reasons	Internal body organs, amputated limbs, placentas, foetus. Also includes urine and blood products	4
		<b>Chemical waste</b>	Wastes, including expired products, generated from the pharmacy, and from chemotherapy	Vials, connecting tubing, drugs, vaccines, pharmaceutical products, disinfection solutions, medicines, expired drugs, drugs, and vaccines	5
		<b>Pharmaceutical Waste</b>			
		<b>Genotoxic</b>			
<b>Mercury Waste</b>	Any mercury containing device	Wastes from mercury containing devices such as batteries, dental amalgam, thermometers, and blood-pressure gauges and fluorescent tubes	8		
C	<b>Highly Hazardous Healthcare Waste</b>	<b>Sharps</b>	These are sharp-edged wastes that can cause cuts or puncture wounds. They are highly hazardous whether or not they are contaminated with blood	Needles, syringes, surgical blades, scalpels, test tubes, ampoules, glass instruments, pipettes,	3
		<b>Highly Infectious Waste</b>	These highly infectious wastes required immediate treatment by chemical disinfectants or autoclaving before joining the hazardous HCW stream.	Sputum cultures of TB laboratories, contaminated blood clots and glassware, highly concentrated microbiological cultures carried out in medical analysis laboratories	6
		<b>Radioactive Waste</b>	Any solid, liquid, or pathological waste contaminated with radioactive isotopes of any kind	Radioactive papers, gloves, cotton swabs, needles (sharps), liquids, patient excretion, spent radiation sources radium needles.	7

#### 4.4 Current State of HCWM Practices in Nigeria

Major constraints with HCWM practices in Nigeria range from inadequate funding, availability of resources and inadequate infrastructure. There is also a low level of manpower training that currently exists for HCWM at all levels all across Nigeria.

In general, HCW is poorly managed in Nigeria. It is estimated that between 10% and 25% of healthcare waste generated by medical institutions are hazardous in nature. However, this is much higher in Nigeria due to the poor HCWM practices (poor segregation at source of generation, poor transportation mechanisms, poor storage). In a 2006 Medical Waste Management survey in sampled health institutions in the Federal Capital Territory (FCT), it was found that 26.5% of the healthcare waste to be hazardous. This figure is expected to be much higher in the states and local governments.

The study results also 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 dispose of their medical wastes into the Abuja municipal dumpsite. These health care 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 non-thermal waste disposal techniques such as autoclaving were not used for HCWM 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 levels. 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 sharps were found on the grounds of 65% of all healthcare facilities visited. Unsupervised open dumping was found in 22% of facilities.

An analysis of the current situation was conducted with respect to Medical Waste generation segregation, collection, transportation, and disposal. Medical wastes includes infectious wastes such as; swabs, syringes, blades, gloves are mostly mixed with municipal waste and disposed in open dumps where they are either burnt or left to decay.

Existing waste management facilities differ among hospitals, it consists mostly of:

- Incinerators built with primary and secondary burners, and in some cases, drum incinerators, which do not have air pollution abatement facilities;
- Autoclaving;
- Chemical disinfection
- Microwave irradiation
- Open ditches; sanitary landfills
- Pit latrines and soak-away;
- Transportation of medical waste to off-site disposal sites; and
- Use of public drainage for infectious liquid disposal.

In urban areas, unregulated practices by both public, private hospitals and private waste collectors has resulted in dumping of medical waste (infectious and sharps) at municipal dump sites. Scavenging at these disposal sites pose severe public health risks. Possibilities of infections are very high considering the fact that scavengers do not wear any form of personal protection.

#### **4.5 Healthcare Waste Management Constraints in Nigeria**

It is estimated that an average of 20% of the waste generated by medical institutions are hazardous in nature. Studies show there is also a large lack of training in management of HCW and HCWMP in practice was almost non-existent.

The major short comings in the current HCWM in Nigeria are

- Absence of HCWM plans in most medical institutions;
- Weak coordination of HCWM system at all levels;
- Poor/lack of segregation of healthcare waste at health facility levels;
- Deficient/non-existent HCW colour-coding and labelling system;
- Poor hygiene practices in collection, storage, transportation, treatment and final disposal of healthcare waste;
- Waste handlers lack Personal protective equipment (PPE);
- Indiscriminate dumping of healthcare waste into public dumpsites;
- Use of locally built low temperature incinerators without adequate protection to the environment;
- Healthcare solid wastes are either buried or burnt at low temperature in open pits;
- High risks of injury and infection to healthcare waste handlers and scavengers;
- Absence of post exposure prophylaxis (PEP) to those who sustain needle stick injury, with increased risk of HIV, HBV & HCV infections; and
- Lack of healthcare waste management information system.

#### 4.5.1 Responsibility for Medical Waste Management

Responsibilities for waste management are not well defined in most HCFs except in tertiary and secondary HCFs. Most institutions do not have Environmental Health Officers and have delegated this duty to administrative staff.

In tertiary and secondary HCFs, Medical Waste Management Committees should be constituted and should include:

- Chief Medical Officer;
- Head of Hospital Departments;
- Chief Pharmacists;
- Radiation Officer;
- Financial Controllers;
- Senior Nursing Officer/ Head Matron; and
- Hospital Administrator.

In Primary HCFs (Rural and Urban), Medical Waste Management Committees should be constituted and should include:

- Senior Nursing Officer/Matron
- Hospital Administrator
- Nurses

Employers have a number of legal responsibilities which include:

- developing and maintaining a safe work environment and safe work practices;
- ensuring that hospital activities complies to state and national environmental standards; and
- providing staff training and education for the safe handling of health care waste.

Employees also have responsibilities which include:

- complying with safety instructions and the use of safe work practices for their own protection and for the protection of other staff and the public;
- actively supporting environmental initiatives introduced by the waste management committee; and
- comply with the requirements for the handling of chemical substances according to Material Safety Data Sheets (MSDS).

#### **4.6 The HCWMP for BHCPFP and the National Health Care Waste Management Plan**

The HCWMP for the BHCPFP will operate within the confines of the National Health Care Waste Management Plan and seek ways and means that it will operationalize the action plan.

The current National Health Care Waste Management Plan (NHCWMP) identifies the indicators to be tracked, specific tasks to be executed and assigns responsibility for waste collection to specific agencies.

For the national plan to be effectively implemented, all HCFs in the country need to develop standardized plans based on their existing needs. Such plans should focus on treatment, recycling, transportation and disposal options through safe and cost effective treatment and disposal methods.

The most critical needs for the implementation of the national plan are funding and skilled/well-trained manpower. The critical issues identified during the study include the following:

- Poor medical waste management practices in HCFs and government disposal sites with regard to handling and disposal
- Lack of waste generation data
- Inadequate waste treatment and disposal equipment
- Inadequate knowledge among those involved in medical waste management
- Lack of awareness on medical waste among health workers and the general public
- Poor management practices at hospitals and dumpsites
- Lack of code of conduct and technical guidelines for safety measures

#### **4.7 Risks Associated with Healthcare Waste Generated in Nigeria**

Health care waste management is an integral part of hygiene and infection control within a health care facility and safe HCWM will help control infections and occupational hazards. All individuals exposed to HCW are potentially at risk of being injured or infected. These individuals include:

- Medical staff: doctors, nurses, pharmacists, laboratory scientists, etc;
- In- and out-patients and their visitors;
- Workers in support services such as laundries, waste handling, maintenance personnel, cleaning staff, and transportation staff;
- Workers in waste disposal facilities, including scavengers; and
- General public, including children playing with hazardous items that they find in the waste outside the health care facilities (HCF) when it is made accessible through improper HCWM.

The general public can be infected by HCW either directly or indirectly through several routes of contamination. Dumping HCW in open areas is a practice that can have major adverse effects on the population. Reuse of improperly disposed injection equipment is another route of infection by HCW. WHO estimates that over 20 million infections of hepatitis B, C and HIV occur yearly due to unsafe injection practices (reuse of syringes and needles in the absence of sterilization). Furthermore, there is a risk for public health as regards the sale of recovered drugs in the informal sector and the lack of controls.

The dumping of HCW in uncontrolled areas can have a direct environmental effect by contaminating soils and underground waters. During improper burning or incineration of HCW, air can also be polluted causing illnesses to the nearby populations. This has to be taken into consideration when choosing a treatment or a disposal method.

## CHAPTER FIVE: BASIC PRINCIPLES FOR GOOD SUSTAINABLE HEALTHCARE WASTE MANAGEMENT

*This Chapter focuses on the best practices as regards proper acceptable waste management practices. These basic principles are also outlined in the FMOH's National Healthcare Waste Management Guidelines 2013 and are discussed in brief in this chapter.*

### 5.1 Waste Minimization

The best practice here is to ensure that all units in each HCF minimize their waste generation (all classes of wastes) to the barest possible minimum. Appropriate plans, strategies and actions should be established to ensure adequate HCW minimization at source. Such strategies should be aimed towards

- Purchasing restrictions to ensure the selection of less wasteful materials;
- Encouraging the use of recyclable materials and products;
- Reducing unnecessary injections and encouraging use of oral alternatives, when appropriate;
- Ensuring good management and control practices especially in the purchase and use of pharmaceuticals; and
- Enforcing a rigorous and careful segregation of the HCW at source.

### 5.2 Waste Segregation

Proper segregation of waste at source generation (at each medical unit/department) is essential, efficient and effective in managing HCW. It helps in reducing the quantity of waste requiring treatment prior to final disposal and ultimately reduces the cost of waste treatment/management. Segregation involves putting different classes<sup>1</sup> of wastes into separate and appropriate temporary storage colour-coded containers/bags as recommended by the National HCWM Guidelines. In essence, waste segregation and waste color coding work hand in hand. For instance, sharps must be put into a separate containers (preferably sharp boxes) from other hazardous wastes as well as non-hazardous wastes. All waste should be fully inserted into the container with no part sticking out.

A homogenous segregation format must be practiced across all HCF in order to avoid mistakes during recording, collection, storage, transportation and onward treatment. See Fig 5.1 below

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<sup>1</sup> Non Hazardous Waste (Class 1), Infectious Waste (Class 2), Pathological/Anatomical Wastes (Class 4), Pharmaceutical Wastes (Class 5), Highly Infectious Wastes (Class 6), Radioactive Wastes (Class 7), Mercury Wastes (Class 8)

### 5.2.1 Segregation, Storage and Color Coding for Sharps

This sub section is paramount because for the BHCPFP, sharps (class 3) are expected to be the most generated HCW across all HCFs in the 3 participating States (Abia, Niger and Osun). It is essential to segregate sharps from other HCW at their point of generation. Important elements specific to the segregation of sharps include:

- Sharps boxes, should be used strictly for sharps. Where there is a difficulty in getting sharps boxes, the use of recycled cardboard boxes is acceptable if it is puncture resistant, securely in place, easy to insert sharps, contains sharps without risk of spillage, and is well labelled.
- No healthcare waste other than sharps should be deposited in sharps containers. When a disposable syringe is used, the packaging should be placed in the general waste bin and the used syringe in the sharps container.
- Syringes and needles must be discarded of immediately following use without needles being removed from syringe, recapped, bent or broken before disposal (except where the healthcare facility has appropriate needle cutters/removers in place).
- The whole combination must be inserted into the safety box directly after use. If removal of the needle is required, special care must be taken.

### 5.3 Colour Coding

Colour coding is done by using colours to differentiate waste classes from one other. It is efficient and helps in the process of waste segregation at source. It is also simple, easy to use and thus can be understood even by illiterate patients particularly at rural PHCs where illiteracy level is high. Color coding is one of the efficient ways of achieving segregation of waste and for sorting out items such as paper, plastic, glass and metal for recycling.

It is important that all HCF in Nigeria use the same colour coding scheme as this helps to minimize and avoid a waste class from mixing with other waste classes. This is also advocated in the Nigeria National Healthcare Wastes Management Guidelines document.

The recommended color codes for PHCs and SHC are shown in Tables 5.1 and 5.2 respectively.

As expected, there will be a wider range of waste classes generated at secondary and tertiary healthcare facilities when compared to primary healthcare facilities. Thus is expected that the use of a broader colour scheme be applied at the former when compared to the latter. For the sake of uniformity and homogenous colour coding for SHC must be an expanded version from that used in the PHCs.



**Table 5.1: Color Coding For Primary Healthcare Facilities**

COLOUR	WASTE DESCRIPTION - WASTE CLASS		EXAMPLES
<b>Black</b>	Non-hazardous waste	Non-hazardous general waste - Class 1	paper, ash, cardboard
<b>Yellow</b>	Hazardous Wastes:	Infectious waste -Class 2	Laboratory waste, materials potentially infected blood, swabs
		Highly infectious wastes - Class 6	Cultures of TB laboratories, contaminated blood clots and glassware
		Sharps - Class 3	Syringes with needles, blades

**Table 5.2: Color Coding For Secondary Healthcare Facilities**

COLOUR	WASTE DESCRIPTION - WASTE CLASS		EXAMPLES
<b>BLACK</b>	Non-hazardous waste	Non-hazardous general waste - Class 1	paper, ash, cardboard
<b>YELLOW</b>	Hazardous Wastes	Infectious waste -Class 2	Laboratory waste, materials potentially infected blood, swabs
		Sharps - Class 3	Syringes with needles, blades
<b>RED</b>	Hazardous Wastes	Highly infectious wastes and pathological waste Class 4 and 6	Cultures of TB laboratories, contaminated blood clots and glassware
<b>BROWN</b>	Hazardous Wastes	Chemical, Pharmaceutical Waste - Class 5	Vials, connecting tubing, drugs, vaccines, pharmaceutical products, disinfection solutions

### 5.3.1 Labelling

An important aspect of color coding is labelling. This particularly helps in rare cases where the same color bags are not available to be used alongside the waste collectors/containers.



All waste bags or containers should be labelled with basic information in English and the local language of the area where the HCF is located. Basic label information should include type of waste in the container; name of the ward/facility, date of collection and, warning of hazardous nature. See Table 5.3 for Labelling tags advocated by the National Healthcare Waste Management Guidelines.



Fig 5.1 Recommended Segregation by Color Codes (In accordance with NHCWMP)

Table 5.3 Recommended Labelling for HCW

CLASS	LABELLING	INTERNATIONAL SYMBOLS
2	« Danger! Hazardous infectious waste »	
3	« Danger! Contaminated sharps, do not open »	
4	« Danger! Anatomical waste, to be incinerated or deeply buried »	
5	« Danger! To be discarded by authorized staff only »	

<b>6</b>	« Danger! Highly infectious waste, to be pre-treated »	
<b>7</b>	« Danger! Radioactive waste »	

*Courtesy: Draft National Healthcare Waste Management Guidelines for Nigeria*

It is important for all appropriate boxes/bags (all recommended colors) to the healthcare facilities, and these must be available at the points of wastes generation.

#### 5.4 Healthcare Waste Collection

Collection of waste is extremely important particularly to avoid over spilling of waste out of collection containers. Collection must be done promptly and routinely or as often as required. This will reduce the probability of contaminated wastes coming into contact with the public. Collection of waste must be done by approved and trained personnel fully equipped with appropriate PPEs and conveying machinery such as trollies and carts.

Medical staff must be actively involved in collection of waste as should the waste handlers. They should ensure that their containers/bags (Bins/boxes and collection receptacles) are never more than three-quarter full before sealing them at their points of generation. They should also ensure that such collection containers are appropriately labelled.

The following should be adhered to when collecting waste

- A supply of fresh collection bags or containers should be readily available at all locations where waste is produced.
- Containers should be leak-proof and puncture resistant to avoid spillages
- Collection must be done routinely on a daily bases;
- Collection containers should be placed on leak-proof surfaces and in secured locations;
- Collection containers should never be allowed to overflow. This requires prompt and frequent collection;
- Collection containers should be tightly sealed once three-quarters full by tying the neck or sealing tag. Bags should not be closed by stapling;
- Regulations and supervisory arrangements must be set in-place to ensure that personnel utilize PPE when on duty.
- Waste collected must be moved directly to the central temporary storage area;
- Clearly labelled (both in English and the local language) with the name of each waste class. Labelling should include the type of waste in the container, name of the ward/facility, date of collection and warning of hazardous nature;

- Only containers and bags properly labelled should be collected from their points of generation;
- Collection containers must be replaced immediately after collection;
- All waste handlers should wear PPE at all times while on duty; and
- Collection trollies and carts should be designed to prevent and accommodate any form of spillages. They must also be easy to convey and clean.
- Sealed sharps containers should be placed in a labelled, yellow infectious health-care waste bag before removal from the hospital ward or department.
- Water and hand-wash materials must be readily available for healthcare waste handlers to wash their hands after handling HCW.

## 5.5 Waste Storage

Storage refers to the time lapse of the entire process from time of waste generation to the point of collection for final disposal. Consideration for storage must be based on the classification or class of waste being dealt with and the potential risk of infection to health-care workers, waste disposal staff, and the public.

The following rules should be observed for proper storage of HCW in Nigeria

- Initial packaging and storage should take place where HCW is generated.
- Storage of waste may then be moved to a temporary on-site storage location
- Non-risk HCW should always be stored in a separate location from the infectious/hazardous HCW in order to avoid cross-contamination

Every HCF must designate an area within its premises where waste can be temporarily stored until final collection for disposal and onward treatment. It is expected that each HCF must manage the HCW it generates. Such a general storage location should be located at the back of the facility and away from the view of the public. The following characteristics are recommended storage locations that deal with infectious and hazardous waste

- Their grounds should be hard, impermeable and with good drainage;
- They should be easy to clean and disinfect with easy access for waste handlers;
- They should be inaccessible to unauthorized persons;
- They should have easy access for waste-collection vehicles;
- They should be protected from the sun and inaccessible for animals, insects, and rodents;
- They should have good lighting and good ventilation; and
- They should not be in close proximity to fresh food stores or food preparation areas.
- For storage periods more than 24 hours, temperature must not exceed +10 degrees Celsius. (The storage of biological waste might require much lower temperatures);
- Convenient to a supply of cleaning equipment, protective clothing, and waste bags or containers.

- Provide secured storage with adequate chambers for infectious, non - infectious, and food waste

However in addition to these, it is also important to educate patients who patronise HCF on how to dispose of certain personal wastes. Patients should be encouraged to dispose of their waste in appropriate manners. For instance, when blood samples are taken, cotton wool is usually given to the patient to cover the puncture. Such cotton wool could be contaminated and it is important such a waste is disposed for properly. In this case, it should be disposed of in a yellow bag rather than in a black bag.

## 5.6 Transportation

This involves the conveying of waste from the point of generation to point of treatment or disposal. Transportation of HCW can be divided into two

- (a) **Transportation to On Site Storage Location:** This involves conveying of wastes from the various points of generation within a HCF to a temporary storage location also within the same HCF.
- (b) **Transportation to Off-Site Disposal/Treatment Location:** This involves conveying wastes both from the temporary on-site location within the HCF and a treatment facility (such as an incinerator) to an off-site location for final disposal.

The following should be adhered to when carrying out *On Site transportation*

- Every effort should be made to avoid unnecessary handling of HCW;
- All waste bags should in-place and intact at the end of transportation;
- Carts, containers, or vehicles used for the transportation of health-care waste should not be used for the transportation of any other material;
- Waste that has the potential to leak must be double bagged;
- Waste bags should be placed in containers (e.g. cardboard boxes or wheeled, rigid, lidded plastic or galvanized bins), before being placed directly into the transportation vehicle

For off-site transportation, the following should be adhered to

- Vehicles must be easily cleaned and have no sharp edges to damage waste containers.
- Vehicles should be kept locked at all times, except when loading or unloading;
- When transporting hazardous waste, vehicles and containers must be cleaned and disinfected daily with an appropriate disinfectant;
- any vehicle used to transport health care waste should fulfil the following design criteria:
  - Suitable size for the amount of waste;
  - designed such that the load is retained even if the vehicle is involved in a collision;

- include a system for securing the load during transport;
  - possess a separate compartment in the vehicle for spare plastic bags, suitable protective clothing, cleaning equipment, tools, disinfectant, and “spill,” and,
  - Must be easily cleanable and have no sharp edges to damage waste containers.
- Provide securely designed transport vessel for off-site transport

## **5.7 Determining the Most Appropriate Treatment Technique and Disposal Site for the Facility’s Waste**

Safe and affordable options for treatment and disposal are not always available/possible for every situation in Nigeria. Decisions regarding treatment technology should be made at hospital level; however, responsible personnel for health care waste management in the hospital should be in close contact with the regulatory/supervisory authority. However, the treatment options chosen should be based on several criteria including

- Disinfection efficiency;
- Health and environmental considerations;
- Volume and mass reduction;
- Occupational health and safety considerations;
- Quantity of wastes for treatment and disposal capacity of the system;
- Types of waste for treatment and disposal;
- Infrastructure requirements;
- Locally available treatment options and technologies;
- Operation and maintenance considerations;
- Available space;
- Location and surroundings of the treatment site and disposal facility;
- Investment and operating cost;
- Public acceptability;
- Regulatory requirements; and
- Risk of toxic emissions.

See Annex 1 for generic and ideal treatment options

## **5.8 Current Waste Treatment Options in Nigeria by Waste Class**

These treatment options are based on the prevailing health systems in Nigeria as revealed in the National Healthcare Waste Management Guideline (NHCWMG). In Nigeria, burning in low-cost incinerators or burying HCW in specialized pits is for the present moment probably the most affordable and acceptable options for smaller health care facilities. However, this option is not satisfactory environmentally, and should only be considered a short-term solution to HCW treatment.

**Non Hazardous Waste (Class 1):** These should be separated from other HCW and disposed of along with other MSW.

**Infectious Waste (Class 2):** These wastes should be burnt and buried in protected pits and fenced to prevent public access. See Annex 3

**Sharps (Class 3):** These waste should first be incinerated before being landfilled. In the alternative, they can be encapsulated and then landfilled. See Annex 4 for other options.

**Pathological/Anatomical Wastes (Class 4):** Anatomical wastes such as placentas can be buried at depths of over 1 metre inside the PHC. For pathological waste these should be preferably transported to central treatment centre as these wastes must not be burnt under low temperature.

**Pharmaceutical Wastes (Class 5):** These should be burnt in temperature around and exceeding 1200°C. If the PHC can afford to build a Cement Kilns, then they can be treated at the PHC, if not, these should be transported to a central treatment centre. These should never be disposed of in sewers or landfilled without appropriate treatment.

**Highly Infectious Wastes (Class 6):** These wastes should be treated in a concentrated solution of Sodium Hypochlorite (NaClO) before being disposed with other wastes.

**Radioactive Wastes (Class 7):** These wastes can be stored in designated rooms cordoned off from access and allowed to decay to background level. Once at background level, the non-infectious radioactive wastes can then be treated the same way as Class 1 HCW while the infectious radioactive waste should be treated the same way as Class 2 HCW.

**Mercury Wastes (Class 8):** This should be treated as a specialised kind of waste and should be collected and stored in a tin container at room temperature and transported to where it will be treated in an environmentally sound manner.

## 5.9 Resource Requirements for the Implementation of the HCWMP

It is important that appropriate colour-coded refuse bags & bins (Black, yellow and red for the primary healthcare facilities) and (black, yellow, brown and red for the General Hospitals. Also important is the provision of PPE for waste handlers. Tables 5.3 shows resource requirement for implementing the HCWMP for the BHCPFP

**Table 5.4: Annual resource requirements for the Implementation of the HCWMP for BHCPPF**

<b>S/N</b>	<b>ACTIVITY</b>	<b>HUMAN RESOURCES</b>	<b>INSTITUTION RESPONSIBLE</b>	<b>COSTS (USD)</b>	<b>COST (NAIRA)</b>
1	Provision of appropriate collection, storage and segregation containers at all medical facilities	Waste management and procurement specialist	NPHCDA, SPHCDA	3,000	1,500,000
2	Procurement of medical waste treatment utilities in hospitals such as disinfectants etc	procurement and financial management specialists	NPHCDA, SPHCDA,	3,000	900,000
3	Assist with design and construction of pilot environmentally sound HCW Disposal Pits in selected HCFs	Consultant / Contractor	NPHCDA; SPHCDA;	1,000	300,000
4	Supply/provision of PPEs for HCFs (coveralls, goggles, nose guards, gloves, face masks, fixtures e.t.c)	Contractor	NPHCDA, SPHCDA	3,000	900,000
<b>TOTAL</b>				<b>10,000</b>	<b>3,000,000</b>



## CHAPTER SEVEN: MONITORING AND EVALUATION

Monitoring is required to follow-up on decisions made to intervene in various activities of health care waste management in order to protect human health as well as the environment. This can be achieved through periodic internal and external processes of monitoring and evaluation on a continuous basis, at all institutional levels. In this way management will be able to assess compliance with regulatory requirements at national, state and local levels.

Thus ensure that objectives of the HCWMP for BHCPFP are achieved, the implementation of the plan has to be monitored by both internal and external bodies including the Federal and State Ministries of Health and Environment as well as the NPHCDA. These MDAs will determine their respective monitoring tools and will work jointly within the monitoring and evaluation mechanism of the proposed project.

### 7.1 Monitoring and Evaluation Objectives

The aim of the M&E is to establish suitable criteria for addressing potential negative impacts of HCW and to ensure that unforeseen impacts are detected and subsequently adequate mitigation measures are implemented at an early stage. Specific objectives of the monitoring plan are to:

- Ensure that any additional impacts are addressed appropriately;
- Check the effectiveness of recommended action plans and mitigation measures;
- Ensure that the proposed mitigation measures are appropriate;
- Demonstrate that health care waste management is being implemented according to plan and existing regulatory procedures; and
- Provide feedback to implementing agencies in order to make modifications to the operational activities where necessary.

### 7.2 Monitoring Indicators

The monitoring of environmental effects is necessary to ensure that predicted impacts are addressed effectively and efficiently through the mitigation measures indicated. Specific monitoring indicators for consideration include the following:

#### **Internal Packaging and Storage**

- Separation of waste (at point of generation)
- Storage bins / bags
- Frequency of removal

### **External Packaging and Storage**

- Segregation of waste
- Storage area
- Frequency of waste removal
- Amount of waste generated per day

### **Transportation**

- Identification of waste management contractor (accredited or certified)
- Conditions for transportation
- Equipment/vehicles (to prevent scattering, spillage, odour nuisance and leakage).

### **Treatment and Disposal**

- Incineration
- Sterilisation by Heat
- Disinfection by steam
- Chemical disinfection
- Sanitary Landfill

### **Administration**

- Establishment / functioning of a Waste Management Committee
- Availability of waste management plans
- Collection and Analysis of data

## **7.3 Monitoring Plan**

An effective control of HCW and monitoring of facilities should be carried out regularly, in order to maintain and improve management of the waste. Measures should be adopted to ensure that problems and risks involved are identified while enhancing safety and preventing the development of future problems.

Compliance and enforcement with legislation shall be ensured through co-coordinating and regulatory bodies. These bodies should include FMEEnv, SEPAs, NPHCDA, and SPHCDA. They shall undertake regular monitoring of these facilities, with the aim of establishing long-term sustainability in HCWM.

The bodies shall ensure compliance with the following:

- Segregation i.e. sharps, pathological, hazardous and radioactive waste from other waste. Picture stickers shall be used in rural areas for identification;
- Storage into appropriate, labelled and adequate containers for both internal and external storage;

- Collection routines including packaging and labelling;
- On-site treatment procedures like sterilisation, disinfection and incineration. It should be ensured that the incinerator plant continually burns its materials at a temperature of not less than 1200°C to eliminate the release of dioxins;
- Transportation i.e. needs and conditions including certification;
- Worker safety measures; and
- Appropriate disposal techniques and approved disposal sites.

To ensure effective record keeping, each health institutions shall keep records on:

- The type and volume or weight of health care waste generated;
- The means of transportation, type and volume transported;
- Commissioned waste contractor (company name, type of license; and
- Disposal method(s) - volume incinerated, volume treated and disposed.

See Annex 5 for Sample of record keeping form

**Table 7.1 Summary of monitoring plan with indicative costs**

S/N	WHAT IS BEING MONITORED	WHY	WHEN	HOW	INSTITUTION RESPONSIBLE	COST (USD)	COST (NAIRA)
1	HCWM Monitoring and evaluation program	To check effectiveness and compliance	Quarterly	Verification of monitoring and evaluation program reports	NPHCDA/SPH CDA/LGAs World Bank	500	150,000
2	HCWMP implementation i) Trainings ii) Use of SOPs iii) Transport and Disposal iv) Treatment of HCW	To verify if HCWMP is being implemented, and to check implementation on progress.	Bi-annual	Organized supervisory missions; stakeholder conference meetings	NPHCDA/SPH CDA, /LGAs World Bank, contractors and consultants.	1500	450,000
3	Compliance to World Bank Environmental Safeguards	To establish that triggered safeguard(s) is being complied with	During and after the commencement of civil works	Environmental Safeguards Audit	World Bank, ESIA consultant	1,000	300,000
4	Social accountability and community perceptions	To ascertain social accountability	Quarterly	Organized supervisory missions	World Bank, Consultant	1,000	300,000
<b>Total</b>						<b>4,000</b>	<b>1,200,000</b>

## CHAPTER EIGHT: INSTITUTIONAL RESPONSIBILITY AND CAPACITY BUILDING

### 8.1 Institutional Responsibility

Implementation arrangements for BHCPFP will be fully streamlined into the existing government structure at the Federal, State and Local Government levels. Additional technical assistance and coordination support will be provided through the project to strengthen implementation. Implementation arrangements for BHCPF involve:

- (iv) The Project Steering Committee (PSC) responsible for overall coordination of WB funded projects at the FMOH and its agencies;
- (v) The Secretariat [The Secretariat of the National Steering Committee]
- (vi) Coordination and implementation offices at the state level; and
- (vii) Implementation at the facility.
- (viii)

Across all these, significant coordination with line ministries and civil society will be included.

***The Secretariat of the National Steering Committee:*** The Secretariat is a statutory body set up in line with the approved BHCPF guidelines. Secretariat will serve as the PMU and oversee the day to day running of the BHCPF operations and coordinates the activities of the two gateways involved in the proposed Project. It reports to the PSC. Its role can be broadly divided into five areas: (i) execution of contract with participating states through a global agreement (ii) engagement of services of IVAs to carry out independent verification of payments quality of care and to organize the quantity verification after payment.; (iii) oversight and guidance on the implementation of BHCPF management guidelines, development of protocols, manuals and service delivery guidelines and their adjustment as needed based upon implementation experience, (iv) management of the information technology (IT) base for the project, and (v) operations research and impact evaluation. This will include annual work plans, budget, training plans, procurement plans, M&E, grievances, technical support to States, and stakeholder engagement, etc.

The Secretariat will be led by a project coordinator. He/she will be responsible for the project management specifically linked to administration of the BHCPF in conjunction with the representatives of the NPHCDA & NHIS. The project coordinator will be supported by a small team of officers on a full-time basis, which will include a procurement officer, project accountant, auditor, program officer, M&E/MIS officers, ICT specialist, communication specialist, social & environmental safeguards officer, gender and grievance officer. Short-term technical assistants will also provide necessary expertise as and when required.

***State Steering Committee (SSC):*** At the state level, the State Steering Committee (SSC) shall provide oversight over the activities of SPHCDA and SSHIAs. Matters arising out of the implementation of the BHCPF at the state level, including the counterpart contribution shall be discussed at SSC. Serious implementation issues shall be escalated to the Secretariat. Also, state Project Financial Management Units (PMFU), who are staff of the Offices of the States Accountants General's office (OSAG) shall be responsible for

managing the disbursement of funds to healthcare providers through the REMITA system. After reviewing support for transfer of funds for the NPHCDA gateway, and the validation of claims for NHIS gateways, the SPHCDA, SSHIAs shall submit their support for the transfer request to the PFMU for review and disbursement. The PMFU shall reject the transfer request if sufficient documentation and justification is not provided.

***The Roles of Federal and State Governments:*** Although the project has been designed as a Federal one, without state buy-in and strong support, BHCPF will not succeed. The Federal Government will enter into an MoU with all participating States, laying out the roles and responsibilities of both entities. The project design recognizes the potential financial constraints States will face in co-financing the implementation of the BHCPF, and therefore does not require cash co-financing by States. The minimum conditions for State participation will include:

- (i) Establishment of a SSHIS and SPHCDA with the agreed staffing;
  - (ii) Staffing of public PHCs receiving operational expenses under the NPHCDA as per guidelines;
  - (iii) Agreement to verification protocol & use of SPFMU and
  - (iv) MoU with Federal Government signed.
- Activities (i) and (iii) can be supported by the Secretariat once the MoU is

## 8.2 Training Needs Assessment

Correct attitudes for effective health care waste management result from knowledge and awareness regarding the potential risk of health-care and administrative procedures for handling the waste. Apart from a general understanding of the requirements of HCWM, each category of personnel (doctors, nurses, ward attendants, cleaners, administrative staff, waste transporters, dumpsites, hospitals etc.) needs to be trained. For the training to be successful and to lead to the desired objective, participants must become aware of the risks linked to medical waste management.

The principal groups involved in waste generation and management are:

- Primary group: (i) management and administrative staff; (ii) medical and laboratory staff; (iii) ward attendants, caretakers, ground workers and other support staff; and
- Secondary group: patients, visitors, scavengers and the local communities, waste collectors/transporters, disposal site operators etc.

## 8.3 Training Targets

The training needs identified based on interview of the categories of actors involved are presented below:

- State and Local Immunization Officers

- Management & administrative staff;
- Medical laboratory staff;
- Ward attendants, caretakers, ground workers and other support staff;
- Patients and visitor and scavenger<sup>2</sup>;
- Waste management facility operator;
- Waste collection and transportation staff;
- Treatment system operators; and
- Disposal managers

Table 8.1 below highlight suggested training courses needed for effective implementation and monitoring of a HCWMP

The training plan shall be structured around the following principles:

- Train-the-trainers: this involves training the senior Public Health Officers at the states who in turn will roll out training courses in their states.
- Training health-care staffs: already trained senior Public Health Officers will train other HCFs staff. These training sessions will be held in each local government area (LGA);and
- Training medical waste management supporting staffs in health centers (Cleaners, transporters, incinerator operators and waste handlers. These training sessions will be held in every healthcare facility and will be conducted by already trained hospital staff. Table 8.1 shows training and schedule for staff and support staff of HCFs.

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<sup>2</sup> Informal waste pickers is a person who collects either from the streets, dump sites or landfills, re-usable and recyclable material to sell or for personal consumption and to make personal income

**Table 8.1: Trainings and Schedule for Staff and Support Staff of HCF**

CAPACITY NEEDS	TOPIC AND CONTENTS	TARGET PARTICIPANT	DURATION	RESOURCE PERSON	ESTIMATED COST (USD)
Basic knowledge about medical waste	<ul style="list-style-type: none"> <li>▪ Waste categories;</li> <li>▪ Public relation and interaction with local community.</li> <li>▪ Hazardous potential of certain waste categories;</li> <li>▪ Transmission of hospital acquired infection; and</li> <li>▪ Health risk for health care personnel.</li> </ul>	All categories of persons listed under Section 8.2	1 day	NPHCDA and partners and HCWM consultant	500
Proper behaviour of waste generators	<ul style="list-style-type: none"> <li>▪ Environmentally sound handling of residues;</li> <li>▪ Waste avoidance and reduction possibilities;</li> <li>▪ Identification of waste categories;</li> <li>▪ Separation of waste categories; and</li> <li>▪ Knowledge about appropriate waste containers.</li> </ul>	All categories of persons listed under Section 8.2	1 day	NPHCDA and partners and HCWM consultant	500
Proper handling of healthcare waste	<ul style="list-style-type: none"> <li>▪ Adequate waste removal frequency;</li> <li>▪ Safe transport containers and procedures;</li> <li>▪ Recycling and re-use of waste components;</li> <li>▪ Safe storage of wastes;</li> <li>▪ Handling of infectious laundry;</li> <li>▪ Handling of chemical and radioactive waste, outdated drugs;</li> <li>▪ Safety regulation in waste management, protective clothing;</li> <li>▪ Emergency regulation in waste management.</li> </ul>	All categories of persons listed under Section 8.2	1 day	NPHCDA and partners and HCWM consultant	500
Establishing a healthcare waste management plan and system	<ul style="list-style-type: none"> <li>▪ Establishment and implementation of a waste management plan;</li> <li>▪ Sampling of waste quantities, monitoring, and data collection;</li> <li>▪ Monitoring and supervision of waste management practices;</li> <li>▪ Cost monitoring of waste management;</li> <li>▪ Establishment of a chain of responsibilities;</li> <li>▪ Set-up of occupational safety and emergency regulations;</li> <li>▪ Interaction with city assemblies or private sector waste handling structures.</li> </ul>	All categories of persons listed under Section 8.2 excluding Patients and visitor;	1 day	NPHCDA and partners and HCWM consultant	500
Establishing a healthcare waste maintenance plan	<ul style="list-style-type: none"> <li>▪ Cleaning and maintaining of collection, transportation and storage facilities;</li> <li>▪ Maintenance and operation of incinerator for infectious wastes;</li> <li>▪ Maintenance of septic tanks and other sewage treatment facilities; and</li> <li>▪ Maintenance and operation of waste pits</li> </ul>	Management & administrative staff, waste management facility operator, waste collection and transportation staff, treatment system operators and disposal managers	1 day	NPHCDA and partners and HCWM consultant	500
				<b>Total</b>	<b>2,500</b>

## CHAPTER NINE: PUBLIC AWARENESS AND CONSULTATION

At Federal level, the National Primary Healthcare Development Agency (NPHCDA) is responsible for coordination of basic primary healthcare services and while at the State level, similar responsibilities lies with the State Primary Healthcare Development Agency (SPHCDA). Therefore, the SPHCDA of the three participating states will have the responsibilities of engaging stakeholders in the sector within their various states.

The scope of this Public Awareness Plan includes every State of the proposed project where the plan will be implemented. It describes the avenues that will be used to convey the plan implementation information to the public.

### 9.1 Objectives

This public awareness/consultation plan provides a framework for achieving effective stakeholder involvement and promoting greater awareness and understanding of issues so that the plan can be effectively implemented on-time to the satisfaction of all concerned.

To ensure effective implementation of this plan, the NPHCDA/SPHCDA shall be committed to the following principles:

- Promoting transparency and easy communication;
- Ensuring effective stakeholder involvement in the development of the project;
- Increasing public knowledge and understanding of the project implementation process;
- Using all strategies and techniques which provide appropriate, timely and adequate opportunities for all concerned parties to participate; and
- Evaluating the effectiveness of the engagement plan in accordance with the expected outcomes.

### 9.2 Potential Stakeholders

The potential stakeholders in the implementation of this plan include the following:

- Patients and visitors;
- Government Agencies e.g. Federal and State Ministries of Health, Environment and Information;
- National and State Primary Health Care Development Agency;
- Medical and Paramedical Professionals;
- Educational Institutions e.g. Medical Schools, Teaching Hospitals;



- Planning Authorities e.g. Town Planning;
- Federal and State Waste Management Authorities; and
- Other Regulatory bodies e.g. Nigerian Medical Association etc.

### 9.3 Consultation Strategies

The focus of this public involvement program/plan is to inform the public and invite input relating to the plan and its implementation. As elements of the plan proceed from planning into execution, the NPHCDA objective will be to maintain the public awareness and understanding of the plan. The implementing agencies shall execute a program comprising seven strategic elements to accomplish the public awareness objective. A comprehensive public awareness program will include the following:

- Develop and distribute a project newsletter;
- Develop presentations and organize seminars and workshops;
- Develop and maintain a project web site;
- Develop radio and television adverts;
- Establish and maintain a project telephone information line;
- Prepare project press releases; and
- Prepare posters and erect billboards.

The objective of the public awareness program is to convey information to the public and interested groups. By utilizing a multi-faceted approach to convey information, the success of the effort is optimized. The Public Awareness Plan describes the general approach and benefits from each element of the program.

#### - ***Newsletters***

Newsletters will be written in all major Nigerian languages to include project progress and information, calendars of events, telephone numbers, and information about the web site, location maps, and photographs of ongoing efforts. The newsletters will be printed and distributed quarterly throughout the implementation period. Newsletters differ from press releases in that a newsletter will have a smaller audience, greater depth of reporting, and more issues presented than a press release. Each newsletter will explain how to provide input into the plan. Newsletter shall be distributed through the 36 states and the federal capital in hospitals and other HCFs.

Newsletter distribution points will be identified on the project Web site, and via press releases distributed to the local media. Although the primary method of distribution will be at established distribution points, newsletters will be mailed out upon specific request.

### - **Seminars and Workshops**

Seminars and workshops will offer the public an opportunity to listen to the experts on different aspects of the plan. These meetings will be broadcasted on local television and radio stations. This will offer the public a convenient opportunity to take advantage of this information.

Newsletters, website, and press releases will advertise the schedule of seminars and workshops. Workshops shall be conducted annually throughout the period of the plan implementation. Other presentations will also be made throughout the plan implementation period on as need basis but will be limited to a reasonable number.

### - **Radio and Television Adverts**

Radio jingles and TV adverts/announcements shall be developed and aired in all the states of the federation in all major languages. Pertinent information will be offered at intervals to maintain viewers' interest on the topic. Two radio jingles and two TV announcements shall be broadcasted in English and the major languages every month, totaling 48 radio and TV messages in major languages per annum.

### - **Posters and Billboards**

Posters and billboards shall be pasted and installed in strategic places to make them accessible to the general public. The public awareness plan would be effective since several medium would be used as part of a coordinated program. Although some strategies may be more effective than other elements, combining several techniques and different media in conveying plan/project information to the public would create an optimal approach.

## 9.4 Stakeholder Consultation and issues raised

**Table 9.1 Outcome of Stakeholders Consultation**

ITEMS	DESCRIPTION
<b>Date Of Public Consultation</b>	10 January 2018
<b>Name Of Stakeholder</b>	FMoH and NPHCDA
<b>Venue</b>	Federal Ministry of Health, Abuja FCT
<b>Language Of Communication</b>	English
<b>Concerns/Complaints</b>	There was a little concern over the anticipated increase in waste generation as a result of increased patronage to the various health care facilities.
<b>Remarks/Recommendations</b>	<p><b>FMoH</b></p> <ul style="list-style-type: none"> <li>▪ It was suggested that the project consider a waste management plan for the purpose of dealing with health care wastes.</li> <li>▪ They advocated for team work and cohesion across the entire</li> </ul>

	<p>project and the 3 States</p> <p><b>NPHCDA</b></p> <ul style="list-style-type: none"> <li>▪ There was concern raised over the anticipated increase in waste generation and highlighted the trickling down effect of the project to bring about secondary services and employment.</li> <li>▪ He went on to advocate for a HCWMP for the project and suggested that the HCWMP used for NSHIP be adopted.</li> <li>▪ They suggested that a waste management committee be set up at the various SPHCDA's who will help monitor the HCWMP in the state</li> </ul>
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**Table 9.2 Outcome of Stakeholders Consultation**

ITEMS	DESCRIPTION
<b>Date Of Public Consultation</b>	18 January 2018
<b>Name Of Stakeholder</b>	NPHCDA, NHIS, SPHCDA's, SSHIA's
<b>Venue</b>	State Ministry of Health, Abia State
<b>Language Of Communication</b>	English
<b>Concerns/Complaints</b>	<p>The major concerns from the three participating states include:</p> <ul style="list-style-type: none"> <li>▪ Solid Waste and Health care waste management</li> <li>▪ Poor Water supply</li> <li>▪ Poor electricity</li> </ul>
<b>Remarks/Recommendations</b>	<ul style="list-style-type: none"> <li>▪ The Abia State Commissioner of Health Dr John Ahukannah thanked the consultant for his presentation and emphasized issues surrounding waste in the State</li> <li>▪ The Special adviser on health Hon. Dr Ikechukwu Nwabeize highlighted their concerns for health care waste management. He enlightened us about the current waste management in Abia State which is unsatisfactory</li> <li>▪ Dr Ahukannah revealed that health care waste associated with measles was also a problem in the States.</li> <li>▪ All the States present revealed they were struggling with dealing with the management of hazardous health care waste</li> <li>▪ Dr Okoro expressed concerns about the hazardous wastes such as sharps being disposed off near such wells</li> </ul>

## REFERENCES

- Environmental Assessment Sourcebook. Volume II: Sectoral Guidelines. World Bank Technical Paper No 140, Environmental Department, The World Bank. Washington, DC.
- Federal Government of Nigeria (2013), National Healthcare Waste Management Guideline
- Federal Government of Nigeria (2013), National Healthcare Waste Management Plan
- Federal Government of Nigeria (2013), National Healthcare Waste Management Policy
- Health-Care Waste Management: Rapid Assessment Tool for Country Level - World Health Organization, 2005.
- Pruss, A, E. Giroult, P. Rushbrook, editors (1999), Safe management of wastes from healthcare activities, WHO, Geneva, Switzerland.
- Suggested Guiding Principles and Practices for The Sound Management of Hazardous Hospital Wastes, World Health Organization, 1999.
- Vergara, W. and Niels, K.V. *Hazardous Waste Management Programs for Developing Countries: Prerequisites for Implementation.*
- World Bank Technical Guidance Note (1999). *Municipal Solid Waste Incineration.*
- World Health Organization (WHO) (2011), Health-care waste management Rapid Assessment Tool[online] Available at <tool[http://www.who.int/water\\_sanitation\\_health/medicalwaste/hcwmtool/en/](http://www.who.int/water_sanitation_health/medicalwaste/hcwmtool/en/)>
- World Health Organization (WHO), “Wastes from Healthcare Activities”, Fact Sheet No. 253, October 2000

## APPENDIX 1: GENERAL HEALTHCARE WASTE TREATMENT OPTIONS

### e) **HCW Waste Treatment**

Proper treatment and disposal of healthcare waste is necessary to ensure that its impact on the environment and human health is minimized or eliminated. Unfortunately, environmental-friendly, safe and affordable options for treatment and disposal are not readily available for every situation in Nigeria.

The first step in HCWM is to ensure that all non-risk (general) waste is safely sent to the municipal waste management system. The remaining fraction of hazardous and highly hazardous health care waste should be treated and disposed appropriately to meet the following objectives:

- destruction of viable infectious organisms
- destruction/transformation of used or expired pharmaceuticals and chemicals
- destruction of sharps and other materials capable of causing physical injuries
- decomposition of radioactive waste materials
- final disposal / destruction of body parts, tissues, blood and other organic material
- avoidance or minimisation of secondary impacts from the disposal system

Decisions regarding treatment technology should be made at hospital level; however responsible personnel for waste management in the hospital should be in close contact with the regulatory/supervisory authority.

- All non-hazardous HCW not designated for recycling should be collected and managed with the general *municipal waste*.
- Burning in low temperature incinerators, preferably a well designed, constructed and managed- **Montfort Waste Disposal Unit (DWDU)** –is satisfactory whenever this can be made available for a primary health centre and even for some secondary healthcare facilities. However, this option is not satisfactory environmentally, and should only be considered a short-term solution to HCW treatment.



**A De-Montfort Waste Disposal Unit**

### Centralized Incineration

- Treatment in a centralized Rotary Kiln Incinerator with good emissions management system, situate in a Tertiary or big secondary healthcare facility (or run by a private waste management firm/Public-Private partnership arrangement) in the region; with HCW collection by a HCWM contractor or public collection system in the opinion of the Consultant, would be the ideal option for the management of HCW from primary and secondary healthcare facilities in Nigeria. This approach would reduce health

and environmental pollution risks that would arise from several inefficiently managed and run incinerators or burning pits/burials pits. The major drawback of this approach is that it will take some time to put in place, is expensive to set-up, and will require a transportation infrastructure that is well organized. But once the initial problems associated with setting up the system are overcome, it should run smoothly, especially if a public-private arrangement for the management of the incinerator is achieved

## Waste Treatment in Secondary Healthcare Facilities:

### Treatment in a Centralized Incinerator

- As with primary healthcare facilities above, sending the HCW from a secondary healthcare facility for treatment in a centralized dual chamber, semi-pyrolytic (preferably a rotary kiln) incinerator, operating at temperatures above 1000°C in the primary chamber and 1200°C in the secondary chamber and incorporating a good emissions management system, situate in a Tertiary or big secondary healthcare facility (or run by a private waste management firm/Public-Private partnership arrangement) in the region would be the ideal option.

The advantages in choosing off-site centralized HCW treatment solutions are:

- financial:** greater cost-effectiveness can be achieved in larger units unless the running costs for waste collection and transportation remain too expensive;
- technical:** efficient operation and maintenance of units is easier to ensure in a centralized facility than in several plants where financial and human resources may not be readily available;
- legal compliance:** conformance to environmental norms are easier to achieve, thanks to the use of more sophisticated/ expensive technology and by the reduced number of facilities that need to be monitored by environmental surveillance authorities.

### Treatment in an On-site Incinerator

- Waste treatment in an on-site, high temperature, dual chamber, semi-pyrolytic incinerator– (which operate at temperatures of over 800°C in the primary chamber, and 1000°C in the secondary chamber), with a good emissions management system is recommended for larger secondary healthcare facilities that is in a region where there is no secondary or tertiary healthcare facility with a good quality incinerator installed. This incinerator should be used to manage HCW from other healthcare facilities in the region, especially by utilizing specialized private HCW managers for waste collection, and whose standards of operation would be supervised by the relevant environmental regulatory authorities.

*Note: An Environmental & Social Impact Assessment (ESIA) would be carried out prior to the installation of incinerators in line with the existing laws in Nigeria and World Bank safeguards Policies.*

### Treatment in a De-Montfort WDU

- As with the primary healthcare facilities, burning in low temperature incinerators, such as a well-designed, constructed and managed-**Montfort Waste Disposal Unit (DWDU)** –would be satisfactory. However, as noted above, this option is not satisfactory environmentally, and should only be considered a short-term solution to HCW treatment in a secondary healthcare facility.

### Treatment in a Burial Pit

- Burying of the HCW in specially constructed pits (lined with impermeable materials such as clay) as described above for treatment of HCW in primary healthcare facilities would be acceptable for use in secondary healthcare facilities where incinerators are unavailable.

**f) Final Disposal of HCW**

To fulfil Best Environmental Practices (BEP), an Environmental and Social Impact Assessment (ESIA) will precede commencement of any civil works aimed at installation of incinerators in both primary and secondary healthcare facilities.

**g) Disposal Procedural Steps**

- Provide secured appropriately lined pits for final disposal of incineration ash.
- Transportation of incineration ash and non-hazardous and treated hazardous waste (that has been rendered non-infectious) to engineered designated (sanitary) land fill sites.

## **APPENDIX 2: REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR SAFE HCW MANAGEMENT**

Waste Handlers and Incinerator operators should always have adequate personal protective equipment (PPE). PPE must be worn at all times when working with health care waste. It is important that the PPE is properly maintained and kept clean; it should not be taken home; and must remain at the health facility to avoid possible spread of infection to the community.

### **Standard PPE generally includes:**

- **Gloves:** Always wear gloves when handling health care waste. Puncture-resistant gloves should be used when handling sharps containers or bags with unknown contents. Heat-resistant gloves should be worn when operating an incinerator
- **Boots:** Safety boots or leather shoes provide extra protection to the feet from injury by sharps or heavy items that may accidentally fall. Boots must be kept clean.
- **Overalls:** Overalls should be worn at all times.
- **Goggles:** Clear, heat-resistant goggles can protect the eyes from accidental splashes or other injury.
- Mouth respirators
- **Helmet (for incinerator operators):** Helmets protect the head from injury and should be worn at all times during the incineration process.

### **Health Worker Safety Measures**

#### **Hand hygiene**

Running Water and soap should be available to ensure clean hands after handling HCW. Hand washing is one of the oldest, most well-known methods of preventing disease transmission. HCW handlers and incinerator operators should always wash their hands after handling HCW.

#### **Medical examinations**

Healthcare waste handlers and incinerator operators should be medically examined prior to initial employment and undergo regular medical examinations every 6 months. They should also be immunized for Tetanus and Hepatitis B Virus.



### APPENDIX 3: GUIDELINES FOR THE DISPOSAL OF HEALTH CARE WASTE BY PIT BURIAL

#### Introduction

The recommended method for HCW disposal in the primary and secondary healthcare facilities at present is the use of burial pits. This option has been chosen because of the need to act quickly in managing the critical negative impacts which the very poor management of HCW in Nigeria is having on the environment and the human population. To wait till other technology options that are more environmentally sound are available would delay the implementation of the project, and needlessly expose the HCW workers to deleterious health impacts.

#### NOTE:

**If HCW are not buried properly, wild animals, dogs, or birds could exhume them and help spread diseases. Partially decayed HCW are unsightly, attract rodents, smell and are a breeding spot for flies.**

All healthcare facilities generate some quantity of hazardous wastes which need to be treated in an environmentally sound manner.

It is important to note that adequate expertise is required for proper disposal of such wastes with consideration to mitigate to the lowest levels the negative environmental and possible human impacts.

Necessary standard operating procedures for pit burial of HCW are described below, with the aim of giving HCWM personnel a hands-on approach to safe disposal of hazardous healthcare wastes.

#### *Factors to consider*

##### A) Ground Water Contamination Concerns

Burial of hazardous HCW in areas susceptible to ground water contamination could result in adverse effects in nearby wells, boreholes and streams. The potential for ground water contamination and subsequent water contamination of other sources is a function of the soil type, bedrock depth, and ground water depth

##### Soil Type

Coarse soils may increase ground water contamination risks because they allow rapid movement of liquids away from the burial site with minimal filtration or treatment.

##### Bedrock Depth

Open fractures in bedrock permit rapid movement of contaminated water with minimal filtration or treatment. Shallow bedrock is therefore a concern.

##### Ground Water Depth

The zone above the ground water table up to the soil surface is effective in destroying some biological contaminants. However, this zone is minimal in areas where the water table is high. Depending on the combination of these three features, the ground water contamination potential could change.

A specified method of determining the potential for ground water contamination at the burial site area will be adopted. It indicates how to determine if the ground water contamination potential is:

High

Low

Moderate

Very Low

Note: Avoid areas of thin soil cover over a bedrock layer.

##### B) Surface Water Contamination Concerns

Improper burial of hazardous HCW can also result in surface water contamination, affecting the water quality draining into watercourses, open-top catch basins and ponds. Some land, have a higher potential for surface water contamination because of the topography and soil type.

### Topography

Hilly land is of more concern than flat land, since it promotes more rapid surface water runoff during spring runoff or heavy rainfall.

### Soil Type

Since they promote more rapid runoff, heavier soils such as clay are of more concern than lighter soils such as sand. Unfortunately, the best soil condition to reduce ground contamination (a fine-grained, heavy soil like clay) also helps promote rapid runoff that can contribute to surface water contamination. In most cases, the optimum burial site is one that is relatively level.

### Site Selection

Important considerations for burial site selection include the following.

**Access:** Access is needed for the equipment to dig the burial pit There should be sufficient space for the temporary storage of overburden.

**Environment:** Selection should take into account;

Distance to watercourses, boreholes and wells.

The height of the water table.

Proximity to buildings, especially houses and surrounding farms.

Proximity to neighbours or public lands, including roads.

The slope of the land and drainage to and from the pit.

The permeability of the soil.

The direction of the prevailing wind (to manage odour).

Consideration may need to be given to the lining of pits and the treatment of leachate and gas, depending on soil type, location, and volume of material to be buried.

**Construction.** Soils should be stable enough to withstand the weight of equipment used to construct and fill the pit. If necessary, surface run-off should be prevented from entering the pit by the construction of diversion banks. Similar banks should be constructed to prevent any liquids escaping from the burial site.

**Fencing:** It is very necessary to fence-in the burial pit to exclude animals and people.

### Land suitability for Burial of HCW

To check the suitability of land for the burial of HCW, consult soil and topographic maps, and dig test holes in the area to see how close the ground water is to the soil surface. Soil auger probes are available in extendable lengths that allow simple depth investigations up to 3 m (10ft.).

Do not bury HCW on hilly land, because the soil covering the HCW could wash out during rainstorms, and surface water could become contaminated. Keep burial sites on relatively flat land.

### Sizing the Burial pit

#### Burial Depth and Cover

Dig the burial hole to a depth of about 1.2-2.0 m deep (4 - 6.5 ft.) below the original ground level. Width of the pit should be determined by the quantity of wastes generated by the facility.

Note : Deeper holes are more difficult to dig, particularly if the inside slopes are quite steep; shallower holes would not permit at least 0.6 m (2 ft.) of soil cover; and wider and longer holes could take an unacceptably long time to fill before moving on to another site.

Place HCW in pit and cover completely with soil cover. When the pit is filled to a depth of about 1ft to the surface it should be covered with a minimum of 0.6 m (2 ft.) of soil, [including soil crowned up over the hole about 0.3 m (1 ft.)]. This mounding helps prevent scavenging animals from exhuming the HCW, allows for settling and helps shed surface water.

Note: Several small burial sites that are spread out are better than fewer, larger sites.

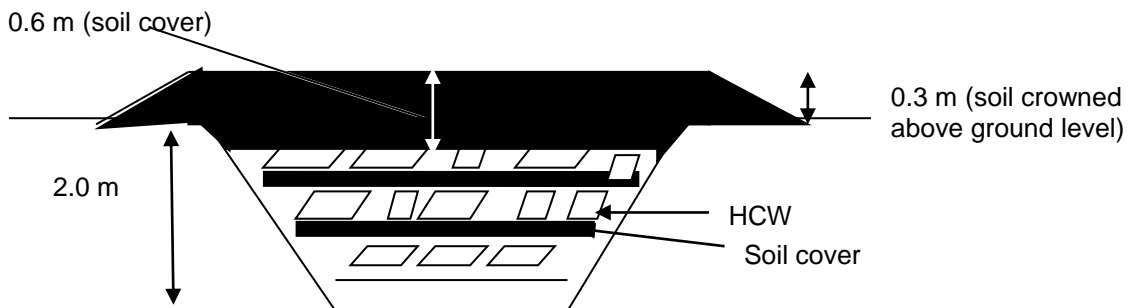
#### Distances from Burial Sites to Water Sources

Maintain the separation distances from burial sites to open-top catch-basins, or natural watercourses to at least 50 m (165 ft.), provided the burial sites are on relatively flat land under.

Keep burial sites at least 15 m (50 ft.) from ground drainage systems and gutters.

As a guideline, don't bury HCW any closer than about 15 m (50 ft.) from all property lines, and 100 m (330 ft.) from neighbouring homes. Keep HCW and burial sites out of view, if possible.

#### Digging a Proper HCW Burial pit



Note: To overcome the Health and Safety issues associated with vertically or straight-sided pits (such as collapsing walls), and environmental concerns about uncontained leachate, it is good practice to use pits with outwardly sloping sides (as shown above) to prevent collapse and allow for impervious liners to contain leachate. There must also be enough cover to prevent waste from surfacing.

#### Pit Management Guidelines

To prevent problems,

cover the HCW with 0.12 m (4 in.) of soil between burial intervals, then cap the hole with a 13 mm (1/2 in.) thick 1.2 x 2.4 m (4 ft. x 8 ft.) piece of plywood, or equivalent, that is secured on the top edges with soil.

Install a bright flag warning of the pit location.

Problems with pit burial include rainwater accumulating in the pit between burials, and safety concerns with slumping inside slopes since they are usually steep.

#### Record Keeping

Keep records of the burial sites to avoid digging the same location again too soon

Important information to record for each site is:

exact location in relation to some fixed point

date of pit usage and closure

#### Essential Considerations

## Personnel Safety

Safety of personnel is an overriding consideration. Aspects to consider include;

The hygiene of the personnel working on the site (especially the availability of hand-wash materials). Suitable Personal Protective Equipment (PPE) especially for coverall, boots, gloves and dust protection.

Before the use construction and operation of the Burial Pits, personnel should be properly trained and briefed.

## Leachate production

Leachate is the liquid that is released during the decomposition of wastes. This can be managed by the use of an impervious layer to cover the base and sides of the pit during construction. Impervious materials could be clay soil or plastic material lining.

## Site inspection and monitoring

Regular inspection of the burial pit site after closure is recommended so that appropriate action can be taken in the event of seepage or other problems. The objective is to return the site to its original condition.

Advice for an ongoing environmental monitoring program of burial sites and the water table will need to be obtained from the Environmental Management Plan (EMP) consultant.

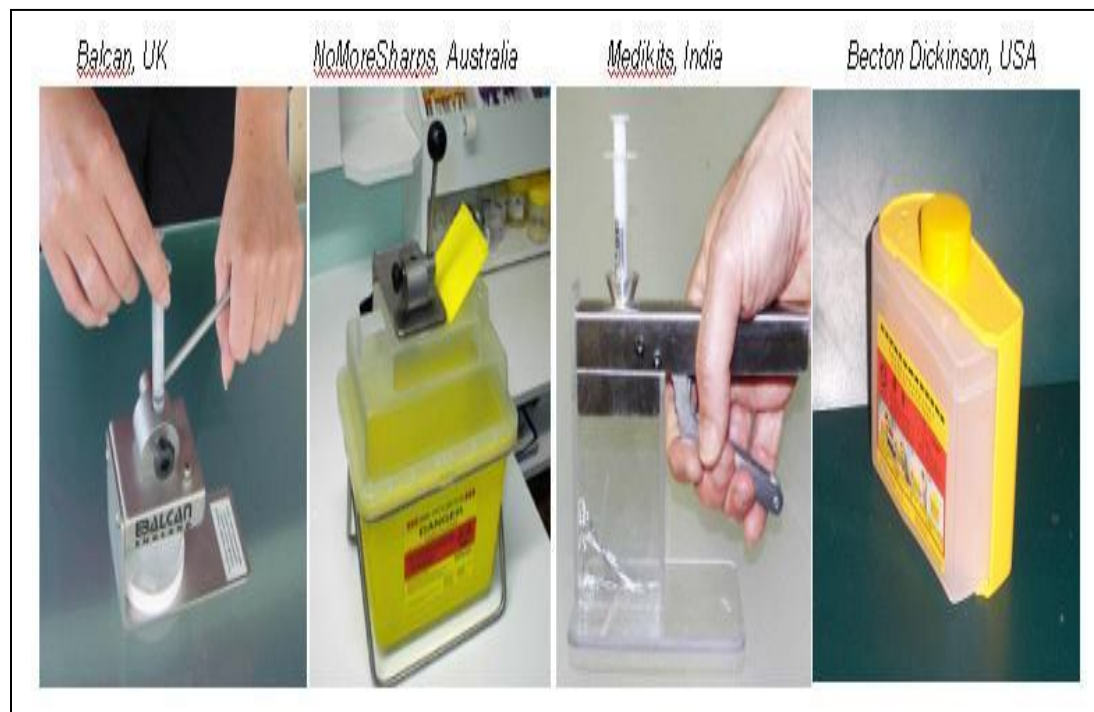
## APPENDIX 4: OPTIONS FOR TREATMENT OF “SHARPS” HCW FOR BHCPFP

### *Disinfection of syringes with bleach*

Household bleach can be used to disinfect sharps and other wastes at an appropriate concentration (0.5% chlorine solution). Disinfection is aimed at reducing the pathogenicity of infectious health-care wastes. Disinfecting procedures must be followed carefully to be effective. Disinfection only serves to reduce the risk from accidental exposure to sharps prior to treatment or disposal and can serve as a pre-treatment prior to employing subsequent treatment technologies, e.g. sending to a centralized incinerator or burial in pits.

### *Needle remover*

The used needle is inserted into a device, which cuts or pulls the needle off from the syringe. Various designs available are shown in the figure below. The devices are inexpensive and can be made locally. Removal of needles from used syringes with needle removers can render them unfit for reuse and safe for disposal after disinfection. Subsequently the plastic syringes can be disinfected and sent to a centralized incinerator for further actions.



### *Encapsulation*

Encapsulation involves filling containers with waste, adding an immobilizing material (plastic foam, bituminous sand, cement mortar, or clay) and sealing the containers. After the medium has dried, the containers are sealed and disposed of in a landfill. The main advantage of the process is that it is very effective in reducing the risk of scavengers gaining access to the hazardous health-care waste. Encapsulation of sharps however, be envisaged in temporary settings, such as camps, or mass campaign, and provided that raw materials are available. Encapsulation of used sharps is generally not practiced and not a long-term solution. The sharps can then be incinerated at the centralized pit.

## **Procedure for “Sharps” Disposal**

The recommended methods of managing HCW in primary and secondary health facilities have been presented in the main body of this report.

The following technology options are recommended for the disposal of “Sharps”:

### **Use of Centralized Incineration**

Incineration presents a good option for good disposal and destruction of sharps-wastes. However, concerns such as availability of technical knowhow, maintenance, environmental pollution, etc should be considered. Incineration has the potential for toxic emissions, particularly if the waste stream is not regulated, as is usually the case if the equipment is not properly operated and maintained, and if the emissions management system is inadequate. Large-scale incinerators tend to pollute less than small-scale incinerators because the combustion temperature is higher and combustion efficiency (gas residence time) is better.

Rather than having an incinerator in several facilities, a centralized, large-scale health care waste incineration plant should be located in a tertiary or secondary healthcare facility in a region. Sharps wastes from healthcare facilities in the region are then transported to the incinerator site for incineration. The sharps should be transported in sharps boxes.

### **2. Pit Burial for Sharps**

Pits for sharps can be constructed in the facilities. The sides of the pits should be covered with a low permeability material, and fenced. The pit should be sealed with cement once it is three-quarters full or at least the last 50cm should be filled with compacted soil and the area identified with a red coloured flag. This approach is simple and adequate for health facilities that generate small amount of waste.

### **3. Cemented sharp pit**

Pit-well covered with a narrow access for sharps should be filled with cement once full.

